**Arizona Office**
738 N 5th Ave, Suite 200
Tucson, AZ 85705
tel: (520) 272-2454
fax: (208) 475-4702
email: cyndi@westernwatersheds.org
web site: www.westernwatersheds.org"

*Working to protect and restore*
*Western Watersheds and Wildlife*

September 26, 2024

Forest Service Southwest Region
ATTN: Objection Reviewing Officer, Regional Forester Machiko Martin
333 Broadway Blvd SE
Albuquerque, NM 87102

*Letter submitted via CARA:*
https://cara.fs2c.usda.gov/Public//CommentInput?Project=51887

**Re: Objection to the Gila National Forest Revised Land Management Plan Record of Decision and Final Environmental Impact Statement**

Dear Objection Reviewing Officer Martin:

The following Objection to the Gila National Forest Land Management Plan Record of Decision (ROD) and Final Environmental Impact Statement (FEIS) is submitted on behalf of the members of Western Watersheds Project (WWP) and WildEarth Guardians, whose members, supporters, staff and board are concerned with the management of our public lands. WWP and Guardians previously submitted comments for this project on April 27, 2018, May 29, 2018, and April 16, 2020. The legal notice for this decision was published on July 30, 2024 and this objection, filed September 26, 2024, is therefore timely.

This Objection is filed pursuant to, and in compliance with, 36 C.F.R. Part 219, Subparts A and B. All parties to this objection have filed timely, specific and substantive written comments in accordance with 36 C.F.R. 219.

As required by 36 C.F.R. § 219, Objectors provide the following information:

1. The name and contact information for the Objectors is listed below.
2. This Objection was written on behalf of Objectors by Cyndi Tuell whose signature and contact information are below.
3. Western Watersheds Project and WildEarth Guardians are the Objectors. Cyndi Tuell is the Lead Objector for purposes of communication regarding the Objection.

Cyndi Tuell
Western Watersheds Project
738 N. 5th Ave, Suite 206
Tucson, AZ 85705

4. The project that is subject to this Objection is "Gila National Forest Plan." The Responsible Official is Camille Howes, Forest Supervisor.
5. Objector submitted timely, specific, and substantive comments during the Public Comment Periods on April 27, 2018, May 29, 2018, and April 16, 2020. All points and issues raised in this objection refer to issues raised in those comment letters or new information.
6. In the following Statement of Reasons, Objector provides the specific reasons why the decision is being appealed and the specific changes or suggested remedies that he seeks, along with the related evidence and rationale on why the decision violates applicable laws and regulations.

## NOTICE OF OBJECTION

Pursuant to 36 C.F.R. § 218, Western Watersheds Project and WildEarth Guardians are filing an Objection regarding the Gila National Forest Land Management Plan.

## INTRODUCTION

WWP is a nonprofit organization dedicated to protecting and restoring western watersheds and wildlife through education, public policy initiatives, and legal advocacy. With over 5,000 members and supporters throughout the United States, WWP actively works to protect and improve upland and riparian areas, water quality, fisheries, wildlife, and other natural resources and ecological values. WWP's staff and members are concerned with the management of national forests and public lands throughout New Mexico, including the Gila National Forest. We work throughout the West, advocating for watersheds, wildlife, and ecological integrity. The ongoing plan revision process affects our interest in the health and integrity of the terrestrial and riparian environments found in the Gila National Forest. Our staff and members regularly visit the Gila National Forest and enjoy the outstanding wildlife, wilderness, and recreational values the Forest provides.

WildEarth Guardians (Guardians) is a nonprofit conservation organization whose mission is to protect and restore wildlife, wild places, wild rivers, and the health of the American West. Guardians has offices throughout the western United States, including New Mexico and Arizona, and has more than 206,700 members and supporters across the United States and the world. As an organization, Guardians seeks to ensure the Forest Service complies with all environmental laws during the Forest Plan revision process. It also has a demonstrated history of advocating for an ecologically and economically sustainable transportation system on the Gila National Forest, and protecting at-risk species.

WWP and Guardians are especially concerned with the impacts of livestock grazing on ecological integrity, wildlife, fisheries, and recreation. Across public lands and national forests in the West, grazing is ubiquitous, and it remains one of the primary commercial uses of the Forest. Too often, and as has occurred here, land managers do not adequately consider the environmental impacts of this widespread and highly extractive use; nor have federal land management agencies considered whether

the environmental costs of public lands grazing outweigh the relatively insignificant economic benefits.

We are also concerned that the Forest Plan and supporting analysis fail to sufficiently consider, analyze, or include forest plan components that provide for an ecologically and economically sustainable forest road system, thereby failing to meet planning rule requirements. Part of our concerns stem from a history of Congress failing to provide adequate road maintenance funding. This lack of funding Gila National Forest has resulted in a deferred maintenance backlog totaling $272,265,429 in the Gila National Forest. FEIS at 310. The lack of proper road maintenance is a significant issue affecting watershed conditions and viability for a range of species, particularly fish and riparian-dependent species. The Gila National Forest has yet to identify and implement a minimum road system and the Forest Plan lacks plan components that ensure it will do so over the life of the plan. It appears the agency remains confused about the Travel Management Rule's subpart A and B requirements and its intersection with 2012 National Forest Management Act (NFMA) Planning Rule.

However, after our careful review of the Land Management Plan, we do see things that we support. We recognize and appreciate that the Forest Plan included components to provide for a climate-resilient transportation system, and to better restore temporary roads after project completion, though the Forest Service still failed to adequately address several concerns we raised in our comments and dismissed recommendations to improve the proposed action and provide sufficient analysis. We appreciate the addition of the pinyon jay to the Species of Conservation Concern list and the prohibition on the conversion of grazing allotments from cattle to sheep or goat use, and the prohibition on the use of domestic sheep and goats to control non-native/invasive plants. We appreciate that several of our prior comments were taken into account when modifying Management Approaches related to livestock grazing, especially related to the public involvement in monitoring or public notification and husbandry practices. Finally, we appreciate the consideration of border wall impacts in the analysis.

Unfortunately, the Forest Service has still not adequately considered the environmental impacts of roads, motorized uses, and livestock grazing during this very important management plan revision process. Instead, the Forest Service has identified nearly the entire forest as available for livestock grazing for a period of time that is likely to span a generation, yet failed to analyze the impacts of this widespread commercial use of the forest. The Forest Service has chosen to defer the analysis of impacts caused by the road system and livestock authorizations forest-wide to some unidentified future time, has based its analysis on deeply flawed assumptions regarding the existing road system, its ability to manage livestock, has refused to consider recommended alternatives that would fit the purpose and need for the project, has used an inappropriate baseline, failed to use the best available science, has inadequately considered the long-term impacts to bighorn sheep and the Mexican gray wolf, and did not adequately address recommendations for specific changes to the language in the Plan's Desired Conditions, Management Approaches, Standards, Guidelines, and for Annual Operating Instructions.

Therefore, WWP and Guardians object to the Gila National Forest Plan for the following reasons:

## STATEMENT OF REASONS

*"The anticipated life of this forest plan spans what many in the scientific community are calling the last window of opportunity to make a difference in terms of the speed and degree of climate-driven changes and prepare for what is now some level of unavoidable change."*

Gila National Forest Land Management Plan, page 26.

The last Forest Plan was finalized in 1986, with revisions planned fifteen years into the future. Now, nearly 40 years later, we have the first Forest Plan revision since that 1986 plan was completed. It is clear that Forest Plans have a lifespan far beyond what was originally anticipated, making their impacts far more significant than expected. This unexpected longevity of the life of a Forest Plan makes it critically important that the plan properly protects the natural resources found within the Gila National Forest and properly analyzes the impacts from the many varied uses of the forest.

Below we identify several areas where we believe the Forest Service has fallen short of crafting a Forest Plan that can protect our shared natural resources for future generations.

### I. Impacts to Mexican gray wolf are inadequately addressed

***Raised in our prior comments: 4.16.2020 Coalition comments at 71-79; WWP 5.29.2018 comments, throughout; WWP 4.16.2020 throughout and at 6, 14, 18-19, 21, and 29.***

We remain concerned that the environmental analysis does not provide any economic analysis of the conflict between Mexican gray wolves and livestock grazing or even identify how many wolves have been killed as a direct result of livestock industry activities on federal public lands within the Gila National Forest.

The Forest Service's response, found in the FEIS Vol.2, at page A-131, at Comment 11, states the Forest Service believes this type of analysis is beyond the scope of the Forest Plan:

> Such an analysis is beyond the scope of the Gila National Forest plan. The purpose of the plan's environmental analysis is to evaluate the effects of plan direction and the differences between alternatives. We contribute to the recovery effort, but we do not manage it. The U.S. Fish and Wildlife Service manages the recovery effort. Information about the recovery program, including population information can be found on the U.S. Fish and Wildlife Service's website.

The Forest Service also refused to analyze impacts to prey species for Mexican gray wolves and claims the analysis of prey-base impacts is more appropriately conducted on a project level basis. (From FEIS Vol.2, page A-136-137.) However, we have evidence that the Forest Service *will not in fact conduct such analysis* at the project (or implementation) level either. Specifically, the Gila National Forest and Apache Sitgreaves National Forests completed an Environmental Analysis for fourteen livestock grazing allotments on the two forests, completed in 2019, known as the Stateline project, yet did not analyze the impacts of livestock grazing on wolves, and specifically did not look at the impacts of grazing on the prey base for wolves. *See* Exhibit #1, June 3, 2024 Appellate Opening Brief in *WWP v. Perdue*, 23-3872, appealing from *WWP v. USFS*, No. 4.21-cv-00020-SHR, pages 12-31.

Given that the Forest Service refuses to conduct the analysis of the impacts of livestock grazing on Mexican gray wolves at the Forest Planning level *and* at the project level, we recommend the Forest Service include Mexican gray wolves as a focal species. Indeed, the FEIS for this Forest Plan indicates Mexican gray wolves could be a focal species and the rationale for refusing to include it arbitrary and capricious.

*See* FEIS Vol.2, at A-184:

> A single focal species would fulfill the 2012 Planning Rule requirements (FSH 1909.12 chapter 30 section 32.13c). Focal species are selected based on their functional role in the ecosystem. To be effective, they should have relatively straightforward relationships between status and the ecological conditions managed for and not be impacted by other stressors. The status of focal species should provide information about the effectiveness of management actions, so it is also useful if those species can be linked to specific ecological conditions in areas where management actions occur with some frequency. Focal species should not be rare, cryptic, or otherwise difficult to monitor and abundant enough to measure change. There should not be factors, like hunting, off-forest land use, or disease, affecting the species' status that would mask a response to management activities.
>
> The Mexican spotted owl and northern goshawk will serve as focal species for the Gila National Forest because they rely on the vegetation communities that are likely to see the most vegetation management activities. The rationale for selecting these two focal species and their associated monitoring questions have also been revised based on response to comment (see appendix C to the final plan). The other species suggested by commenters were not selected because they would not fulfill the role of focal species as well as Mexican spotted owl and northern goshawk. We welcome any monitoring data on any species or guild that our partner agencies and organizations would be willing to share or to gather on our behalf.

Notably, Mexican gray wolves have a relatively straightforward relationship between their status and ecological conditions, are located in areas where management actions occur frequently (grazing authorizations occur nearly forest-wide on an annual basis), they are no longer rare, are not cryptic, and are quite easy to monitor given that nearly every wolf pack has at least one radio-collared adult in the pack. The location information for wolves is published online in a database that is publicly accessible.

Because the Forest Service has refused to analyze the impacts of livestock grazing on Mexican gray wolves and could have included Mexican gray wolves as a focal species but chose not to, we object.

## II. Grazing generally

***Raised in our prior comments: 4.16.2020 Coalition throughout; WWP 4.16.2020 throughout and at 8-9, 24; WWP 5.29.2018 throughout and at 5-6.***

### A. Use of undefined terms

We continue to notice that "traditional cultural use" is a phrase used in the discussion on livestock grazing. However, this phrase (or term) is not defined, and does not appear to be applied to any use other than livestock grazing. The use of the phrase "cultural heritage" is also applied to livestock grazing, but throughout the rest of the Land Management Plan, that phrase is applied to Mimbres and Mogollon culture and not to other resource extractive uses. Neither phrase is applied to mining or logging, despite the fact that logging and mining have been taking place on the forest for just as long as ranching.

We object to the use of the phrases "traditional cultural use" and "cultural heritage" as they are applied to livestock grazing or ranching. The use of these phrases without definitions and without consistent application is arbitrary and capricious and it appears to be an attempt by the Forest Service to romanticize a commercial use of the Gila National Forest and entrench this use as part of the "culture" of the region. Without more definition and consistent application of the phrases, they should be removed.

### B. Suitability

***Raised in our prior comments: 4.16.2020 Coalition throughout; WWP 4.16.2020 at 6, 8.***

As we stated in our prior comments, one of NFMA's most powerful provisions is its wildlife diversity mandate.[1] It requires that forest plans to "provide for a 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."[2] According to Wilkinson and Anderson's authoritative history of NFMA's development, the diversity provision was meant to require "Forest Service planners to treat the wildlife resource as a controlling, co-equal factor in forest management and, in particular, as a substantive limitation on timber production."[3] The revised Forest Plan evaluates suitability for just one use – timber, and ignores all other stressors on plants of conservation concern and plant community diversity including grazing, mining, road building, fire suppression, post-fire salvage logging, chaining, fuels reduction, mastication, intensive recreation, water diversions, inholding development, or infrastructure. While the Forest Service may not feel compelled to evaluate suitability for all of these uses, it *may* evaluate suitability and we specifically asked the Forest Service to evaluate suitability for livestock grazing. At the very least, the Forest Service could have, and should have, evaluated areas of the Gila National Forest that were unsuitable for livestock grazing. These areas could have included riparian areas, habitat (or even critical habitat or occupied habitat) for species such as the New Mexico meadow jumping mouse, heavily used recreational areas, areas that have recently undergone restoration efforts, etc.

The 2012 planning rule and this planning process provided the framework for addressing the legacy effects of livestock grazing damage to ecosystems, and an opportunity to eliminate grazing in areas where uses are simply incompatible or not suitable. Unfortunately, the Forest Service has failed to take advantage of this opportunity. Instead, the Forest Service refused to heed the best available

[1] *See generally* Courtney A. Schultz et al., 2013. Wildlife Conservation Planning Under the United States Forest Service's 2012 Planning Rule. J. Wildlife Mgmt. 71: 428-444.

[2] 16 U.S.C. 1604(g)(3)(B).

[3] Wilkinson, C.F., and H.M. Anderson. 1985. Land and Resource Planning In the National Forests. Oregon Law Review 64(1 & 2).

science or acknowledge the ongoing cumulative effects of grazing on riparian systems and obligate wildlife.

Despite the substantive legal requirements imposed by the 2012 rule on the Forest Service's traditional discretion under the Multiple Use and Sustained Yield Act, the Forest Service has not identified any areas as unsuitable for grazing. Even though there is no requirement that all uses be allowed in all areas, under this Forest Plan it appears that forest resources for grazing are likely to be available and suitable for use in every management area.

In response to our concerns, the Forest Service states:

> From FEIS Vol.2, page A-72:
>
> (3) Suitability of lands for livestock grazing is better addressed at the allotment level because suitability determinations in forest plans are a coarse analysis indicating a general compatibility with desired conditions. Because plans prepared under the 2012 Planning Rule have explicit desired conditions, a determination for whether an activity is suitable in a particular location is best conducted at the project level.

This response fails to address our concerns, fails to explain why a suitability determination for livestock grazing was not conducted, and fails to explain why not even one area of the Gila National Forest was found unsuitable for livestock grazing. The statement that this determination is better conducted at the project level provides no rationale for the Forest Service's choice to avoid this determination. This is an arbitrary and capricious decision that cannot stand. This is especially true because the Forest Service acknowledged that livestock grazing is a cause of tree density increases in at least four areas: Largo Mesa, Agua Fria, Pinos Altos, and Eagle Peak. (FEIS Vol.3, page 361 et seq.) The Forest Service also acknowledges that the impacts of livestock grazing can persist for decades (and perhaps centuries), as it has in the Rabbit Trap livestock exclosure area, which has not been legally grazed since the 1940s, but still shows evidence of livestock abuse, including gully erosion. FEIS Vol.3, page 360-361.

Furthermore, Forest Service decision-makers at the project level have stated that "[g]razing suitability is analyzed and determined at the forest plan level under the 1982 Planning Rule." 2019 Forest Service response to Stateline project grazing decision objection, page 5, attached as Exhibit #2. "[T]here is no requirement under NEPA or the forest plans that a suitability analysis be conducted at the project level." *Id*. Unfortunately, the 2012 Planning Rule also fails to include a requirement that suitability determinations for grazing are conducted. Thus, we are in a situation where the suitability determination for livestock grazing is extremely unlikely (and demonstratively unlikely) to ever occur at the Forest Planning or project level.

***Relief Requested:*** The Forest Plan must explain how continued grazing by non-native cattle is within the natural range of variability. We also request that riparian areas and (Riparian Management Zones) RMZs are managed foremost to maintain and restore wildlife, water, and ecological integrity, and that plan direction identifies the prohibition of domestic livestock from these ecologically sensitive areas. The Forest Service must commit to conducting livestock grazing suitability determinations on a forest-

wide basis by a time-certain or withdraw the FEIS while such a determination is made for this Forest Plan revision.

### C. Typo[4]

Finally, at page 193 of the FEIS, there is a typo or missing words. It may be an extra period between the words permit and consistent (underlined and bolded, below), or perhaps there are missing words, it is unclear:

> Permanent grazing management modifications that are consistent with the National Environmental Policy Act decision can be authorized through the term grazing **permit. consistent** with the National Environmental Policy Act decision.

## III. Impacts to bighorn sheep must be further addressed

As an initial matter, because the adoption of recommended wilderness areas included in Alternative 5 would benefit bighorn sheep, which inhabit the Lower San Francisco, Park Mountain, and Mogollon Box/Tadpole Ridge Wilderness Study Areas, we support the addition of these Wilderness Study Areas to existing Wilderness and encourage the Forest Service to include them and we object to the failure to include them.

***Raised in our prior comments: 4.16.2020 Coalition comments at 110; WWP 4.16.20 at 15-18.***

### A. We object to failure to include a guideline for protection of lambing season from prescribed fires

As we noted in our prior comments, the Forest Service must coordinate with the land and natural resource management planning processes of the state and local governments. Relative to bighorn sheep, the New Mexico State Wildlife Plan has recommendations related to scheduling controlled or prescribed burns to avoid impact to bighorn sheep during lambing season.

To advance the prioritized conservation actions of the New Mexico Comprehensive Wildlife Conservation Strategy, we object to the failure to include a guideline, and suggest such a guideline be added, to the Cliffs and Rocky Features section of the plan that avoids controlled burning in bighorn sheep habitat during bighorn sheep lambing season between mid-December and mid-February. While the likelihood of controlled burns being proposed specifically on cliffs or rocky features may below, prescribed fires could be proposed around such features that are habitat for bighorn sheep.

### B. We object to the failure to include a limitation on where special use permits for pack animals can be authorized

We appreciate that vegetation management (targeted grazing) by sheep or goats is now prohibited (Non-native Invasive Species Standard 6). While the Forest Plan does not ban pack goats, or associated special use permits, there are significant requirements that now have to be met to get a permit,

[4] We don't intend to "flyspeck" the Forest Plan or analysis, but as we did come across this typo in our review and it does appear to have some substantive words possibly missing, we included it.

including requiring the user to demonstrate goats have tested negative for pneumonia, and are up to date on vaccinations. Pack goat use can only occur outside of bighorn sheep occupied range with such an approved special use permit (Sustainable Recreation Standard 5).

However, an occupied range proscription is not sufficient to protect bighorn sheep, so the Forest Plan must further limit where such special uses can be authorized.

We recommend a prohibition on issuing pack permits within a 10-mile boundary of known bighorn sheep habitat and foray areas. The Forest Plan should include a special management area for bighorn sheep that would essentially incorporate a 10-mile buffer area around sheep habitat and foray areas to create a no pack animal (goat and sheep) zone.

### C. The Forest Plan is unclear as to the status of bighorn sheep[5]

Global conservation status ranks are assigned by NatureServe scientists or by a designated lead office in the NatureServe Network. NatureServe conservation status ranks are based on a scale of one to five, ranging from critically imperiled (1) to demonstrably secure (5). Status is also assessed and documented at three distinct geographic scales– global (G), national (N), and state/province (S). The conservation status of a species or ecosystem is designated by a number from 1 to 5, preceded by a letter reflecting the appropriate geographic scale of the assessment. (https://explorer.natureserve.org/AboutTheData/DataTypes/ConservationStatusCategories).

NatureServe identifies Bighorn Sheep (*Ovis canadensis*) as having a Global Conservation Status rank of G4 or "Apparently Secure", while it gives a State of New Mexico Subnational Conservation Status Rank of S1, or "Critically Imperiled". Lastly, intraspecific taxon or subspecies status are defined by NatureServe using a T designation. NatureServe identifies Rocky Mountain Bighorn Sheep (*Ovis canadensis canadensis)* as T4 (Apparently Secure) in New Mexico, while further identifying Mexicana Bighorn Sheep (*Ovis canadensis mexicana)* as T3 (Vulnerable) in New Mexico. (NatureServe, 2024; Accessed 9/23/24).

There is confusion when comparing taxa between Nature Serve and New Mexico Game and Fish (NMGF) and its BISON-M platform, as NMGF calls the *Mexicana* sub-species by the common name "Desert Bighorn sheep". The Nature Serve Platform uses "Desert Bighorn Sheep" for the sub-species *Ovis canadensis nelsoni*, which is not found in the state of New Mexico, with the exception of some possible range in the far northwest portion of the state, and not in the Gila National Forest. (New Mexico Game and Fish BISON-M, Accessed 9/18/24).

There is further confusion as the Gila Forest Plan Final Assessment Report (hereafter referred to as Assessment) notes Bighorn Sheep (*Ovis canadensis*) as G4/S1, but does not articulate the status of either sub-species as NatureServe does; in this case *O.c. canadensis* as T4, nor *O.c. mexicana* as T3. Rather the Assessment lumps both subspecies together. While the S1 subnational rank designation likely results from considering the T3 status of the *mexicana* subspecies, the Gila Forest Plan Final

[5] We are also submitting a separate objection for Species of Conservation Concern for bighorn sheep.

Assessment makes no distinction between the "Apparently Secure" (T4) *O.c. canadensis* subspecies and the "Vulnerable" (T3) *mexicana* sub-species, instead simply evaluating them as *Ovis canadensis.*

The NatureServe designation was used as Rationale for Consideration to determine whethera species should be designated a Species of Conservation Concern (SCC) (Assessment; p. 367-368). Results of the analysis led to Bighorn Sheep (*Ovis canadensis*) being evaluated for SCC status.

However, bighorn sheep were subsequently removed from SCC consideration due to the fact that "Population trends for Rocky Mountain bighorn sheep within the Gila National Forest were decreasing from 2004-2012, but have been on the increase since 2013 with a large jump in the San Francisco population in 2014.[6] This species is managed as a game species,[7] and as such are secure enough to be hunted." (Assessment; p. 383).

While both sub-species *O.c. canadensis* and *O.c. mexicana* are considered game species by NMGF, it is important to note that there are no NMGF management units for hunting of Desert Bighorn sheep *(O.c. mexicana)* in the Gila National Forest. While there are units for Rocky Mountain Bighorn sheep, the fact you cannot hunt Desert Bighorn sheep (*mexicana sub-species*) within the Gila National Forest points to their limited population within the Gila National Forest boundary.

For this reason, along with the issue of confusion over sub-species status between Nature Serve and NMGF, we object to Bighorn sheep not being designated a Species of Conservation Concern at this time and ask that a separate Species of Conservation Concern analysis be conducted for each of the two sub-species of Bighorn sheep *O.c. canadensis* and *O.c. mexicana*. Because *O.c. mexicana* is considered T3, has a small population within the Gila, cannot be hunted in the Gila, and is a key contributing factor for the S1 (Critically Endangered) status by Nature Serve, we ask that this subspecies be considered a Species of Conservation Concern.

Additionally, recreationists can alter the landscape use patterns and foraging efficiency of bighorn sheep populations, disturbing and displacing animals from optimal habitat areas. Neither the Species of Conservation Concern assessment or the EIS analyze the impacts to bighorn sheep by recreational users, including hikers, motorized users, and river rafters. How are existing trails impacting bighorn sheep lambing areas? Are popular river landings displacing wildlife in areas with limited water? Is increased motorized use likely to disturb bighorn sheep? Are additional standards necessary to prevent conflicts with recreational users? These questions were neither asked, nor answered in the EIS for the Forest Plan, a violation of NEPA that has resulted in a failure to adequately consider the impacts of the Forest Plan on bighorn sheep.

***Relief Requested:*** Bighorn sheep should be added to the Species of Conservation Concern list and the status of bighorn sheep should be clarified in the Forest Plan.

## IV. National Environmental Policy Act (NEPA) Violations

[6] NMDGF (New Mexico Department of Game and Fish). 2016b. State Wildlife Action Plan (Draft). New Mexico Department of Game and Fish. Santa Fe, New Mexico. 282 pp + appendices. Available online: http://www.wildlife.state.nm.us/conservation/state-wildlife-action-plan/

[7] NMDGF (New Mexico Department of Game and Fish). 2016c. 2016-2017 New Mexico Hunting Rules & Info. 137 pp. Available online: http://www.wildlife.state.nm.us/hunting/

***Raised in our prior comments: 4.16.2020 Coalition comments throughout; WWP 4.16.20 at 8-15.***

The Forest is violating the National Environmental Policy Act, 42 U.S.C. §4321 et seq. and its implementing regulations, 40 C.F.R. §1500 et seq., by making important grazing management decisions on allotments throughout the Forest without compliance with NEPA's environmental analysis requirements and by deferring all site-specific analysis to some to-be-completed-but-aspirational revision of the Forest's outdated Allotment Management Plans (AMPs).

We asked the Forest Service to identify grazing allotments with and without AMPs, including the dates the AMPs were issued, and a schedule to renew those AMPs. The Forest Service states, in the response to comments, that the question/issue is beyond the scope of the Forest Plan.

From the FEIS Vol.2, page A-126-127:

> This question is beyond the scope of the forest plan, is not a science-based question, and does not require supporting scientific literature. All allotments that have a signed National Environmental Policy Act decision are required to have an Allotment Management Plan. These plans contain the direction from the decision with additional detail as the decision-maker deems necessary. These plans are part of the permit. The permit is the instrument that authorizes the permittee to graze and implements the decision (FSH 2209.13 chapter 94). There is no schedule for renewal or revision of Allotment Management Plans. They are renewed or revised based on the need to reflect changed conditions and new information resulting from the most current allotment-level National Environmental Policy analysis and decision (FSH 2209.13 chapter 94). There are six allotments without a signed decision (see also response to comment 26 in this section of this appendix). These are the Redstone and Fort Bayard allotments on the Silver City District, and the Harden Cienega, Deep Creek, Copper Creek, and Apache Creek allotments on the Glenwood Ranger District. The Fort Bayard allotment is for administrative use for the Gila National Forest's pack and saddle stock. The Redstone allotment is vacant, with one pasture authorized for use by the permit holder on an adjacent allotment.

We disagree that this issue is beyond the scope. Knowing how many allotments have outdated AMPs and developing a schedule by which to revisit those AMPs is precisely within the scope of a Forest Plan. Disclosing this information and developing a schedule would not result in any on-the-ground decisions, but would provide guidance by which the Forest Service could ensure livestock grazing authorizations are not woefully outdated.

**A. The analysis of impacts has been indefinitely deferred**

***Raised in our prior comments: WWP 4.16.20 at 8-9. We also address this issue above at Section I, Impacts to Mexican gray wolf.***

WWP objects to the direction to continue to defer actual analysis of the impacts of authorizing livestock grazing, the dominant land use of the forest.

The Forest Service has illegally deferred the analysis of livestock grazing throughout the Forest and failed to use the best available science. WWP pointed out these violations in our prior comments and

these problems were not remedied by the revision of the EIS. Rather, the Forest Service has highlighted the historical use of the Forest for livestock grazing (while largely ignoring the devastating impacts that historical grazing has had on the land), focusing on the romantic notion of ranching families as a lifestyle choice despite the acknowledgment that this commercial activity is not economically viable ("While the ranch may produce little or even a negative operating income…[and] many of these operations may not be viable if unable to use public lands."

The Forest Service continues to refuse to analyze the impacts of livestock grazing as part of the Forest Plan Revision, instead deferring the analysis of impacts to a later date.

From FEIS Vol.2, page A-124:

> Under all alternatives analyzed in detail, there are multiple mechanisms to evaluate, review and adapt livestock grazing management to effectively conserve resources and respond to changing conditions. Furthermore, stocking decisions regarding the number of livestock and amount of grazing authorized for each allotment are considered as part of project-level analysis and beyond the scope of the forest plan and environmental analysis. 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. An explanation of the legal and policy framework livestock grazing is managed under has been added to the Livestock Grazing Background Information in the plan, and the Livestock Grazing Affected Environment in the FEIS.

**B. Assumptions used for the analysis of impacts are deeply flawed**

i) **Animal Unit Months (AUMs) are incorrectly calculated**

***Raised in our prior comments: WWP 4.16.2024 at 9.***

For calculating Animal Unit Months (AUMs), wherein the animal unit is defined as one mature cow and her nursing calf, the Forest Service should use the well-known that the average livestock weight, which is in excess of 1,300 pounds. Any calculations using the 1,000 pound cow per AUM should be revised to indicate 1.3 AUMs per cow.

ii) **Trespass/Unauthorized use**

***Raised in our prior comments: 4.16.2020 Coalition comments at 42, 58, 95, 164; WWP 4.16.20 at 5-9, 19, 29-30.***

The Forest Service continues to ignore the issue of trespass livestock. As we noted in our prior comments this assumption is completely baseless and in fact, contrary to known information, the Forest Service must revise the EIS to acknowledge and address the impacts of unauthorized grazing by permittees. In our prior comments we provided the government's own documentation of the inability of the Forest Service (and other land managers) to ensure livestock remain where they are authorized to be. We asked the Forest Service to disclose the level of unauthorized grazing that has occurred throughout the forest over the past 10 years, including incidents that were handled "informally," and

including willful and non-willful incidents. The cumulative impact of unauthorized livestock grazing was undisclosed in the Draft EIS and remains undisclosed in the Final EIS.

The Forest Service's response to our concerns is found at From FEIS Vol.2, page A-126:

> The effects of livestock grazing on upland vegetation communities, riparian and aquatic ecosystems, soils, watersheds, water quality and species are discussed in their respective sections of the FEIS. However, the effects analysis is limited to only those effects that are likely if plan direction is followed. Overgrazing and unauthorized or unmanaged grazing is not analyzed because it would not be compliant with the plan, and it is illegal. The purpose of the environmental analysis is to evaluate the effects of plan direction and the differences between plan alternatives, not to evaluate the effects of everything that could happen if plan direction is not followed.

While we realize non-compliance is not something the plan revision can address, it is something the Forest Service must accurately consider in its analysis and assumptions used for the analysis. The Forest Service must also adequately and accurately describe the impacts of trespass livestock on species such as the Mexican gray wolf, Chiricahua leopard frog, other aquatic and riparian species, and native plans. Here, we have an acknowledgment that trespass or unauthorized livestock are a well-known problem on Forest Service managed lands and therefore the Forest Service cannot make an assumption of compliance.

This deficiency and incorrect assumption must be corrected.

However, it is clear, from the Stateline project and subsequent litigation, that the Forest Service cannot be trusted to actually conduct this analysis at any point in the future.

Unfortunately, the Final EIS is the perfect example of the NEPA shell game whereby analysis is deferred from the larger planning document to yet to be conducted site-specific analysis. However, based on the level of NEPA analysis conducted on Forest Service allotments in the Gila National Forest, it is clear the agency has no intention of actually completing the site-specific analysis and will continue to permit the underlying activity in the meantime. This is a clear violation of law and must be remedied before a final decision is implemented. The problems with deferring any action to site-specific analysis are manifold given the tremendous impact livestock grazing has had on the ecological conditions of the Gila National Forest.

### iii) Monitoring

***Raised in our prior comments: 4.16.2020 Coalition comments at 119-122; and 4.16.2020 WWP at 6-8.***

Forest Plan monitoring tests assumptions, tracks changes, and measures management effectiveness and progress toward achieving and maintaining desired conditions and objectives. The plan monitoring program is included as Chapter 5 of the plan. It is important that monitoring is based on the best available scientific information, is reliable, and allows for comparisons across time.

In our review of the purpose, process and methods of rangeland monitoring we identified the agency's flawed reliance on the outdated Parker 3-step method. Our concern was that Forest Service staff had not actually conducted the necessary monitoring to determine rangeland health, that the methods used to analyze herbaceous vegetation were qualitative, and only based modeled changes in woody vegetation. We noted that the Parker 3-step method of monitoring should have resulted in a map of utilization, but such a map was not included in the draft or final EIS. We also raised concerns that the Parker 3-step method is heavily dependent on photo comparisons, yet no photos of allotments were included in the analysis either. We pointed out that the locations of the permanently marked transects that are necessary for the Parker 3-Step method were not identified and there was nothing publicly available on the website that showed a summary of field data, or the scoring process. Because of the lack of information, we noted that it was unclear which parts of the method, if any, were implemented.

We also noted that the environmental analysis lacked an explanation of how the current, and seemingly unused, ecological monitoring concepts were reconciled with the 1950s era Parker 3-step, which is based on Clementsian concepts of succession and evaluates conditions relative to what is best for livestock, not wildlife, raising concerns about the scientific basis for authorizing livestock use on the Gila National Forest.

Unfortunately, the Forest Service's response did not alleviate our concerns. While we understand the 2012 Planning Rule requires the use of readily available information, it appears the information on range monitoring *was* readily available, but not in a format the Forest Service preferred to use, and the Forest Service had never made good use of decades of collected data.

From FEIS Vol.2, at A-133:

> The range monitoring data generated by decades of using the Parker 3-Step was not in readily available format to be used for the assessment, which is where that data's utility would have been. The environmental analysis is future oriented. The planning team did not have the capacity or resources to compile and digitize the many boxes of monitoring records. Attempts were made to contract outside resources to do this work, but that effort proved impracticable. Instead, the assessment analyst for range reviewed National Environmental Policy Act analyses and conversed with District and Supervisor's Office staff to reach the conclusions documented in the assessment (Chapter 11: Multiple Uses and Their Economic Contributions page 510 and Chapter 19: Social, Economic, and Cultural Sustainability Integrated Risk page 723). The assessment concluded that range was generally in "fair" condition across the forest with stable to upward trends; however, the ability of the forest to provide forage for livestock was at risk of being un[sus]stainable due to higher densities of woody species, drought, climate change and market factors.
>
> While the relative merit of various monitoring protocols is beyond the scope of the forest plan, it is true that successional theory and our understanding of ecology have advanced considerably since the Parker 3-Step method was developed and implemented. The data are still useful for evaluating trends. Rangeland scientists recommend the Parker 3-Step method continue to be used in addition to newer methods until those data are sufficient to inform trend analysis (Ruyle and Dyess 2016). The transition is ongoing, as are data storage improvements.

*Literature Cited in Response:*
Ruyle, G. and J. Dyess. 2016. Rangeland Monitoring and the Parker 3-Step Method: Overview, Perspectives and Current Applications. University of Arizona College of Agriculture and Life Sciences Cooperative Extension. 14 pp.

From this response, it appears range condition was determined using Parker 3-Step Method data, even though the Forest Service acknowledged that method as outdated, and despite the fact the Forest Service did not have the data "readily available." It appears the Forest Service took a step further away from the already flawed Parker 3-Step Method data, based its range condition assessment on NEPA analyses that were not available to the public during the comment period for the Draft EIS associated with this Forest Plan, and essentially made a collective "best guess" about range condition as "generally in 'fair' condition" with a stable to upward trend. But the public cannot verify or vet this information. Then, despite the fact the Forest Service found that the ability of the forest to provide forage for livestock was "at risk of being un[sus]stainable due to higher densities of wood species, drought, climate change and market factors" (which are not identified), the Forest Service fails to identify any areas of the Forest that are unsuitable for livestock grazing.

The methodology and assumptions remain flawed and the Forest Service has made no effort to address the increasingly unsustainable livestock grazing authorizations on the Forest. For these reasons, we object.

**iv) Impacts from bovine fecal coliform (*E. coli*) contamination were not adequately addressed**

***Raised in our prior comments: 4.16.2020 Coalition comments at 21-23; WWP 4.16.2020 3-4.***

The Forest Service admits it has not conducted adequate monitoring for *E. coli* contamination in many streams caused by livestock authorizations. *See* FEIS Vol.2, page A-330. The Forest Service suggests that *E. coli* monitoring could be conducted regularly, but it is difficult to determine whether or not the contamination is from livestock. This is not true.

It is incorrect to state that determining the source of *E. coli* contamination is difficult. Microbial source tracking of *E. coli* DNA samples has been conducted within the Bureau of Land Management's San Pedro Riparian National Conservation Area in southern Arizona. The study was conducted by the University of Arizona and supported by the Arizona Department of Environmental Quality. The source of *E. coli* can be reliably identified as either human or bovine. This YouTube video, produced by a retired Arizona Department of Environmental Quality hydrologist, discusses the *E. coli* source characterization study for the Upper San Pedro River Watershed:
https://www.youtube.com/watch?v=dKXuB1V2Y2s&t=237s

We object to the failure to conduct and disclose monitoring for *E. coli* contamination because this information is necessary to make informed management decisions related to livestock management at the Forest Planning level, and because such testing is quite possible to conduct and trace to livestock.

**C. Lack of a Range of Alternatives**

We remain concerned about the lack of alternatives. From an alternative that would reduce the number of AUMs to a level at or below that which has been authorized for the last several decades, to a refusal to address the question of whether or not livestock grazing is even a suitable use of the Gila National Forest, to a refusal to include a livestock grazing permit retirement provision as part of the Forest Plan.

### i) Alternative That Reduced AUMs

***Raised in our prior comments: 4.16.2020 Coalition comments at 160, 169-174; WWP 4.16.20 at 12.***

The analysis of alternatives under the National Environmental Policy Act (NEPA) is the "heart" of an environmental impact statement (EIS).[8] The Forest Service must "[r]igorously explore and objectively evaluate all reasonable alternatives" to a proposed action.[9] "Without substantive, comparative environmental impact information regarding other possible courses of action, the ability of an EIS to inform agency deliberation and facilitate public involvement would be greatly degraded."[10] Consistent with NEPA's basic policy objective to protect the environment, this includes more environmentally protective alternatives.[11]

An agency risks a finding that it has violated NEPA if it considers only the no action alternative and its primary, preferred alternatives, and ignores action alternatives suggested in public comments.[12] Put simply, "[t]he existence of a viable but unexamined alternative renders an [EA] inadequate."[13]

In our prior comments we asked the Forest Service to analyze an alternative focused on heavily reducing ***or eliminating*** grazing and range infrastructure as a forest use, due to its impact on other forest uses and resources such as at-risk species and habitat, recreation, water resources, and climate change. We also asked the Forest Service to consider eliminating livestock grazing from fragile riparian areas, reduce the number of AUMs by more than a few thousand forest-wide, and/or an alternative that would protect Forest resources from the deleterious impacts of livestock grazing. The Forest Service refused, providing a variety of excuses:

From FEIS Vol.2, page A-125:

> In chapter 2 of the DEIS, potential changes in AUMs were displayed in the Summary of Alternatives table. An increase in authorized grazing is not proposed under any alternative; they are an analysis indicator for comparing differences in expected forage production under each

[8] 40 C.F.R. § 1502.14.

[9] *Id.* § 1502.14(a); see also 42 U.S.C. § 4332(2)(E) (agencies must "study, develop and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources").

[10] *New Mexico ex rel. Richardson v. BLM*, 565 F.3d 683, 708 (10th Cir. 2009).

[11] 40 C.F.R. § 1500.2(e) (agencies must "[u]se the NEPA process to identify and assess reasonable alternatives to proposed actions that will avoid or minimize adverse effects of these actions upon the quality of the human environment").

[12] *See, e.g., Soda Mountain Wilderness Council v. Bureau of Land Management*, 534 Fed. Appx. 680 (9th Cir. 2013), on remand to, 2013 WL 4786242 (D. Or. 2013) (failure to consider alternative to timber sale that would not have required building new roads to access three units in the project area).

[13] *Western Watersheds Project v. Abbe*y, 719 F.3d 1035, 1050 (9th Cir. 2013).

alternative. We have clarified this in the FEIS by removing AUMs and all other analysis indicators from the Summary of Alternatives and including them in the new Summary of Effects section at the end of chapter 3 in the FEIS. Nevertheless, the estimated change in animal unit months is far from dramatic, ranging from a decline of 8 percent (alternative 1-no action) to a maximum increase of 4 percent (alternative 5).

In addition, the alternatives include a range of options on how to deal with vacant allotments that could increase or decrease grazing numbers. Based on all the above, a no grazing alternative was not considered necessary or legally compliant, as described in volume 1, chapter 2 of the FEIS (Alternatives and Alternative Elements Considered but Eliminated from Detailed Study). Eliminating grazing from riparian areas was also an alternative element considered but eliminated from detailed study and an explanation can be found in that same section of the FEIS. Commenters may also refer to comment 1 in the Riparian and Aquatic Ecosystems section of this appendix for more information. Outright elimination of grazing in wilderness would not be compliant with the Wilderness Act, ***which protects livestock grazing where it was established prior to wilderness designation.***

We recognize that livestock production may be easier in environments where water is not limiting and acknowledge the perspective that climate change may make livestock production unsustainable in some locations.

First, we strongly object to the idea that the Wilderness Act protects livestock grazing where it was established prior to wilderness designation. That is simply untrue. Livestock grazing within designated Wilderness areas is governed by the Wilderness Act and the Congressional Grazing Guidelines (PL 96-560, House Report 96-617, November 14, 1979). Section 4(d)(4)(2) of the Wilderness Act states that "the grazing of livestock where established prior to the effective date of this Act, *shall be permitted to continue subject to such reasonable regulations as are deemed necessary by the Secretary of Agriculture*," and the legislative history of the Wilderness Act make clear that grazing and associated activities are *permitted* to continue *when such grazing was established prior to* the Wilderness designation. This is *permissive*, not *protective.* While grazing may be allowed to continue within Wilderness areas, it may also be eliminated, especially where livestock grazing is impacting natural resources in violation of other laws and regulations, including the Endangered Species Act, the National Forest Management Act, Forest Plans, or the Clean Water Act. The Congressional Grazing Guidelines simply reiterate this fact: grazing cannot be curtailed simply because an area is Wilderness, but grazing can be curtailed within Wilderness act if land managers decide to do so. Range conditions and compliance with all land management regulations can determine whether or not livestock grazing can continue within Wilderness. Indeed, a Land Management Planning revision is an appropriate vehicle for changing livestock grazing authorizations within Wilderness areas, as indicated by slide 13 of this Forest Service presentation from March 9, 2006, by Russell D. Ward (District Ranger for the Silver City Ranger District) on grazing and Wilderness:
https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5335086.pdf

It is inappropriate, arbitrary, and capricious for the Forest Service to use the Wilderness Act as an excuse to refuse to consider an alternative that would reduce or eliminate livestock grazing within designated Wilderness areas.

### ii) Alternative That Provides for Grazing Permit Retirement

***Raised in our prior comments: 4.16.2020 Coalition comments at 78, 112; WWP 4.16.20 at 13, 23-26.***

We asked the Forest Service to include an objective for livestock grazing that would at least allow for the permanent retirement of vacant grazing allotments. From FEIS Vol.2, at A-149: "Annually consider at least 1 vacant or understocked allotment for permanent grazing retirement."

The Forest Service's response (*Id*.) was that our suggestion was "not appropriate for a plan objective under any of the alternatives analyzed in detail. Those National Environmental Policy Act processes, including proposals, alternatives, and decisions, are best addressed at the allotment level."

While the Forest Service says that this is a decision made at the District Ranger level, District Rangers don't believe they have the authority to accept a waiver back to the Forest Service nor the ability to permanently retire an allotment. If this authority were made explicit in the Forest Plan then the District Ranger would know, without any doubt, that they have the authority to protect natural resources through permanent allotment retirement. Indeed, when we have asked for grazing retirement provisions at the allotment or project level, we are often told that these provisions are not allowed at all. In response to a request for a voluntary permanent grazing retirement provision, the Apache-Sitgreaves National Forest responded:

> The responsibility and authority for management of National Forest System (NFS) lands is delegated to the Secretary of Agriculture and are non-delegable to private entities. Buyouts that include permanent allotment retirement would impose restrictions in the Forest Service's management prerogatives and would cause the Forest Service to relinquish future management options.

Eagle Creek Range NEPA Environmental Assessment, April 19, 2023, page 41.

The Forest Plan *is* the proper place to let agency decision-makers, permittees, and the public know that permits can be waived back to the agency for permanent resource protection. The option of permanent voluntary retirement of permits and associated grazing privileges represents an equitable solution to wildlife conflicts with agricultural operations on public lands. It provides security to livestock producers facing declining economic returns, increasing price instability, a shrinking available workforce, and other challenges, and allows the Forest Service to redesignate lands to other uses, including wildlife habitat, recreation, and hunting. The permit waiver system represents the increasing public interest in maintaining natural systems and restoring native species, and allows land managers to facilitate the win-win resolution of grazing conflicts which impact not only native species, but also water quality and the recreational experience of users. Allotments already vacated for resource protection, either through Forest Service actions or through the voluntary relinquishment of grazing preference (for example the Deep Creek allotment), must be closed.

We do appreciate that the Gila National Forest has at least developed and shared information about one possible avenue for grazing allotment closure (from FEIS Vol.2, at A-128):

> We acknowledge the commenter's opinions and preferences. Please refer to response to comment 1 in this section of the appendix regarding the no-grazing and no-grazing in riparian area alternatives. These

> rationales have been revised in the FEIS based on further review and stakeholder comment. Alternative 5 includes an adaptation of the suggestion for waiving permits (Livestock Grazing G6). It was adapted to be compliant with agency policy direction, which limits the amount of time a permit can be in non-use for resource protection. Entering nonuse for resource protection may indicate a need for change (FSM 2209.13 section 17.2) and trigger a new National Environmental Policy Act decision-making process to evaluate conditions and determine appropriate future uses. Under all circumstances, it is the allotment-specific National Environmental Policy Act process which determines future uses, not the forest plan. Allotment closure is a viable alternative and decision at that level. A reduction in livestock numbers is better addressed at the allotment-level as well. A plan alternative arbitrarily reducing numbers forestwide would not be equitable, as conditions vary across the forest and from allotment to allotment

However, the Forest Plan includes an objective which would allow vacant allotments to be used as open allotments. This provision appears to make the Forest Service's decision to preclude an alternative that would allow for allotment *closure or retirement* arbitrary and capricious.

***See* FEIS Vol.2, A-160:**

> Guideline 6 and Management Approach (Vacant Allotments)
> "Vacant allotments should be considered for temporary use by holders of a current permit during times or events when their allotment(s) require growing season recovery time because of wildfire or other disturbance, or to minimize livestock and wildlife conflicts."

We note that Alternative 5 would maintain vacant allotments as vacant and unstocked until future NEPA process and it is unclear to us why there is no alternative that would allow for vacant allotments to be permanently closed.

The Forest Plan contains no requirement for any changes in grazing management to occur until site-specific Allotment Management Plans (AMPs) are created or revised, meaning the identified harms to the forest caused by livestock grazing will continue indefinitely. No alternatives propose any interim management prescriptions for livestock grazing even though the EIS is replete with references to current grazing practices responsible for conditions that are far below the past or now current desired conditions.

The assertion that there is no legal alternative to grazing public land is false. It is disturbing and frankly deeply chilling to see a public agency, which is formally tasked with managing public resources belonging to and intended for the benefit of everyone so completely captured and directed by a single, industrial use of citizen owned resources. There is ample legal precedent for permanent retirement of industrial grazing on some public land areas through NEPA analysis (reflecting the will of the citizen owners of the land) and any number of other administrative policy and regulation applications on many public lands. Examples of where livestock can be excluded or retirement may be applicable include, but are not limited to: designation of administrative areas, recreational areas, where mining may and may not occur, archaeological areas, bighorn sheep habitat, protection for species listed under the endangered species act.

***Relief Requested:*** We request the Forest Service select the part of Alternative 5 that would authorize the permanent retirement of grazing allotments that are requested for non-use for resource protection by the permittee.

### D. The Forest Service has perpetuated the myth of "sustainable grazing"

***Raised in our prior comments: 4.16.2020 Coalition comments at 164-171; WWP 4.16.20 at 4***

WWP and Guardians again ask the Forest Service to acknowledge that there is no way to conduct a sustainable and commercially viable livestock grazing operation in the arid southwest and to remove all references to "sustainable livestock grazing" in the Forest Plan. As we noted in our prior comments, public lands grazing operates at a profound financial public deficit (economically unsustainable), has converted and degraded entire landscapes (ecologically unsustainable), converts thousands of gallons of potable water into sewage every year (hydrologically unsustainable), produces greenhouse gasses at levels that exceed other forms of agriculture (climatically unsustainable), and results in a product that is demonstrably adverse to human health when ingested frequently or in high amounts (nutritionally unsustainable). Additionally, the reliance on removing top predators from the landscape as a way of making it safe for untended livestock is highly impactful on native wildlife species such as the coyote, cougar, and black bear.

Please note that if the Forest Service insists on maintaining this myth of "sustainable livestock grazing" and "sustainable rangelands" in the Forest Plan, WWP and other groups will work diligently to enforce the Forest Plan provisions which will then require livestock grazing is actually sustainable.

As we stated in our prior comments, the analysis in the EIS briefly discusses the long history of livestock grazing in the Gila National Forest, but fails to acknowledge the long-lasting negative impacts livestock grazing has had on the forest. There is no discussion of how livestock grazing has contributed to and continues to exacerbate altered fire regimes, invasive species, loss of species diversity, and degraded watersheds. Statements about the "benefits" of livestock grazing are extreme hyperbole: "aeration through hoof action" is actually destruction of soil crusts and structure that leads to erosion; "invasive plant control" is more accurately described as invasive plant distribution; "fine fuels reduction" is removal of forage for wildlife as well as removal of plant cover that prevents erosion.[14]

***Relief Requested:*** Remove all references to "sustainable livestock grazing."

### E. The Forest Service has not used or has obfuscated the best available science

***Raised in our prior comments: 4.16.2020 Coalition comments throughout and at 26, 39, 45, 76, and 98; and WWP 4.16.20 comments at 4, 8.***

In our prior comments we asked the Forest Service to use the best available scientific information, as required by 36 C.F.R. § 219.3, to determine which areas of the Forest are suitable for livestock grazing, and which are not. 36 C.F.R. § 219.7(e)(1)(v). Unfortunately, the EIS fails to adequately

[14] FEIS Vol. 1 at 197.

address this issue as well as the capability of Forest Service lands to provide forage for livestock. This is a primary example of a clear and direct failure of the Forest to apply the best available scientific information that must be remedied before the release of a final decision.

### F. The EIS fails to take a hard look at the road system and its effects under the alternatives

***Raised in our prior comments: 4.16.2020 Coalition at 142-145, 199-220.***

We raised a number of concerns in our prior comments urging the Forest Service to address significant inadequacies in its analysis. These and additional concerns persist in the FEIS. For example, we asked that the FEIS disclose how system and unauthorized roads affect inventoried roadless area characteristics. This is especially important given the allowance for existing roads to persist within these areas, and the agency's disclosure that "Existing open roads would continue to be managed consistent with their maintenance level and no new permanent roads would be constructed." FEIS at 367. Given the Forest Service intends to retain existing roads, both system and non-system, and that it failed to disclose the miles of those existing roads within each IRA or how such roads affect its roadless character, the Forest Service cannot reasonably state the Revised Plan maintains roadless character. Moreso, closed roads often are subject to unauthorized motorized use and therefore they must be considered, especially if they have an ineffective closure device or remain passable by a motor vehicle.

Our comments also raised concerns about the watershed analysis, specifically failing to include each attribute for the Watershed Conditions Framework's Road & Trail indicator. Here the agency failed to consider mass wasting, even while the analysis explained "... in steep watersheds, where geological erosion rates are already high and soils are naturally unstable, even low-severity fire can accelerate water, nutrient and sediment delivery to streams." FEIS at 153. Further, we acknowledge that "[b]etween 64 and 67 percent of subwatersheds are functioning properly with respect to road density and proximity to water," (FEIS at 312), but this does little to explain each subbasin's rankings or how the Carrizo Wash subbasin is the only one with a Road/Trail Indicator score with a 60 percent functioning properly. In fact, out of 11 subbasins, the analysis shows 8 of them are under 25 percent, two of which are at zero percent. The analysis fails to disclose the actual attribute scores, or provide a list of subwatersheds that have impaired or functioning at risk rankings with respect to road density or proximity to water. When responding to our comments, the Forest Service acknowledges the importance of the three attributes it considered and the outsized influence from the lack of maintenance capacity:

> We agree that road density, proximity to water, and road maintenance are all consequential attributes of the Watershed Conditions Classification's roads indicator. This paragraph [referencing our excerpt from the Assessment] does not state that road density or proximity to water are more, or less, consequential than road maintenance. It states that road maintenance is more often the case of impairment, on the Gila National Forest, than density or proximity to water. Thus, road maintenance is more frequently a concern.

FEIS Vol. 2 A-238. While we readily acknowledge that the lack of adequate road maintenance is the largest factor contributing to low indicator scores, the agency has little control over the amount of funds Congress provides, and therefore must provide a Revised Plan that will improve the other attribute rankings, including by reducing road densities particularly where the attribute ranking is listed as "poor." However, the Forest Service does not disclose those rankings or provide the actual road densities as we requested. Rather, the agency states in its response to our comments that "[t]he level of analysis the commenters would like to see can be found in the FEIS supporting the 2014 travel management decision (USDA FS 2014b)." The response is inadequate for a few central reasons. First, the 2014 travel management FEIS (hereafter, "TMP FEIS") is 10 years old and the WCF analysis is even older: "The condition classification of each 6th-code watershed is considered a result of cumulative watershed effects up to 2011." TMP FEIS at 196. Next, the analysis discloses that of the 202 6th-code watersheds that intersect the forest only 180 watersheds were assessed for Watershed Condition Classification, with the overall findings that 98 classified as "functioning properly," 81 classified as "Functioning at Risk" and 1 classified as "Impaired Function." TMP FEIS at 193, Table 50. In other words, the Road and Trail Indicator scores were not listed, let alone the road density attribute rankings. It appears the Forest Service is relying on incomplete and outdated information to assert that the Revised Plan analysis need not take a hard look at its road densities.

Furthermore, when looking at the 2014 TMP FEIS, we found the following table:

**Table 19. Existing Gila NFS road miles by operational maintenance level and general description**

| Operational maintenance level (OML) | Miles |
|---|---|
| 1 - Intermittent service roads during the time they are closed to vehicular traffic | 530.9 |
| 2 - Roads open for use by high-clearance vehicles | 4,196.7 |
| 3 - Roads open and maintained for travel by prudent drivers in standard passenger cars | 261.6 |
| 4 - Roads that provide a moderate degree of user comfort and convenience at moderate travel speeds | 130.7 |
| 5 - Roads that provide a high degree of user comfort and convenience | 24.2 |
| Total miles | 5,144.1 |
| Miles open to motor vehicle use (OML 2–5) | 4,613.2 |

2014 TMP FEIS at 48. This is notable because the Revised Plan FEIS failed to include OML 1 roads entirely and provided the following:

**Table 66. Miles (and percentage) of Gila National Forest roads by maintenance level (ML)**

| ML2 | ML3 | ML4 | ML5 | Total |
|---|---|---|---|---|
| 2,932 (88%) | 251 (8%) | 129 (4%) | 22 (<1%) | 3,334 (100%) |

FEIS at 310. Here, the Forest Service fails to disclose the amount of ML 1 roads in its analysis and omits any discussion about how the road system has changed since the 2014 TMP ROD, which is particularly important for ML 2 roads which shows a reduction of 1,264.7 miles. But were all of these road reductions through physical decommissioning or administrative closure? How has the agency ensured closed roads are not subject to unauthorized use? The Revised Plan FEIS provides no answers. In fact, one has to look at the Revised Plan itself to learn the following:

> The forest's most current motor vehicle use map (2023) shows approximately 3,330 miles of National Forest System roads open for motorized use by the public. An additional 330 miles of routes are designated for administrative use or by written authorization only, and approximately 910 miles are closed.

Revised Plan at 211. Adding these numbers together totals approximately 4,564 miles of system roads, and we expect there are unauthorized roads the agency fails to disclose or consider in its analysis. Put another way, since the 2014 Travel Management Plan decision, the Gila National Forest has reduced its road system by approximately 49 miles over 10 years. It is unclear how this small reduction has helped achieve the identified minimum road system since the Revised Plan FEIS lacks any mention of the agency's requirements under subpart A of the Travel Management Rule. 36 CFR 212.5(b)

Further, the Revised Plan analysis still explains it cannot maintain the current road system:

> The forest is completing basic custodial maintenance such as grading the road surface, maintaining ditch lines, select sign replacement, and minor brushing of roadside vegetation on approximately 300 miles, or roughly 9 percent of the total open road miles on an annual basis; approximately 75 percent of miles maintained are maintenance level 3, 4, and 5 roads. The remaining 25 percent are maintenance level 2 roads.

FEIS at 309. Again, we are sympathetic to the lack of maintenance capacity, and at the same time we recognize there are significant environmental consequences from having a deferred maintenance backlog totaling $272,265,429. FEIS at 310. Those consequences were not adequately addressed in the Revised Plan's analysis.

***Relief Requested*:** Supplement the FEIS with sufficient analysis to address these and other shortcomings we discussed in our comments, including more detailed discussion of the Watershed Condition Framework's Road and Trail Indicator and each attribute ranking for all subwatersheds

across the Gila National Forest, especially road densities. This, in addition to, disclosing the miles and types of roads with Inventoried Roadless Areas, and how they affect roadless characteristics.

## V. Forest plan components for roads infrastructure fail to comply with the 2012 Planning Rule and Forest Service Directives

***Raised in our prior comments: 4.16.2020 Coalition throughout and at 142-145, 166, 199-225.***

Our comments explained the substantive requirements of the 2012 Planning Rule, the implementing Forest Service Directives, and how the Forest Service must comprehensively address the road system in its plan revision. We explained that 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, necessitates that the Forest Service satisfy the rule's substantive requirements by providing sufficient management direction for transportation infrastructure. As described in our comments, plans must provide standards and guidelines to maintain and restore ecological integrity, landscape connectivity, water quality, and species diversity. Those requirements simply cannot be met absent integrated plan components directed at making the road system considerably more sustainable and resilient, especially given changing climate conditions.

In response, the Forest Service explained the following:

> The final plan includes components to support future project-level decisions and that allow for management of designated roads (those included on the motor vehicle use map) and unneeded roads. Unneeded roads are decommissioned to reduce impacts to ecological resources and connectivity (Roads O1).
>
> --
>
> Roads DC6 was added to provide direction related to vulnerability assessments and a climate-resilient transportation system. We also added a guideline to the final plan requiring temporary roads to be restored to more natural vegetative conditions upon project completion.

FEIS Vol. 2 at A-238. We appreciate the Forest Service included the additional plan components, but these additions fail to address our comments or concerns as we explain below.

### A. Failure to include direction to identify and implement a minimum road system

***Raised in our prior comments: 4.16.2020 Coalition 199-200.***

Our comments explained the need for the Forest Service to address its unsustainable and deteriorating road system by ensuring the Revised Plan includes components to meet requirements under subpart A of the Travel Management Rule (TMR). We explained that the regulatory history of the Roads Rule makes clear that the Forest Service intended that forest plans would address Subpart A compliance. In response to comments on the proposed Roads Rule, the Forest Service stated:

> *The planning rule provides the overall framework for planning and management of the National Forest System. The road management rule and policy which are implemented through the planning process must adhere to the sustainability, collaboration, and science provisions of the planning rule. For example, under the road management policy, national forests and grasslands must complete an analysis of their existing road system and then incorporate the analysis into their land management planning process.*[15]

The Revised Plan fails to analyze its existing road system, precluding the agency from incorporating it in the land management planning process or providing specific plan components necessary to provide the overall framework for planning and management of the national forest road system. The Forest Service attempts to refute this in its response to comments:

> The Gila National Forest completed a travel analysis and plan in compliance with Subpart A of the Travel Management Rule with the decision signed in 2014 (USDA FS 2014a and 2014b). The travel analysis plan identified the minimum road system needed for safe and efficient travel and for administration, utilization, and protection of National Forest System lands (36 CFR 212.5(b)(1).

FEIS Vol. 2 at 238. As our comments explained, the Forest Service Washington Office issued direction clarifying that identification of the minimum road system must be completed through a NEPA-level analysis and decision, and that an internal pre-NEPA Travel Analysis Report is insufficient to demonstrate compliance with subpart A of the TMR. We further explained that while the Gila National Forest completed its travel analysis process in 2009, it did not identify the MRS in its 2014 travel management planning record of decision, instead focusing specifically on designating motorized roads and trails for public use. In fact, the Forest Service acknowledges that it did not consider meeting subpart A direction to identify an MRS that reflects long-term funding expectations by explaining the "[a]nalysis in the FEIS shows that none of the action alternatives identify a road system that can be fully maintained with current or projected funding levels." As such, the Forest Service cannot rely on its 2014 travel management plan decision to satisfy Subpart A requirements, especially because the supporting FEIS did not consider the entire road system, instead narrowing its focus to only changes to existing designations at the time of the analysis. Further, it is unreasonable for the agency to assert that results from an analysis completed in 2009 are still relevant and applicable for the Revised Plan decision some 14 years later. Moreso, WildEarth Guardians released a detailed report that illustrates the travel analysis process itself was often fundamentally flawed,[16] which supports our position, as we stated in our prior comments, that the Forest Service should include these additional Roads Objectives:

[15] 66 Fed. Reg. at 3209 (emphasis added).

[16] See "A Dilapidated Web of Roads - The USFS's Departure From a Sustainable Forest Road System_Jan 2021_WildEarth Guardians." Exhibit #3.

- Within 3 years of plan adoption, the forest shall identify its minimum road system and an implementation strategy for achieving that system that is consistent with forest plan direction and relevant regulatory requirements.
- Over the life of the plan, implement the minimum road system (pursuant to 36 C.F.R. § 212.5(b)).

The Forest Service response that it already identified the minimum road system is without basis, thus the one Roads Objective it did provide has no reasonable basis because the agency lacks an identified minimum road system:

> Roads Objective 1: "Decommission at least 50 miles of closed roads every 10-year period until the need has been met."

Revised Plan at 212. The Forest Service did not clarify precisely what need is being met. Is it to bring the road system into alignment with the projected maintenance budget? Is it to have minimal impacts to ecological and cultural resources? Is it to implement an undisclosed recommended minimum road system based on a 2009 Travel Analysis Report that was meant to only inform designating motorized use under subpart B of the TMR? Whatever the answers, the Revised Plan needs additional components as we indicated in our comments.

**B. Failure to provide direction that properly manages temporary roads**

We urge the Forest Service to provide consistent direction regarding the construction and removal of temporary roads. The Revised Plan includes the following Roads Guideline:

> 4. Construction of temporary roads in areas with desired recreation opportunity spectrum classifications of semi-primitive non-motorized should be avoided unless required by a valid permitted activity or management action. ***If authorized, roads should be constructed and maintained at the lowest maintenance level needed for the intended use and then obliterated or naturalized when the permitted activity or management action is completed.***

Revised Plan at 212 (emphasis added). We support direction to obliterate or naturalize temporary roads, if the latter means removing any engineered components. In other words, any temporary road removal must ensure there are no physical remnants that may be utilized in the future as a temporary road or added to the transportation system. We urge the Forest Service to clarify what is meant by "naturalize" or simply strike it to make clear that temporary roads should be obliterated. Further, the Forest Service is now authorizing projects for numerous years, sometimes 10, 15 and even 20 years or more, making "upon project completion" an unreasonable time frame to remove temporary roads. We urge the Forest Service to revise this guideline as follows:

4. Construction of temporary roads in areas with desired recreation opportunity spectrum classifications of semi-primitive non-motorized should be avoided unless required by a valid permitted activity or management action. If authorized, roads should be constructed and maintained at the lowest maintenance level needed for the intended use and then obliterated within 3 years after construction. ~~or naturalized when the permitted activity or management action is completed.~~

In addition, we urge the Forest Service to adopt this direction for other guidelines as well, particularly the following:

Roads Guideline

5. Temporary roads that support adaptation and restoration activities, fuels management, or other projects should be restored to more natural vegetative conditions upon project completion to assist in moving toward desired conditions for watersheds and habitats and to discourage illegal motorized use.

Revised Plan at 213. It is unclear why the Forest Service would direct temporary roads be obliterated or "naturalized" in Guideline #4 and not include the same direction for Guideline #5. Restoring temporary roads to a "more natural vegetative conditions" risks these roads persisting on the ground where they could be utilized in the future, which is essentially expanding a network of unauthorized roads. All temporary roads must be fully removed from the ground within a reasonable timeframe (3 yrs) if they are truly going to be temporary.

Such direction should also be added where road construction may occur in the Riparian Management Zone:

Riparian Management Zone Guideline

1. To minimize sediment delivery to streams, new construction or realignment of roads and motorized routes, recreation sites or other infrastructure should not be located within the 100-year floodplain or within 300 feet of a riparian management zone. Exceptions for stream crossings are made where determined necessary by site-specific analysis to reduce potential long-term investments in maintenance or adverse impacts (a downward trend or movement away from desired conditions) to floodplains and water resource features.

Revised Plan at 119. Given this is a guideline and there is a likely scenario where temporary road construction may occur within the RMZ because there is no standard prohibiting such activity, the Forest Service should clarify that any temporary roads constructed will be obliterated within 3 years after construction.

The same direction must also be included in the section directing management for plants, specifically the following:

Wildlife, Fish and Plants

2. Where there are known populations of rare and endemic plants, no new permanent roads or motorized trails will be constructed unless it is to provide legal access to private property. Temporary motorized routes that facilitate management activities are acceptable provided appropriate avoidance or mitigation measures are incorporated. ***Temporary motorized routes are closed when no longer needed.***

Revised Plan at 133 (emphasis added). Foremost, temporary roads are anything but temporary if they are simply closed. Not only are closure devices often circumvented or ignored, but the road template will persist on the ground long after they are "no longer needed." As written, this standard is woefully inadequate and must be revised to ensure they are obliterated after 3 years of their construction.

### C. The Forest Plan and FEIS does not consider or incorporate motorized route density standards

***Raised in our prior comments: 4.16.2020 Coalition at 74, 206-208, 214-215.***

Our comments urged the Forest Service to consider and adopt an alternative that establishes motorized route density standards, based on the long history of established science that demonstrates high road densities harm fish and wildlife species. There is little difference between a motorized trail and a road in its effects on sensitive, threatened and endangered species. In response, the Forest unreasonably, arbitrarily, and capriciously dismissed our request for such an alternative stating:

> This standard was considered, but not analyzed in detail because while road density measures may be useful condition indicators, they make poor management standards. This is because the effects of roads on habitat connectivity also depends, at least, on traffic volume, the species, and sometimes the sex of the species. Road density standards are also ineffective management standards for water quality because the effects of roads on watershed condition and water quality depend on many other factors, including road location and design features, maintenance, the size and topography of the watershed, and vegetative cover over the rest of the watershed.

FEIS at 17. Certainly, we agree that other road-related factors affect watershed conditions, water quality, and habitat connectivity. Yet, the Revised Plan lacks standards that address those other factors, and the agency does not provide a rationale as to why it couldn't include road density standards in addition to others that it listed in its response. In fact, road or motorized route density standards

provide clear direction that can be easily operationalized during project development and implementation. The assertion that other factors preclude their adoption in the Revised Plan is without merit and scientific studies show limiting road densities has a direct benefit to fish and wildlife habitat.[17]

And, although the 2009 Gila Travel Analysis Report needs a crucial update, it did include relevant and timeless rationales that support the benefits of motorized route density thresholds:

> The Forest considered that calculating road density by watershed as an appropriate method to display the scale of a road system in a watershed. Road density is used as an indicator of the system's general potential to impact water quality or modify the surface hydrology of an area. It can also be used in cumulative effects analysis to estimate the magnitude of disturbance that roads may be having on a watershed in conjunction with other land management activities.
>
> The Forest also used road density at a watershed scale to assess impacts to wildlife. Impacts include such things as: displacement, home range modification, creating barriers to movement, and increased fragmentation. Road densities at varying scales may also be used to determine cumulative impacts to wildlife.

2009 Gila National Forest Travel Analysis Report at 12. In addition, the Forest Service use of the Watershed Condition Framework (WCF) to inform the Revised Plan analysis includes the Road and Trail Indicator that relies in part on road densities. Here, it is important to note that the WCF utilized an expansive road definition that the Forest Service should have used in its Revised Plan analysis:

> For the purposes of this reconnaissance-level assessment, 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. Properly closed roads should be hydrologically disconnected from the stream network. If roads have a closure order but are still contributing to hydrological damage they should be considered open for the purposes of road density calculations.[18]

Clearly, road or motorized route densities provide useful tools for analyzing their environmental impacts and there is no justifiable rationale that they should not be used as Revised Plan standards.

---

[17] *See* WildEarth Guardians. 2020. The Environmental Consequences of Forest Roads and Achieving a Sustainable Road System - Literature Review. Exhibit #4.

[18] Potyondy, J.P. and T.W. Geier. 2011 at 26.

However, the Forest Service did provide an additional explanation for excluding them in any alternative:

> Additionally, road densities and their effects on species, habitats and watersheds were addressed by the 2014 travel management decision (USDA FS 2014a) and its supporting environmental analysis (USDA FS 2014b), which have been incorporated into the project record for plan revision.

FEIS at 17. We explain in our comments and here in our objection that the 2014 travel management decision does not disclose or properly address road densities, and 10 years after implementing the decision, the subwatersheds on the Gila National Forest still have high road densities that contribute to degraded conditions.

***Relief Requested*:** Acknowledge that the Gila National Forest has yet to comply with subpart A of the Travel Management Rule and include specific road objectives as explained herein and listed in our prior comments. Address the Revised Plan inconsistencies regarding standards and guidelines related to the removal of temporary roads as we explain herein. Finally, supplement the FEIS analysis with an alternative that considers appropriate motorized route densities, and include those densities as standards in the final Revised Plan.

## VI. Specific Recommendations for Changes to the Forest Plan as it pertains to Livestock Grazing

***Raised in our prior comments: 4.16.2020 Coalition comments at 71-79; WWP 4.16.20 at 21-30.***

WWP again asks that our specific recommended changes to the Forest Plan are included in the final Forest Plan.

~~Strikethrough~~ indicates our recommended deletion and ALL CAPS indicates our recommended addition to the text.

***Recommended changes for page 18 of the Forest Plan:***
**Livestock Grazing** is ~~an economically and culturally traditional~~ A use valued by local communities and has been for generations. IT IS A USE THAT HAS HAD AND CONTINUES TO HAVE SIGNIFICANT ENVIRONMENTAL IMPACTS. Like timber harvest, livestock grazing has its fair share of challenges, because forage and water availability change with environmental conditions. ~~Adaptive management is the cornerstone of sustainable livestock grazing, providing managers with the flexibility and information needed to respond to changing conditions.~~ Successful ~~adaptive~~ management OF LIVESTOCK GRAZING hinges on PROTECTION OF NATURAL RESOURCES, PRIORITIZING HABITAT FOR THREATENED AND ENDANGERED SPECIES, good relationships, communication, and monitoring. IF MONITORING CANNOT BE ACCOMPLISHED, LIVESTOCK GRAZING PERMITS SHOULD BE WITHDRAWN.
***Gila National Forest managers envision a future in which livestock grazing is ALLOWED AS A ~~sustained as a culturally and economically important~~ use of the national forest, ONLY WHEN***

***forage is plentiful, and IS NOT REQUIRED TO ENSURE producers are prosperous, AND ONLY PERMITTED WHEN HABITAT FOR NATIVE PLANTS AND ANIMALS IS PROTECTED . Leadership advances this vision by (1) restoring productive rangelands; (2) encouraging collaborative monitoring to support adaptive management; and (3) strategically selecting vacant allotments ~~to serve as forage reserves, or swing allotments that provide flexibility to support current permittees during times of drought and other environmental disturbances~~ FOR PERMANENT RETIREMENT.***

***Recommended addition:***

ALL ANNUAL OPERATING INSTRUCTIONS, MONITORING REPORTS, AND EPHEMERAL USE PERMITS WILL BE POSTED ONLINE AND MADE PUBLICLY AVAILABLE IN A TIMELY MANNER.[19]

***Recommended changes to page 193 et seq. of the Forest Plan:***

**Livestock Grazing**

Background Information

~~The production of forage to support livestock grazing is a benefit humans derive from many of the forest's ecosystems.~~ Livestock grazing in the forest contributes to the livelihood of the permittees and to the economy of local communities and counties BUT CAN HAVE SIGNIFICANT IMPACTS ON THE ENVIRONMENT. It is a ~~traditional cultural~~ HISTORICAL use of the forest, and one of the multiple-use elements for which the Forest Service is managed.

Rangelands, as working landscapes, ~~sustain~~ PROVIDE FOR beef cattle ranching while providing habitat for wildlife, recreation opportunities, open space amenities and cultural values that define a way of life (Maher et al. 2021). ~~Continuing this way of life enhances cultural heritage for future generations. Many people living in and near local communities participate in or have connections to ranching and identify with the associated values.~~ [unless a citation for this statement can be provided] Forage provided by rangelands supports livestock grazing and provides provisioning ecosystem services which contribute to the livelihood of permit holders and to the economy of local communities and counties. Livestock grazing opportunities contribute to the economic viability of local ranches, which helps to conserve open space by keeping private lands in agricultural production and avoiding exurban development (Bradford et al. 2002, Brown and McDonald 1995, Resnick et al. 2006 and USDA FS 2007). Well-managed livestock grazing can aid in maintaining or improving rangeland health (Adler et al. 2001 and Strand et al. 2014), which in turn facilitates their ability to provide supporting ecosystem services such as nutrient cycling and regulating ecosystem services such as long-term carbon storage (Havstad et al. 2007, Teague and Kreuter 2020, and Yahdijian et al. 2015).

Livestock grazing is directed by regulations set in 36 CFR 22 Subpart A, which mandates the agency to develop, administer, and regulate the grazing use. The use, timing, duration, and other considerations are evaluated by an interdisciplinary team through regulations set by the National Environmental Policy Act. The responsible official, typically a district ranger, considers the interdisciplinary team's evaluation, input and feedback received during the public process mandated by the National Environmental Policy Act, and decides what will be authorized. This decision is then

[19] WWP here acknowledges that the Gila National Forest is one of the few forests that already posts many of the AOIs online. We sincerely appreciate this information and hope the Forest Service will continue to provide it online.

outlined in a multi-year allotment management plan, which guides adaptive management. Grazing permits incorporate the Allotment Management Plan and may also include additional allotment-specific terms. Both the issuance of the permit and the development or amendment of an Allotment Management Plan that becomes part of the permit is considered an administrative action that implements the National Environmental Policy Act decision (FSH 2209.13 chapter 90 section 94). Permanent grazing management modifications that are consistent with the National Environmental Policy Act decision can be authorized through the term grazing permit~~.~~ [delete period, insert comma] consistent with the National Environmental Policy Act decision.

Annual operating instructions are developed to carry out the allotment management plan. They are reviewed annually as an opportunity to make any adjustments needed to respond to environmental conditions. Rangeland utilization and infrastructure monitoring are conducted to provide information on conditions that inform the need for adjustments. Annual operating instructions allow for temporary adjustments while implementing the terms and conditions of the permit. Annual operating instructions do not constitute a permit modification and are not an appealable decision (36 CFR 214.4). Grazing permits, allotment management plans, permit modifications, and Annual Operating Instructions are site-specific and outside the scope of the forest plan.

~~Adaptive management is the cornerstone of sustainable livestock grazing. Successful adaptive management hinges on good relationships, communication, and monitoring. However, without sufficient and functional range infrastructure (that is, fences, water sources), there can be less management flexibility, more inconvenience, and additional costs.~~

Challenges facing the Gila National Forest's livestock grazing program include the condition of some range infrastructure. Some THE MAJORITY OF range infrastructure is in poor condition or is non-functional due to age, lack of maintenance, poor design features or locations, damage associated with recent fires, or a combination of these factors. There have been instances where infrastructure condition has resulted in injury to other forest users and livestock that encounter downed and obscured barbed wire fencing material. Permittees and forest staff have invested substantial efforts to address fire-damaged infrastructure with limited financial resources, but much work remains.

*Desired Conditions*

1. ~~Sustainable~~ livestock grazing contributes to the long-term social, economic and cultural diversity and stability of local communities, and helps to preserve the rural landscape, LIFESTYLE CHOICES ~~cultural heritage,~~ and long-standing tradition.

2. Livestock use IS ONLY PERMITTED WHERE IT provides for conditions that support movement toward natural fire regimes.

3. Livestock grazing and use is ONLY PERMITTED WHERE IT IS compatible with the desired conditions for ecosystems, soils, watersheds, native plant and animal species, and other activities and resources.

4. Range infrastructure facilitates livestock management and the production of forage, allows wildlife safe and reliable access to water, provides for habitat connectivity and wildlife movement, and does not negatively affect the safety of forest users or Forest Service personnel.

5. Required environmental analyses are conducted in a thorough and timely manner to reduce regulatory uncertainty and encourage investment by permit holders.

6. LIVESTOCK GRAZING IS NOT PERMITTED IN RIPARIAN AREAS.

7. 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 WILDLIFE AND, WHERE APPROPRIATE, LIVESTOCK.

8. 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 AND SHRUB RIPARIAN DESIRED CONDITIONS

*Objectives*

1. Implement at least one action per year to improve poor or very poor range condition (or equivalent condition class), other than mechanical treatments targeting woody invaders (woody invaders are addressed through the objectives for vegetation communities INCLUDING THE CONSIDERATION OF ALLOTMENT OR PERMIT RETIREMENT. All Upland Ecological Response Units.

2. In cooperation with every permit holder AND THE PUBLIC, evaluate consistency with annual operating instructions and document pasture rotation, utilization compliance, and improvement maintenance annually.

3. ANNUALLY REMOVE AT LEAST 6 - 10 EXISTING RANGE IMPROVEMENT STRUCTURES FOR LIVESTOCK GRAZING THAT ARE NO LONGER NECESSARY OR IN POOR OR NON-FUNCTIONAL CONDITION.

4. ANNUALLY CONSIDER AT LEAST 1 VACANT OR UNDERSTOCKED ALLOTMENT FOR PERMANENT GRAZING RETIREMENT.

*Standards*

1. Project-specific best management practices identified in the proposed action will be followed (see also Soils, Water Quality, and Watersheds) to mitigate impacts to soil, water, riparian, and aquatic resources.

2. New or reconstructed range improvements will be designed to prevent wildlife entrapment (for example, escape ramps in water troughs and cattleguards) and allow for wildlife passage except where specifically intended to exclude wildlife (for example, elk exclosure fence) and/or to protect human health and safety (see also Wildlife, Fish, and Plants).

3. New livestock handling facilities designed to hold or concentrate livestock (for example, corrals, traps, water developments) will be located outside of riparian management zones, known archeological sites, and known occupied sites of at-risk species. Buffer distances will be determined during project planning on a case-by-case basis in coordination with the permittee to adequately address management needs, site-specific circumstances, species-specific characteristics, and any associated legal requirements.

4. Permit conversions to domestic sheep or goats will not be allowed, to minimize the risk of disease transfer to bighorn sheep.

5. The Congressional Grazing Guidelines for Wilderness shall be applied to all decision making regarding management of commercial grazing in wilderness areas.

6. LIVESTOCK MANAGEMENT WILL ONLY BE ALLOWED WHEN COMPATIBLE WITH CARRYING CAPACITY AND WHEN IT IS POSSIBLE TO ADDRESS ECOLOGICAL RESOURCES (SUCH AS 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.

*Guidelines*

1. Annual operating instructions ~~should~~ SHALL address ecological resources such as native plant communities, at-risk species, soils, riparian health, and water quality, if they are departed from desired conditions, as determined by data that are relevant to the allotment and the current management system.

2. In areas recommended for wilderness designation, authorization of mechanized or motorized access and equipment for the maintenance or replacement of existing infrastructure ~~should~~ SHALL ~~encourage~~ ENSURE protection of the wilderness characteristics.

3. Existing livestock handling and watering facilities located in riparian management zones ~~should~~ SHALL be modified or relocated where interdisciplinary evaluation finds they are not compatible with movement toward desired conditions for other resources. These evaluations would be made during environmental analysis or review or triggered by monitoring results. Any modification or relocation of infrastructure should include consultation with the permittee.

4. Mineral (for example, salt) or vitamin supplements ~~should~~ SHALL not occur on or adjacent to known occupied sites of at-risk plant species, significant archaeological sites, cave entrances, poorly drained or saturated soils, unsatisfactory soils, or those with severe erosion hazard or high mass wasting hazard ratings. Buffer distances will be determined on a case-by-case basis in coordination with the permittee to adequately address management needs, site-specific circumstances, species-specific characteristics, and any associated legal requirements.

5. Mineral (for example, salt) or vitamin supplements ~~should~~ SHALL not be authorized within ~~0.25~~ 0.5 mile of water sources to support maintenance of or movement toward desired conditions for soil, water

quality, watersheds, riparian and aquatic ecosystems, and range condition by encouraging better distribution of use. Exceptions may ONLY occur if prior written approval is obtained from the appropriate line officer and one or more of the following sets of circumstances are present: (1) ~~the water source is not in a riparian management zone and special circumstances dictate a short-term need; (2)~~ the water source not in a riparian management zone and the intent of placing the supplement near water is to draw use away from riparian areas~~; or (3) the water source is not in a riparian management zone and the particular supplement requires that it be close to water to encourage better distribution (for example, high-protein liquid feed)~~.

6. As part of implementing prescribed fire, stocking and management of grazing allotments ~~should~~ SHALL be evaluated by an interdisciplinary team, THE PUBLIC, and the permittee before applying prescribed fire to balance the availability of forage and fine fuels, and after prescribed fire to evaluate and determine range readiness.

7. Vacant allotments should be considered for PERMANENT VOLUNTARY RETIREMENT ~~temporary use by holders of a current permit during times or events when their allotment(s) require growing season recovery time because of wildfire or other disturbance, or to minimize livestock and wildlife conflicts~~.

8. As part of all management activities, range infrastructure and associated materials (including barbed and smooth wire, storage tanks, pipeline, et cetera) that are no longer functioning or are more than what was needed for the maintenance, reconstruction, or construction activity, ~~should~~ SHALL be removed to provide for the safety of forest visitors, wildlife, recreational and permitted livestock, and aesthetics. Such requirements should be incorporated into contracts, permits, and agreements. Forest personnel should resolve any such safety hazards identified during project or incident activities.

9. All monitoring data collected by non-Forest Service personnel that adhere to Forest Service approved protocol ~~should~~ SHAL be accepted for consideration and made available to permit holders AND THE PUBLIC for allotment management.

Management Approaches

*Collaboration, Adaptation, and Monitoring* [No deletions or edits recommended]

*Range Infrastructure and Relationships* [No deletions or edits recommended]

*Adaptation and Forage Reserves*
Climate change and vegetation management activities present opportunities and challenges for livestock production, grazing permit holders, and forest leadership and staff. Challenges can arise because the herbaceous vegetation that provides forage for livestock is the same vegetation that provides the fine fuels necessary to support the natural role of fire on the landscape and flame heights that are effective at killing young trees that are encroaching grasslands and infilling forest and woodland openings. Fire damage to range infrastructure is another significant, but not insurmountable, challenge. Forest staff and leadership continue to work with grazing permittees and other interested stakeholders to minimize challenges and maximize opportunities related to fire management to the greatest extent possible. This includes addressing fire damage to range infrastructure within existing

authorities (see Wildland Fire and Fuels Management) and evaluating allotments, when grazing permits that are waived back to the forest, for their suitability for use as forage reserves or swing allotments, OR FOR PERMANENT CLOSURE AND RETIREMENT. A small, strategically located network of swing allotments could help increase options available to permittees during drought years, before or after fire, and when there are conflicts between livestock and wildlife. PERMANENT CLOSURE AND RETIREMENT OF ALLOTMENTS CAN FURTHER REDUCE CONFLICTS BETWEEN LIVESTOCK AND WILDLIFE. The Forest Service would be responsible for the maintenance and upkeep of range infrastructure and developments within these swing allotments when they are not being used to that they are ready to be stocked when the need arises, AND RESPONSIBLE FOR THE REMOVAL OF RANGE INFRASTRUCTURE WHEN ALLOTMENTS ARE PERMANENTLY CLOSED AND RETIRED. This maintenance would need to be integrated into the forest's program of work, prioritized, and then completed by forest staff, contractors, partnerships, or a combination of those resources.

*Drought, Forecasting Services and Adaptation*
Drought is an inevitable occurrence in the southwestern United States. The question is not will drought occur, but are forest leadership, staff, and permittees prepared for drought? The intent of this management approach is to highlight technologies that can inform allotment-specific drought plans and adaptation and emphasize the importance of early and frequent communication. There are many sources of information that can be helpful in developing strategies to cope with drought. The ability to forecast in-season forage production, green up, and curing out and relate that to past conditions and management strategies can support a timely, more effective, and complete response to drought. The 2021 Rangeland Technology Summit highlighted over 40 tools that have recently become operational for agency staff, permittees, and the public. Many of them leverage satellite data. Tools like Fuelcast.net provide weekly, in-season projections of herbaceous production in pounds per acre and PhenoMap allows a weekly comparison of how the current season is tracking with past seasons back to 1984, in terms of average greenness. The Rangeland Allotment Monitoring tool is a web application that combines access to PhenoMap and annual productivity data. There are also tools such as the SPI Explorer and Quick Drought Response Index, or QuickDRI. SPI stands for Standardized Precipitation Index (SPI), which is a unit of measure that compares recent precipitation values for a period of interest with long-term historical values to assess moisture conditions. QuickDRI is a relatively new measure of drought that monitors rapid, short-term changes in landscape-level dryness to detect the onset of drought and rapidly developing flash droughts. QuickDri combines the standardized precipitation index with measures of vegetation health, root-zone soil moisture, evaporative stress, and other environmental characteristics that influence drought. Armed with a knowledge of past management strategies specific to the allotment and tools such as these allow management to anticipate drought impacts and develop the appropriate adaption actions with greater agility than ever before.

To maintain a trajectory toward desired conditions for livestock grazing as a use of the forest and for the natural resources that support such use, early and frequent communication and coordination with permittees and others is critical. The Forest Service, Natural Resources Conservation Service, other federal agencies, state and local government entities, and non-governmental organizations have different abilities to leverage different resources for drought response. Strong partnerships founded on communication and trust will be essential adaptation tools. The United States Department of Agriculture's Action Plan for Climate Adaptation and Resilience specifically identifies programs available through the Natural Resources Conservation Service as response mechanisms. There are also

programs available through the Farm Service Agency that could be important as droughts become more frequent and intense. The Farm Service Agency recently released an online tool for drought-stricken producers that helps them estimate costs associated with supplemental feed and water and reimburses ranchers for a portion of those costs. Ranchers considered underserved may be eligible for up to 90 percent reimbursement on costs associated with supplemental feed. The New Mexico Department of Agriculture, Office of the State Engineer and Interstate Stream Commission, and other state agencies and working groups such as the New Mexico Healthy Soil Working Group, also have plans and resources for adaptation that can be brought to the table. Forest leadership and staff recognize these entities as critical partners for success and seek opportunities to actively collaborate with them.

*Livestock and Wildlife* [No deletions or edits recommended]

*Riparian Critical Habitat* [No deletions or edits recommended]

*Unauthorized and Excess Livestock* [No deletions or edits recommended]

***Relief Requested:*** make the above noted changes to the Forest Plan.

**E. Recommendations for Annual Operating Instructions**

WWP has submitted management recommendations to other Forest Service units in Region 3 for inclusion in Forest Plan revisions that are currently underway, as well as for inclusion in AOIs. By asking for these Special Management Instructions to be implemented as part of the AOI, we hope to reduce the impacts of livestock grazing to all predators found on the Gila National Forest. We note that some of these recommendations were incorporated, at least in part, into the Grazing Management Approaches. However, the Forest Plan could be stronger on this issue. Therefore, we are again asking the Gila National Forest to include such recommendations as part of the Forest Plan revision process as a recommended Management Approach (or Standard, Guideline, etc., as appropriate). This is similar to how the Forest Plan addresses concerns related to the Mexican spotted owl and Northern goshawk.

**Management Approach for AOIs**

"Best Practices" for protecting livestock and grazing operations where predators are present have been successful in reducing negative interactions between predators and livestock. These best practices must be followed and include:

1. Removing, destroying, burying, or placing electric fencing around dead livestock discovered on allotments if carcasses would attract predators into high use areas such as currently grazed meadows, salting grounds, water sources, or holding corrals.
2. Removing sick or injured livestock from grazing allotments to prevent them from being targeted by predators.
3. Increasing range riding to provide a more consistent human presence around your cattle. This has proven to be one of the most effective means for reducing predator-livestock interactions and depredation. There is nothing in your Grazing Permit, Allotment Management Plans (AMPs), or in these Annual Operation Instructions (AOI) that authorizes predator control.

For this allotment, the permittee is aware:

- The allotment does include predator habitat and the possibility of predator-livestock conflicts exists and will be an ongoing part of managing livestock on the allotment;
- The permittee has an obligation to comply with the Endangered Species Act, among all other federal laws;
- The Forest Service will provide conflict-reduction resources as they are developed;
- A grazing permit in non-use status shall not be allowed to increase allowable animal unit months when returning to use to help prevent livestock-predator conflicts;
- The Forest Service has provided notification to the permittee regarding BMPs to minimize the potential for predator-livestock interactions
- Permittees must implement specific best management practices to reduce livestock-predator conflicts, including, at a minimum, the removal of predator attractants during calving season, increased human presence during vulnerable periods, use of range-riders and diversionary and deterrent tools such as fladry fencing, airhorns, crackershells, etc.;
- Measures to reduce livestock-predator conflicts, including a clause notifying the permittee of the potential for modification, cancellation, suspension, or temporary cessation of livestock activities to resolve livestock-predator conflicts;
- Permittees are prohibited from using leg-hold traps to manage livestock predation on any allotments.

All AOIs should include a notice to grazing permittees that they may take conservation non-use for the sake of reducing livestock-predator conflicts on these allotments, pursuant to the Forest Service regulations at 36 C.F.R. 222.3 Issuance of grazing and livestock use permits; Issuance of grazing and livestock use permits 36 C.F.R. 222.3(C)(1)(iv)(D); Forest Service Handbook 2209.13(17.2) Nonuse for Resource Protection or Development.

Drought management planning should take into consideration increased competition between predators, native prey and livestock for forage and resources and the Forest Service should maintain an adequate supply of food for wildlife it intends to avoid livestock-predator conflict.

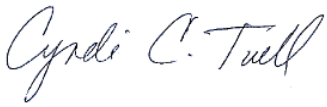
***Relief Requested****:* Include the above Management Approaches for AOIs in the Forest Plan.

Because the Forest Service refused to analyze an alternative that eliminated or even reduced livestock grazing, the Forest Service was unable to acknowledge or analyze the impacts of fewer livestock on the ground. These impacts would have included improved scenic integrity, better habitat for wildlife and native plants, reduction in invasive non-native plants forest-wide, improved fire ecology, improved soil conditions, reduced erosion, more eligible segments of Wild and Scenic Rivers, more lands eligible for Wilderness recommendations, and a host of other positive, ecological beneficial impacts.

The Forest Service must therefore withdraw the Record of Decision, issue a new decision that selects Alternative 5 as it pertains to vacant grazing allotments (they should remain vacant), and provide the other such relief as requested above.

Thank you for your consideration of this Objection. If you have any questions or wish to discuss the issues raised in this objection letter in greater detail, please do not hesitate to contact me.

Sincerely,



Cyndi Tuell
Arizona and New Mexico Director
Western Watersheds Project

Adam Rissien, ReWilding Manager
WildEarth Guardians
PO Box 7516, Missoula, MT 59807
arissien@wildearthguardians.org - (406) 370-3147

Exhibit 1

No. 23-3872

# IN THE UNITED STATES COURT OF APPEALS FOR THE NINTH CIRCUIT

WESTERN WATERSHEDS PROJECT, et al.,
*Plaintiff-Appellants*,

v.

PERDUE, et al.,
*Defendant-Appellees*,

On Appeal from the United States District Court for the District of Arizona
No. 4:21-cv-00020-SHR
Hon. Scott H. Rash

## APPELLANTS' OPENING BRIEF

Kelly E. Nokes
Western Environmental Law Center
P.O. Box 218
Buena Vista, CO 81211
(575) 613-8051
nokes@westernlaw.org

Sarah K. McMillan
Western Environmental Law Center
103 Reeder's Alley
Helena, MT 59601
(406) 708-3062
mcmillan@westernlaw.org

*Attorneys for Plaintiff-Appellants*

## CORPORATE DISCLOSURE STATEMENT

Pursuant to Federal Rule of Appellate Procedure 26.1, Plaintiff–Appellants Western Watersheds Project and Wilderness Watch hereby certify that neither of their organizations has a parent corporation and that no publicly held corporation holds 10 percent or more of any Plaintiff–Appellant organizations' stock.

## TABLE OF CONTENTS

# TABLE OF AUTHORITIES

## CASES

## STATUTES



## REGULATIONS AND ADMINISTRATIVE MATERIALS

## INTRODUCTION

Mexican wolves are a critically endangered subspecies of gray wolf protected under the Endangered Species Act ("ESA"). Despite decades of conservation and reintroduction efforts, they remain one of the rarest mammals in North America. Mexican wolves are primarily threatened by human-caused mortality, low genetic diversity (all Mexican wolves alive today derive from only seven founders), small population size, and limited geographic range. Today, fewer than 300 individuals exist in the wild, all generally residing in the Mexican Wolf Experimental Population Area ("MWEPA" or "recovery area") – the area specifically selected for the species' recovery in central Arizona and New Mexico.

Since reintroduction started in 1998, the species has been returning slowly to its historic habitat across the Southwest – and rightfully repopulating some of the wildest and best suitable areas of the recovery area in the Greater Gila bioregion. Their movements are increasingly overlapping with livestock grazing activities on our federal public lands. Across a nearly 270,000–acre region of the Apache–Sitgreaves and Gila National Forests along the central New Mexico and Arizona state line, livestock grazing has occurred unabated for over a century. However, it was only in 2019 that the U.S. Forest Service ("Forest Service") initiated its first–ever analysis of the effects of livestock grazing (and the accompanying infrastructure, including miles

of fencing and water pipelines) in accordance with the mandates of the National Environmental Policy Act ("NEPA") for allotments in the Stateline region.

The Stateline Range Environmental Assessment ("EA") should have assessed the direct, indirect, and cumulative impacts of re–authorizing livestock grazing and associated expanded infrastructure developments across 14 allotments in the Mexican wolf recovery area over the next ten years. But rather than taking a hard look at the impacts of livestock grazing on the species' conservation and recovery, the Forest Service's analysis falls woefully short of what the law requires. Nowhere in the EA does the Forest Service actually describe, analyze, or consider the impacts of livestock grazing on Mexican wolves. NEPA demands that the effects of a proposed agency action be considered before decisions are made, and that an Environmental Impact Statement ("EIS") be prepared for major federal actions that may significantly affect the quality of the human environment. This did not occur for the Stateline Project. The Forest Service's failure to abide by NEPA's fundamental mandate to "look before you leap," and decision to instead rubberstamp continued grazing in the heart of the recovery area for a critically imperiled species violates the law and must be vacated and remanded.

## STATEMENT OF JURISDICTION

The district court had subject matter jurisdiction under 28 U.S.C. § 1331 because Conservation Groups' claims arise under the National Environmental Policy Act ("NEPA"), 42 U.S.C. § 4321 *et seq*. The district court's judgement was final, and this Court has jurisdiction under 28 U.S.C. § 1291. The district court entered final judgment on September 29, 2023. 1–ER–0002. Conservation Groups filed an appeal on November 27, 2023, 3–ER–0424, within the time permitted by Fed. R. App. P. 4(a)(1)(B) and 28 U.S.C. § 2107(b).

## STATEMENT OF THE ISSUES

(1) When the Forest Service undertakes an analysis of the effects of grazing on over 270,000 acres of public lands that are in the primary recovery area for the critically endangered Mexican wolf, do short conclusory statements satisfy NEPA's requirement to take a hard look at the effects of grazing?

(2) When the Forest Service undertakes an analysis of the potentially significant effects of grazing on over 270,000 acres of public lands that overlap with the primary recovery area for the critically endangered Mexican wolf, two Wilderness areas, multiple Inventoried Roadless Areas, and a Primitive Area in a geographically and ecologically unique region, does NEPA require the preparation of an Environmental Impact Statement?

## STATEMENT REGARDING THE ADDENDUM

Pursuant to Circuit Rule 28–2.7, the text of relevant statutory and regulatory provisions is set forth in an addendum submitted concurrently with this brief.

## STATEMENT OF THE CASE

### I. Background on the National Environmental Policy Act

Congress enacted NEPA in 1969, directing all federal agencies to assess the environmental impact of proposed actions that significantly affect the quality of the environment. 42 U.S.C. § 4332(2)(C). NEPA is designed to prevent damage to the environment by "focusing Government and public attention on the environmental effects of proposed agency action." *Marsh v. Or. Nat. Res. Council*, 490 U.S. 360, 371 (1989). As the statute's implementing regulations explain, "[t]he NEPA process is intended to help public officials make decisions that are based on understanding of environmental consequences, and take actions that protect, restore, and enhance the environment." 40 C.F.R. § 1500.1(c)(2019).[1]

Indeed, the United States Supreme Court has emphasized that NEPA "promotes its sweeping commitment to 'prevent or eliminate damage to the

[1] NEPA regulations were updated in 2020 and 2024. *See* 85 Fed. Reg. 43,304 (July 16, 2020); 89 Fed. Reg. 35,442 (May 1, 2024). The Forest Service relied on the pre-2020 NEPA regulations for the Stateline project and thus all citations are to the regulations as codified at 40 C.F.R. Part 1500 (2019).

environment and biosphere' by focusing Government and public attention on the environmental effects of proposed agency action." *Marsh*, 490 U.S. at 371. "'NEPA expresses a Congressional determination that procrastination on environmental concerns is no longer acceptable.'" *Ctr. for Biological Diversity v. Nat'l Highway Traffic Safety Admin.*, 538 F.3d 1172, 1185 (9th Cir. 2008) (quoting *Found. for N. Am. Wild Sheep v. U.S. Dep't of Agric.*, 681 F.2d 1172, 1181 (9th Cir. 1982)).

Citing to the statute itself, the Council for Environmental Quality ("CEQ") recently reaffirmed that "NEPA seeks to promote efforts that will prevent or eliminate damage to the environment…, making it the continuing policy of the Federal Government to use all practicable means and measures to create and maintain conditions under which humans and nature can exist in productive harmony…." 89 Fed. Reg. 35,442 (citing 42 U.S.C. § 4331(a)). Moreover, NEPA explicitly recognizes the "profound impact" of human activity and the "critical importance of restoring and maintaining environmental quality." *Id.* (citing 42 U.S.C. §§ 4321, 4331).

Under NEPA, federal agencies prepare an Environmental Impact Statement ("EIS") if an action may cause significant effects. *Ocean Advocs. v. U.S. Army Corps of Eng'rs.*, 402 F.3d 846, 864–65 (9th Cir. 2005); 43 U.S.C. § 4332(2)(C). Agencies prepare an Environmental Assessment ("EA") for all other actions that are not

categorically excluded from documentation and where they determine an EIS is not needed. *Solar Energy Indus. Ass'n v. Fed. Energy Reg. Comm'n*, 80 F.4th 956, 991 (9th Cir. 2023).

In these documents, the Forest Service must disclose and analyze the environmental effects of a proposed action. 40 C.F.R. §1500.1(b). Additionally, the Forest Service "must insure that environmental information is available to public officials and citizens before decisions are made and before actions are taken. The information must be of high quality. Accurate scientific analysis, expert agency comments, and public scrutiny are essential to implementing NEPA." *Id.*

The Forest Service prepares an EA to evaluate whether a project will have significant impacts warranting development of an EIS. 40 C.F.R. § 1508.9. An EA is a "concise public document that briefly provide[s] sufficient evidence and analysis for determining whether to prepare an EIS or a finding of no significant impact" ("FONSI"). *Id.* The inquiry into whether an action may significantly affect the environment is governed by regulations that prescribe the agency's consideration of the context and intensity of a project. 40 C.F.R. § 1508.27.

An EIS is a "detailed statement" that describes (i) the environmental impact of the proposed action; (ii) any unavoidable adverse environmental effects of the proposed action; (iii) alternatives to the proposed action; (iv) the relationship

between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity; and (v) any irreversible and irretrievable commitments of resources involved if the proposed action is implemented. *Id.*

Whether preparing an EA or an EIS, NEPA requires the Forest Service to take a hard look at the direct, indirect, and cumulative effects[2] of all actions. 42 U.S.C. §§ 4332(2)(C)(i)–(v); 40 C.F.R. §§ 1502.14(a), 1502.16, 1508.8, 1508.14. Direct effects are caused by the action and occur at the same time and place. 40 C.F.R. § 1508.8. Indirect effects are caused by the action and occur later in time or are farther removed in distance but are reasonably foreseeable. *Id.* Cumulative effects are the impacts on the environment that result "from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions." 40 C.F.R. § 1508.7. The Forest Service is required to provide a hard look analysis of these impacts before there are "any irreversible or irretrievable commitments of resources which would be involved in the proposed action should it be implemented." 42 U.S.C. § 4332(C)(v); *see also* 40 C.F.R. §§ 1501.2, 1502.5(a).

[2] NEPA regulations use the terms "effects" and "impacts" synonymously. 40 C.F.R. § 1508.8(b).

Ultimately, "NEPA's purpose is not to generate paperwork – even excellent paperwork – but to foster *excellent action*." 40 C.F.R. § 1500.1(c) (emphasis added).

## II. Factual Background

### A. The Endangered Mexican Wolf

 [3]

Mexican wolves are a critically endangered subspecies of gray wolf native to the American Southwest and northern Mexico. Once numbering in the thousands, they were all but extirpated by the 1970s by "concerted eradication efforts" due to conflicts with livestock grazing in their native habitat. 3–ER–0320–21; 63 Fed. Reg. 1,752 (Jan. 12, 1998) (1998 Mexican wolf ESA Section 10(j) Rule).

[3] U.S. Fish & Wildlife Serv., Eagle Creek Mexican wolf, Aislinn Maestas, Public Domain, *available at* https://www.fws.gov/media/eagle-creek-mexican-wolf (last visited June 2, 2024).

By the 1970s, the species "hovered on the brink of extinction" and was "thought to be completely extirpated from [their] historic range." 3–ER–0320–21. To save the species from extinction, U.S. Fish and Wildlife Service ("FWS") biologists captured the last seven remaining Mexican wolves, began a captive breeding program to support eventual reintroduction, and identified a recovery area for the species (currently known as the Mexican Wolf Experimental Population Area ("MWEPA" or recovery area herein)). 3–ER–0321; 3–ER–0323. All Mexican wolves alive today originate from these seven founding wolves. 3–ER–0321.

To foster the recovery of Mexican wolves, the FWS released eleven wolves in 1998 into the core recovery area in the Greater Gila bioregion along the central border of Arizona and New Mexico. 3–ER–0323.

The MWEPA is divided into three zones, with initial release or translocations occurring in Zone 1; initial releases of only pups under five months old and translocations of other wolves, and dispersal and occupation in Zone 2; and no releases or translocations, only dispersal and occupation in Zone 3. 3–ER–0327. The Stateline project is in Zone 1, the primary area in which Mexican wolves are released and allowed to roam and recover. *Id.*

Wolf packs generally consist of a set of parents, their offspring, and non–breeding adults, with territories that range in size from 50 square–miles to greater

than 1,000 square–miles, depending on how much prey is available and seasonal movements. 2–ER–0216. Lone dispersing wolves have travelled as far as 500 miles in search of a new home. *Id.* Based on the needed size of pack territories, a large recovery area is required to allow the establishment of multiple packs and, eventually, sustainable populations.

Although relatively small (50–90 pounds), Mexican wolves' preferred prey is elk. 3–ER–0320. When elk is not abundant, their prey includes mule deer, other ungulates, and small mammals, as well as livestock. *Id.* Mexican wolves tend to wander and will roam across many square miles of available habitat where prey are abundant. *Id.*

While Mexican wolves are slowly returning to some of their historic habitat in the Southwest, excessively high levels of human–caused mortalities continue to threaten their recovery. 3–ER–0331. These mortalities are the result of both illegal killings and lawful removals under federal and state land management regimes to alleviate conflicts with livestock. *Id.* Today, the fewer than 300 wild Mexican wolves all generally reside in the MWEPA– the area specifically selected for the species'

recovery in central Arizona and New Mexico. 2–ER–0216 (documenting a minimum of 114 Mexican wolves in 2017).[4]

Livestock conflicts are a primary reason for management–caused Mexican wolf mortalities because federal wildlife managers may authorize the killing or removal of wolves in conflict situations. 3–ER–0331. These removals – both lethal and relocation to captivity – combined with illegal killing, threaten the Mexican wolf's path to recovery in the wild. *Id.*

The population's small size critically imperils the genetic health of the species both in captivity and in the wild. 3–ER–0330–31. Further exacerbating this problem, removals and lethal management have resulted in losses of genetically valuable animals. 3–ER–0331–33. Additionally, Mexican wolves are geographically limited in where they are permitted to roam and are prohibited north of Interstate 40 in Arizona and New Mexico, limiting their ability to disperse into additional suitable habitat with abundant prey. 3–ER–0327; *see also* 80 Fed. Reg. 2,512.

Mexican wolves in the wild today are managed as an experimental, non-essential population under the ESA's section 10(j) pursuant to a species–specific

[4] *See also* U.S. Fish & Wildlife Serv., *Mexican Wolf Population Grows for Eighth Consecutive Year* (Mar. 5, 2024) *available at* https://www.fws.gov/press-release/2024-03/mexican-wolf-population-grows-eighth-consecutive-year (last visited May 31, 2024) (documenting a minimum off 242 Mexican wolves in 2022) .

ESA Section 10(j) rule. 80 Fed. Reg. 2,512 (2015 Mexican wolf ESA Section 10(j) Rule), as codified at 50 C.F.R. § 17.84(k). The 10(j) Rule provides exceptions from certain provisions of the ESA (such as take prohibitions) and other special management provisions. *Id.* However, the 10(j) Rule has no effect on a federal land or wildlife agencies' obligations under NEPA to take a hard look at the impacts of their proposed actions and to prepare an EIS when those effects may be significant.

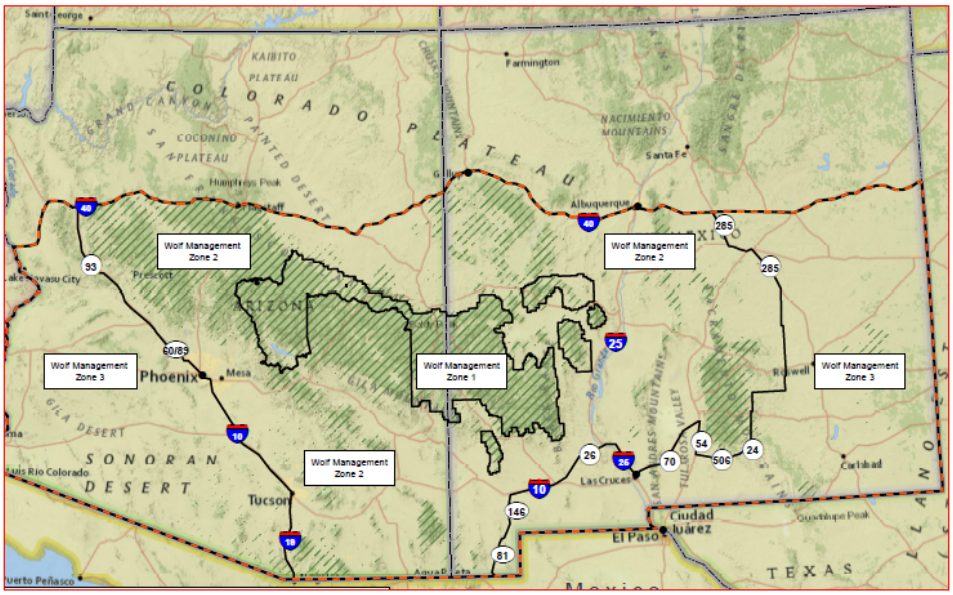
Even after decades of conservation and reintroduction efforts, with fewer than 300 in the wild in Arizona and New Mexico, Mexican wolves are the "rarest and most genetically distinct subspecies of all the North American gray wolves" and remain one of our nation's most imperiled species. 3–ER–0320.

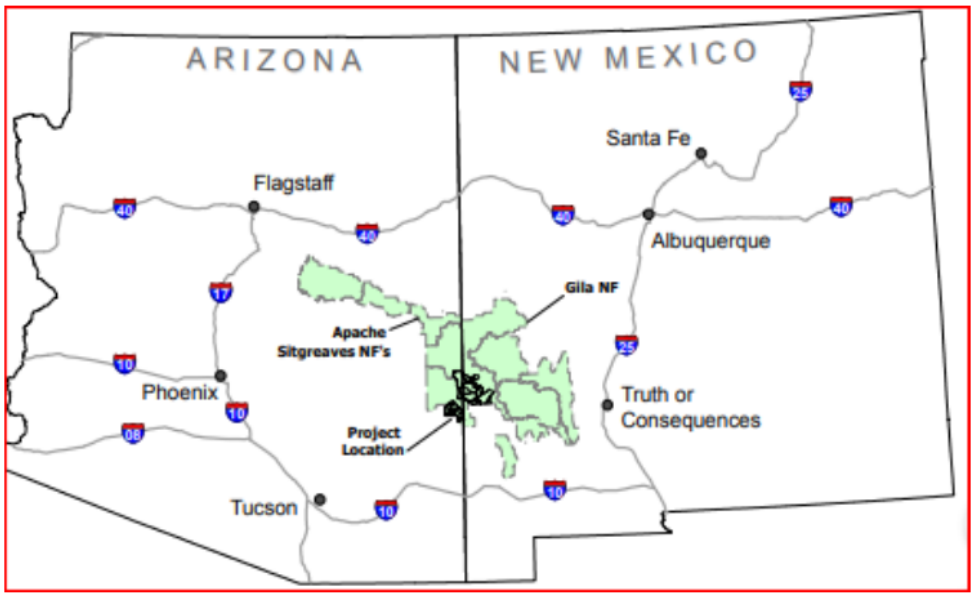
**B. The Stateline Project**

In 2019 and 2020, the Forest Service issued three Decision Notices and Findings of No Significant Impacts ("DNs/FONSIs") for the Stateline Project, which authorized nearly 4,000 head of cattle and horses and a total of up to 44,186 Animal Unit Months ("AUMs")[5] each year for the next ten years on 14 allotments spanning over 270,000 acres of public lands. 2–ER–0037; 2–ER–0143; 2–ER–0163; 2–ER–0184. Notably, this was the Forest Service's first–ever effort to consider the effects

[5] "An animal unit month ["AUM"] is a measure of the amount of forage required by a 1,000-pound cow or its equivalent for one month based on a daily allowance of 26 pounds of dry forage per day." 2–ER–0041, n. 1.

on Mexican wolves from livestock grazing and infrastructure development on these allotments. *See* 2–ER–0044 (noting the need for the project was to come into compliance with Rescissions Act of 1995, which requires all range allotments to undergo NEPA analysis). The ecologically rich and wild Greater Gila bioregion is known for its unique wilderness resources and is home to our nation's first designated Wilderness – the Gila Wilderness (turning 100 today) – as well as the Blue Range Wilderness, and the Blue Range Primitive Area, which is the only Congressionally–designated primitive area and is managed as wilderness. *See* 2–ER–0122. The Stateline project area contains some of the American Southwest's last remaining wild, remote, and diverse landscapes, and is home to the Hell Hole, the Lower San Francisco, Mitchell Peak, San Francisco, and the Sunset inventoried roadless areas ("IRAs") – nearly 80,000 acres of which overlap with the Stateline allotments – and is within the very heart of the Mexican wolf recovery area's Zone 1, the primary area for releases of wolves. 2–ER–0122; 3–ER–0358 (presenting maps of MWEPA and Stateline project side-by-side).




3-ER-0358 (maps comparing the MWEPA (top) and Stateline project area (bottom)).

Many of the Project's new infrastructure developments are located in some of the wildest reaches of the unique landscape of the Greater Gila. These developments include the construction of over 16 miles of new fencing, the installation of 27 water

storage tanks and 51 water troughs, the construction of 46.5 miles of pipeline to transport water, the installation of five new groundwater wells, one trick tank, three new cattle guards and four new corrals. 2–ER–0053–54; 2–ER–0284 (Map of Proposed Infrastructure Improvements).

Mexican wolves were present in at least some of the Stateline allotments in 2018, as indicated by the Forest Service's biological assessment on the Blackjack and Hickey allotments for the Stateline project. 2–ER–0216. The Forest Service noted that in early 2018, wolf/livestock interactions had occurred on the Alma Mesa allotment (another allotment approved by the Stateline decision). *Id.* Recognizing that the Alma Mesa allotment is within 10–miles of the Blackjack and Hickey allotments, the Forest Service explained there was a possibility of un–collared wolves on the allotment, and that they "could expect wolves to potentially move through the Alma Mesa allotment, south towards Blackjack and Hickey...." *Id.* The Forest Service also recognized the Mexican wolves' occupied range was only about 11–miles northeast of the Stateline allotments at the time of its decision. *Id.* As noted, Mexican wolves tend to roam and can readily travel more than eleven miles, and thus should be anticipated in the Stateline project area.

### III. The District Court Proceedings Below

In 2021, Western Watersheds Project and Wilderness Watch (collectively, "Conservation Groups" or "Appellants") filed suit in the U.S. District Court in Arizona (Tucson) alleging violations of NEPA and challenging the Forest Service's authorization of the Stateline project. Following summary judgment briefing and argument in 2022–2023, the District Court issued an order and opinion denying Conservation Groups' motion for summary judgment on all claims. 1–ER–0003. The District Court erred in its decision because: (1) the agency failed to take a hard look at the effects of allowing grazing on more than 270,000 acres within the Mexican wolf recovery area; and (2) an adequate analysis of the Project's effects would show they may be significant, requiring preparation of an EIS. Conservation Groups timely appealed the district court's decision. 3–ER–0424; 3–ER–0429.

## STANDARDS OF REVIEW

This Court reviews a district court's grant of summary judgment de novo. *Greater Yellowstone Coal., Inc. v. Servheen*, 665 F.3d 1015, 1023 (9th Cir. 2011) (citation omitted). This challenge is brought under NEPA, 42 U.S.C. § 4332, and the Administrative Procedure Act ("APA"), 5 U.S.C. § 706(2). As NEPA does not contain standards of review, courts borrow the standard from the APA. *W. Watersheds Project v. Kraayenbrink*, 632 F.3d 472, 481 (9th Cir. 2011). The APA

directs that a reviewing court "shall" set aside agency actions, findings, or conclusions that are "arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law." *Japanese Vill., LLC v. Fed. Transit Admin.*, 843 F.3d 445, 453 (9th Cir. 2016) (quoting 5 U.S.C. § 706(2)(a)). Under the APA, a court must not substitute its judgment for that of the agency, but must nonetheless engage in a "thorough, probing, in-depth review." *Citizens to Pres. Overton Park, Inc. v. Volpe*, 401 U.S. 402, 415 (1971). In conducting this review, the Court's job is to "ensure that the agency considered the relevant factors and articulated a rational connection between the facts found and the choice made." *Greater Yellowstone Coal.*, 665 F.3d at 1023 (quoting *Nw. Ecosystem All. v. U.S. Fish & Wildlife Serv.*, 475 F.3d 1136, 1140 (9th Cir. 2007)). Although this standard of review is narrow, it requires that this Court conduct a "searching and careful" review. *Japanese Vill., LLC*, 843 F.3d at 453–54 (quoting *Marsh*, 490 U.S. at 378 (1989)).

Agency action is arbitrary and capricious if the agency has "entirely failed to consider an important aspect of the problem, offered an explanation for its decision that runs counter to the evidence before the agency, or is so implausible that it could not be ascribed to a difference in view or the product of agency expertise." *Motor Vehicle Mfrs. Ass'n of U.S., Inc. v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 43 (1983).

## SUMMARY OF THE ARGUMENT

Conservation Groups contend the Forest Service violated NEPA in approving the Stateline project by: (1) failing to analyze the direct, indirect, and cumulative effects of grazing on Mexican wolves, contrary to NEPA's "hard look" mandate, and (2) failing to adequately assess whether significant effects to Mexican wolves from grazing may exist such that an EIS was required.

## ARGUMENT

### I. The Forest Service failed to adequately analyze effects and take the requisite "hard look" that NEPA demands.

The crux of this case lies in the Forest Service's failure to comply with NEPA's requirement that the agency take a "hard look" at the impacts of the Stateline Project, and particularly, the cumulative effects associated with livestock grazing on Mexican wolves.

NEPA requires the Forest Service to disclose and analyze the direct, indirect, and cumulative impacts and consequences of its activities. 40 C.F.R. §§ 1502.16(a), 1502.16(b), 1508.25(c), 1508.27(b)(7). The failure here to disclose and analyze these impacts indicates that the Forest Service failed to take a "hard look" at the environmental consequences of its actions. *Klamath–Siskiyou Wildlands Ctr. v. Bureau of Land Mgmt.*, 387 F.3d 989, 993–94 (9th Cir. 2004).

As explained by the Ninth Circuit, an "EA's analysis of cumulative impacts 'must give a sufficiently detailed catalogue of past, present, and future projects, and provide adequate analysis about how these projects … are thought to have impacted the environment." *Te-Moak Tribe of W. Shoshone of Nev. v. U.S. Dep't of Interior*, 608 F.3d 592, 603 (9th Cir. 2010) (citation omitted). Some "quantified and detailed information" is required; general statements "about 'possible' effects and 'some risk' do not constitute a 'hard look' absent justification regarding why more definitive information could not be provided." *Kern v. U.S. Bureau of Land Management*, 284 F.3d 1062,1075 (9th Cir. 2002) (citation omitted). The "analysis must be more than perfunctory; it must provide a useful analysis of the cumulative impacts of past, present, and future projects." *Klamath-Siskiyou Wildlands Ctr.*, 387 F.3d at 994. It is not enough to simply catalogue or briefly mention other projects – an "adequate analysis" is required. *Great Basin Mine Watch v. Hankins*, 456 F.3d 955, 971–72 (9th Cir. 2006). There are "two critical features of a cumulative effects analysis[:] … First, it must not only describe related projects but also enumerate the environmental effects of those projects … Second, it must consider the interaction of multiple activities and cannot focus exclusively on the environmental impacts of an individual project." *Or. Nat. Res. Council Fund v. Brong*, 492 F.3d 1120, 1133 (9th Cir. 2007) (citations omitted).

Importantly, to prevail on a NEPA cumulative effects claim, Conservation Groups "need not show what impacts *would* occur. To hold otherwise would require the public, rather than the agency, to ascertain the cumulative effects of a proposed action." *Te-Moak Tribe*, 608 F.3d at 605 (emphasis added). "Such a requirement would thwart one of the 'twin aims' of NEPA – to 'ensure[] that the *agency* will inform the *public* that it has indeed considered environmental concerns in its decision making.'" *Id.* (citation omitted) (emphasis in original). Conservation Groups, rather, need "show only the potential for cumulative impact" which is not an onerous burden. *Id.*

Simply put, nowhere in the EA does the agency describe, explain, or attempt to assess the potential and/or actual direct, indirect, or cumulative effects of the Stateline Project's grazing authorizations and related infrastructure developments on Mexican wolves, the species' habitat, or the species' recovery prospects in the project area. Nor does the Forest Service identify and describe related projects, such as grazing occurring on other allotments in the Mexican wolf recovery area. *Or. Nat. Res. Council Fund.*, 492 F.3d at 1133.

For context, this is the relevant excerpt from the EA relating to direct and indirect effects on Mexican wolves:

"**Mexican Gray Wolf (*Canis lupus baileyi*)**

Endangered Species Act Status: Endangered January 16, 2015; Experimental, non-essential January 12, 1998; revised regulations January 16, 2015

Pursuant to the Endangered Species Act Section 10(j) rule, the Mexican gray wolf population is an experimental, nonessential population. The section 10(j) rule lists activities, including livestock grazing, specifically excluded from adversely affecting the Mexican gray wolf.

The Mexican gray wolf population is managed by the Interagency Field Team. In the event wolves establish a territory within an allotment or depredation by wolves becomes an issue, various methods to reduce depredation should be considered as recommended by the Interagency Field Team. This may include but is not limited to:

- removal of attractants such as the carcass or visceral remains of livestock and wildlife
- moving livestock from a pasture that is adjacent to or near a denning site during the denning season to an alternative pasture
- employ range riders to patrol livestock herds and prevent depredations that could occur
- hazing wolves by non-lethal methods and/or making loud noises in proximity to wolves
- lethal removal

Reintroduction of experimental non-essential populations of wolves in the recovery area is predicated on wolves adapting to current land uses, including livestock grazing. By definition, an experimental, non-essential population is not essential to the continued existence of the species. Therefore, the preliminary determination is **not likely to jeopardize** for the Mexican gray wolf." 1–ER–0097-98 (emphasis in original).

This is the totality of the Forest Service's analysis, or alleged "hard look," at the direct and indirect effects of the project on Mexican wolves. In truth, no effects or impacts are discussed at all; rather, the agency reiterates the species' status under the ESA and notes that the ESA section 10(j) Rule "lists activities, including livestock grazing, specifically excluded from adversely affecting the Mexican gray wolf."[6] But this mere reiteration of the species' status and the agency's obligations under *the ESA* does not satisfy the NEPA–mandated "hard look" at the direct and indirect effects of this particular project, along with those of other past, present, and foreseeable future projects.

NEPA and the ESA are different statutes, each with a different focus, and even when using the same terms, NEPA should not be conflated with the ESA. *Conservation Cong. v. U.S. Forest Serv.*, 720 F.3d 1048, 1055 (9th Cir. 2013). Nor can compliance with the ESA be used as a substitute for compliance with NEPA. *See Seattle Audubon Soc'y v. Evans*, 952 F.2d 297, 302 (9th Cir. 1991) ("[A]n agency

[6] Note that the Section 10(j) Rule does not state that livestock grazing is an activity that is excluded from "adversely affecting" the Mexican wolf, nor is there anywhere in the Section 10(j) Rule stating that the effects of livestock grazing on Mexican wolves are exempt from NEPA analyses. 80 Fed. Reg. 2,512, 2,557 (providing the text of the 2015 version of 50 C.F.R. § 17.84(k), as revised on January 16, 2015, and as was in effect at the time of the Stateline EA's promulgation).

cannot exempt itself from duties plainly imposed by law; it cannot decide that only one of two statutes governs its activities when the laws themselves, and the implementing regulations, clearly show that both apply." (citations omitted)); *Portland Audubon Soc'y v. Lujan*, 795 F. Supp. 1489, 1509 (D. Or. 1992) (rejecting agency's request for the court to "accept that its consultation with [FWS under the ESA] can substitute for compliance with NEPA).

The Forest Service's cumulative effects section in the EA does no better. For context, this is the relevant excerpt of the EA, which constitutes the entirety of the Forest Service's cumulative effects analysis of the grazing in the Stateline project on *all* wildlife:

> **Cumulative Effects**
> This cumulative effects analysis relies on current environmental conditions as a proxy for the impacts of past actions, because the existing conditions reflect the aggregate impact of prior actions and events. Typically, past actions focus on those of the past 10 to 15 years. However, historic overgrazing and the exclusion of fire from the landscape prior to 15 years ago has had long-lasting effects. Some plant communities have crossed a threshold and reached a new stable state from which they will not return to the identified potential natural community.
>
> Ongoing and reasonably foreseeable activities in the project area that are relevant to the effects on listed, sensitive and management indicator species include recreation, firewood cutting, juniper removal projects, prescribed burning, and noxious weed treatment. Climate change, although it is not a management activity, was also considered. Details are

> contained in the "Terrestrial Wildlife" report in the project record. There are no known occurrences of any sensitive species in the project area. The risk from these activities is low.
>
> Alternative 1 – No Grazing …
>
> Alternative 2 – Proposed Action
> The past, present, and foreseeable future activities have the potential to affect listed, sensitive, and management indicator species, with varying degrees of adverse and beneficial impacts. However, current management direction is designed to eliminate or reduce negative cumulative impacts by protecting listed, sensitive, and management indicator species from direct and indirect impacts.
>
> The direct and indirect effects to listed, sensitive, and management indicator species habitats are expected to be minimal or beneficial under the proposed action. The direct, indirect, and cumulative effects expected from the action alternative is not expected to contribute to a downward population trend that would reduce the existing distribution of any of the [U.S. Forest Service Region 3] listed, sensitive, or management indicator species discussed in this analysis. 1–ER–0115-16.

Again, no effects or impacts to Mexican wolves are identified, much less analyzed. Indeed, the Mexican wolf is not mentioned. The foreseeable future activities are not identified. The "management direction" that will reduce or eliminate negative cumulative impacts is not identified. The grazing allotments adjacent to or near the Stateline Project are not identified. Nor is any analysis included. Instead, the agency simply concludes that there are no cumulative effects

on wildlife from the Stateline project. 1–ER–0115-16. The Forest Service reiterated this finding in each of its three DN/FONSIs, asserting that it had considered cumulative effects of the project and that "[n]o past or future actions have been identified that will combine with the effects of the proposed action to cause cumulatively significant effects." 2–ER–0158; 2–ER–0179; 2–ER–0202.

But in reaching the conclusion that no past, present, or future actions will combine with the effects of the Stateline project, the Forest Service did not provide any of the "quantified or detailed information" that a hard look requires. *Great Basin Mine Watch*, 456 F.3d at 971 (citing *Klamath–Siskiyou Wildlands Ctr.*, 387 F.3d at 993). Indeed, courts have routinely rejected "general statements about possible effects and some risk" – which is more than the Forest Service did here – because they do not constitute a hard look. *Id.*

This first–ever assessment for authorizing grazing on over 270,000 acres of these public lands does not provide detailed information and analysis of the direct, indirect, or cumulative effects of the action on Mexican wolves. Although Conservation Groups identified effects from grazing, including, as discussed below: the risk of livestock conflict on grazing allotments in the area and resulting wolf removal; livestock causing native ungulates to disperse; and genetic threats, the Service did not respond to these comments or analyze these, or any other, potential

effects. *See* 3–ER–0376 (comments raising these issues). In particular, three key impacts to Mexican wolves were ignored, contrary to NEPA's "hard look" mandate.

**A. Management removals due to conflicts with livestock**

The agency did not consider the effects on Mexican wolves resulting from management removals due to conflicts with livestock on the project allotments and other allotments within the recovery area. The Forest Service is well aware of both illegal killing and management removals resulting from alleged conflicts with livestock on federal public lands, whereby Mexican wolves are either killed or permanently removed from their habitat. 3–ER–0359; 3–ER–0331. A meaningful analysis of the direct, indirect, and – in particular – cumulative effects of the Stateline project must include considering the long history of grazing in the MWEPA and historical removals of wolves due to conflict, likely future removals both in the Stateline allotments and on grazing allotments outside of the Stateline Project, illegal killings, and the impacts of that activity on the species' recovery. But the Forest Service's analysis does not include this information or analysis in the EA, nor anywhere else in the record. A true hard look would also consider the effect of livestock displacing Mexican wolves traditional prey, native ungulates, further increasing the potential for wolf/livestock conflict. *See infra* Part I (B).

The Forest Service's biological assessment for the Blackjack and Hickey allotments mentions a relatively recent wolf/livestock conflict on the Alma Mesa allotment (within the Stateline project area), and the likely movement of wolves into more of the Stateline allotments in the near future. 2–ER–0216. The Forest Service's EA, however, does not analyze the effects on Mexican wolves and wolf recovery from livestock grazing and likely conflict removals in the Stateline project area and on other allotments nearby.

Instead, the Forest Service's direct and indirect effects section primarily reiterates the species' status under the ESA and provides a few measures that *might* be employed to protect livestock from wolves. *See* 2–ER–0097-98. The agency's cumulative effects discussion – for *all* of the wildlife in the project area and not just Mexican wolves – consists of just five generic paragraphs (included above) and concludes with the unsupported statement that no significant cumulative effects exist. 2–ER–0115-16.

While the Forest Service references a "Terrestrial Wildlife" report in its cumulative effects section of the EA, that document does not discuss Mexican wolves, 2–ER–0228-29 (stating only that the Forest Service separately consulted- pursuant to ESA obligations- on Mexican wolves), nor was that report provided to the public during the NEPA process. 40 C.F.R. §1500.1(b) ("public scrutiny [is]

essential" to the NEPA process); *Klamath–Siskiyou Wildlands Ctr.*, 387 F.3d at 996 (explaining the agency's underlying data must be made available to the public (citation omitted)); *see also id.* (citing 40 C.F.R. §§ 1500.2(d), 1502.8 (agencies are charged to "encourage and facilitate public involvement in decisions" and thus must ensure "environmental information is available to public officials and citizens before decisions are made")).

And while the Forest Service concludes that no "downward trend" in any listed, sensitive, or management indicator species' populations is expected as a result of the project, 2–ER–0116, the agency did not include information that provided the basis for this conclusion, nor analyze whether this is true with respect to Mexican wolves. *See Klamath–Siskiyou Wildlands Ctr.*, 387 F.3d at 996; 40 C.F.R. §§ 1500.2(d), 1502.8 (underlying data must be provided to the public). And based on information placed before the agency, this conclusion is likely incorrect. As one example, from "1998 to 2002, 100 wolves were released and 58 were removed; from 2003 to 2007, 68 wolves were released and 84 were removed; from 2008 and 2013, 19 wolves were released and 17 were removed" via lawful management removals. 3–ER–0331; *see also* 3–ER–0415 (commenter noting that since the first eleven wolves were reintroduced, over 100 have been removed due to conflicts with livestock). Removals of Mexican wolves as the result of livestock conflict situations are reasonably

foreseeable and can have dramatic and devastating impacts on the species' recovery prospects and thus are important effects that should have been identified and considered. 3–ER–0331.

In this, the Forest Service's first–ever effort to consider the effects of grazing on Mexican wolves across these over 270,000 acres of this endangered species' habitat in the heart of its recovery area, the EA is surprisingly meager as to the direct, indirect, and cumulative effects of livestock grazing and the heightened potential for associated conflict removals on Mexican wolves and the species' recovery. The agency's analysis does not include the kind of quantified and detailed information that NEPA requires, but instead relies on a very few general and conclusory statements. This is insufficient. *Klamath-Siskiyou Wildlands Ctr.*, 387 F.3d at 994.

In short, the agency has "entirely fail[ed] to consider an important aspect of the problem," rendering its approval of the Stateline project arbitrary and capricious, and in violation of NEPA and the statute's implementing regulations. *State Farm*, 463 U.S. at 43; 5 U.S.C. § 706(2)(A); 42 U.S.C. § 4332(2)(C); 40 C.F.R. §§ 1502.16(a), 1502.16(b), 1508.25(c), 1508.27(b)(7).

**B. Displacement of native ungulates causing conflicts with livestock**

The agency also failed to consider the exacerbating threat of the potential displacement of Mexican wolves' primary prey: native ungulates (including elk and deer). Cows compete with native ungulates for forage and can cause native species to abandon their natural habitat. *See* 3–ER–0380 (comments raising the issue and providing scientific support). "It is well understood that livestock significantly displace certain native ungulates. Wallace and Krausman, 1987. Some deer species are known to avoid cattle, Kramer 1973. Elk and deer densities can decline by as much as 92 percent in response to introduction of livestock. Clegg 1994." *Id.* "Given that each AUM allocated to livestock effectively redirects the same forage away from native wildlife, the Forest Service should accurately discuss the public trust resources (wildlife) being replaced by private profit (livestock)." *Id.*

Rather than looking at these issues, the Forest Service chose not to analyze the potential effects raised or respond to the scientific support provided. Again, the Forest Service simply concluded that no analysis of the issue was necessary because "competition for forage between livestock and wildlife was not identified as an issue in the project area." 2–ER–0308. There is no data or explanation underlying this conclusion though. *See id.* This ignores NEPA's mandate that the agency provide more than general, conclusory statements and instead provide some detailed and

quantified information. *Klamath-Siskiyou Wildlands Ctr.*, 387 F.3d at 994; *Great Basin Mine Watch*, 456 F.3d at 971.

This failure ignored an important aspect of the problem. *State Farm*, 463 U.S. at 43. Livestock operations have the potential to threaten Mexican wolves by displacing their prey, due to competition for forage. *See* 3–ER–0380. When native ungulates decline in Mexican wolf habitat, wolves will turn to livestock as a food resource. *See* 3–ER–0320. In short, grazing in Mexican wolf habitat can trigger an adverse cycle of depleting prey availability for the wolves, wolves then turn to livestock instead, which causes more conflict situations, and the conflict is likely to result in management removals of the wolves from the landscape. As noted further above and below, the impacts of this action on Mexican wolves can cause dire direct, indirect, and cumulative effects on the species' survival and recovery prospects overall. *See supra and infra* Parts I (A) and (C). The Forest Service did not analyze this issue in the Stateline EA, rendering its decision arbitrary and capricious, and not in accordance with law. *State Farm*, 463 U.S. at 43; 5 U.S.C. § 706(2)(A); 42 U.S.C. § 4332(2)(C); 40 C.F.R. §§ 1502.16(a), 1502.16(b), 1508.25(c), 1508.27(b)(7).

**C. Genetic health effects resulting from conflict removals**

Relatedly, nowhere in the EA does the Forest Service consider the cumulative genetic health effects of grazing with its associated increased potential for

livestock/wolf conflict (and resulting removals). The FWS has long recognized that loss of genetic diversity is a chief threat to Mexican wolves. 3–ER–0331. "Genetically depressed wolves have lower reproductive success, including smaller litter sizes, low birth weights, and higher rates of pup mortality, as well as lowered disease resistance and other accumulated health problems." *Id.*

The entire population of Mexican wolves in the wild is derived from only seven individual wolves. 3–ER–0321. The FWS has since estimated that the captive population "retains only three founder genome equivalents – i.e., more than half of the genetic diversity of the seven original founders has been lost from the population." 3–ER–0331-32. To highlight the severity of this grave genetic situation, leading Mexican wolf scientists have explained that "[m]embers of the reintroduced population were, on average, as related to each other as full siblings." 3–ER–0332. One leading scientist, Dr. Fredrickson, stated: "the reintroduced population is a genetic basket case in need of serious genetic rehab. Failing to do so is irresponsible and also managing for extinction." *Id.*

Mexican wolves were eradicated to near extinction due to conflict with livestock. 3–ER–0321. Removals due to livestock conflict continue today to be a primary threat to the recovery of Mexican wolves. *Id.* Yet the Forest Service failed to even mention, let alone analyze, the effects of the Stateline project's grazing and the

foreseeable potential removals of Mexican wolves – along with conflict removals on other allotments outside the Stateline project – on the severely genetically depressed population. Neglecting to analyze such an important issue – and the cumulative effects from potential removals in combination with past and likely future removals throughout the wolf's habitat – is a failure to satisfy with the cumulative effects analysis requirements of NEPA and fails to consider an important aspect of the problem. *State Farm*, 463 U.S. at 43; 42 U.S.C. § 4332(2)(C); 40 C.F.R. §§ 1502.16(a), 1502.16(b), 1508.25(c), 1508.27(b)(7).

As explained by the Ninth Circuit, "[c]umulative impacts of multiple projects can be significant in different ways." *Klamath-Siskiyou Wildlands Ctr.*, 387 F. 3d at 994. "Sometimes the total impact from a set of actions may be greater than the sum of the parts." *Id.* "For example, the addition of a small amount of sediment to a creek may have only a limited impact on salmon survival, or perhaps no impact at all. But the addition of a small amount here, a small amount there, and still more at another point could add up to something with much greater impact, until there comes a point where even a marginal increase will mean that no salmon survive." *Id.* The same is true here – the additive impact of livestock conflict removals of a Mexican wolf here and there and in another location can very well "add up to

something with much greater impact" on the species' recovery prospects overall. *See id.*

But there is simply no detailed analysis in the EA of the cumulative effects of any of these activities and threats –both within the Stateline project and beyond – in combination with the Stateline Project's expansive grazing, prey displacement, and infrastructure developments. *See* 2–ER–0097-98; *Great Basin Mine Watch*, 456 F.3d at 971–72 (explaining a detailed analysis is required). This is a major oversight. And this oversight means the Forest Service does not have detailed information and analysis on which to base its decision as to whether the Project may have significant effects (which would require an EIS (*see infra* Part II (A)).

If the total impact from these incremental actions is not aggregated, it is easy to "underestimate the cumulative impacts." *Kern*, 284 F.3d at 1078. This is why the consideration of cumulative effects is so important. *Klamath–Siskiyou Wildlands Ctr.*, 387 F. 3d at 993–94. By not including this information and analysis in the EA, the agency ignored the fundamental purposes of the NEPA document: to inform the public and take a hard look at possible effects of proposed action. The EA itself is where this required information and analysis must be found. *Klamath–Siskiyou Wildlands Ctr.*, 387 F.3d at 997 (explaining that requisite analysis must be in the environmental document). Here again, the agency "failed to consider an important

aspect of the problem," and failed to comply with NEPA's hard look mandate. *State Farm*, 463 U.S. at 43; 42 U.S.C. § 4332(2)(C). Accordingly, the agency's approval of the Stateline project was arbitrary and capricious and in violation of law. 5 U.S.C. § 706(2)(A); 42 U.S.C. § 4332(2)(C).

## II. An EIS is required because substantial questions exist whether significant effects may occur.

NEPA requires a federal agency to prepare an EIS for all "major Federal actions significantly affecting the quality of the human environment." 42 U.S.C. §4332(2)(C). "A plaintiff raising a NEPA claim need only raise substantial questions as to whether a project may have a significant effect to trigger the requirement for an EIS; the plaintiff need not show that significant effects will in fact occur." *All. for the Wild Rockies v. Gassman*, 2023 WL 4172930, at *29 (D. Mont. June 26, 2023) (citing *Ocean Advocs.*, 402 F. 3d at 865 and *Bark v. U.S. Forest Serv.*, 958 F.3d 865, 868 (9th Cir. 2020)).

To determine whether an EIS is required, "the agency must consider the context and intensity of the project; intensity refers to the severity of the project's impact and is evaluated using ten factors." *Id.* (citing 40 C.F.R. §§ 1508.27(b)(1)–(10)). These factors include, *inter alia*, whether the action is related to other actions with individually insignificant but cumulatively significant impacts, the degree to which the action may adversely affect listed species, and the unique characteristics of

the geographic area, such as proximity to ecologically critical areas. 40 C.F.R. §§ 1508.27(b)(1)–(10). The presence of even "one of these factors may be sufficient to require preparation of an EIS in appropriate circumstances." *Ocean Advocs.*, 402 F.3d at 865 (citation omitted). "'If an agency decides not to prepare an EIS, it must supply a "convincing statement of reasons" to explain why a project's impacts were insignificant.'" *Gassman*, 2023 WL 4172930 at *29 (quoting *Cascadia Wildlands v. Bureau of Indian Affairs*, 801 F.3d 1105, 1111 (9th Cir. 2015)).

An EIS was required for the Stateline Project because multiple significance factors were present and substantial questions exist whether significant effects may occur.

**A. The effects to Mexican wolves may be significant, requiring an EIS**

The Forest Service chose not to prepare an EIS yet failed to provide a convincing statement of reasons or fully address the relevant significance factors, particularly, the cumulative effects factor as it applies to the project's potentially adverse impacts on Mexican wolves and the species' recovery in the MWEPA. The lower court agreed with the Forest Service's finding that no impacts exist that may be significant and require an EIS, but its determination erred in an important respect: the agency never analyzed the potential direct, indirect, or cumulative effects of the Stateline Project on endangered Mexican wolves.

As noted, the Stateline project EA contains only three paragraphs discussing Mexican wolves in the direct and indirect effects section of its analysis, and only five paragraphs discussing cumulative effects on *all* wildlife generally. *See supra* Part I; 2–ER–0097-98; 2–ER–0115-16. None of these paragraphs discuss any actual direct, indirect, or cumulative effects, but instead consist of conclusory statements and fail to include either the information on which those conclusions are based or any analysis of the information. *Id.* No effects are discussed. *Kern*, 284 F.3d at 1075 (requiring more than general, conclusory statements in a NEPA analysis); *Klamath-Siskiyou Wildlands Ctr.*, 387 F. 3d at 994 (same); *Great Basin Mine Watch*, 456 F.3d at 973 (rejecting agency's five–sentence cumulative effects section where it included no specific data and merely provided conclusions).

While it appears that the Forest Service relies on the conclusion that the project will not "jeopardize the continued existence" of the Mexican wolf (an ESA standard), 2–ER–0098, as a substitute for assessing whether the project "may significantly effect" Mexican wolves (the proper NEPA standard at issue here), this cannot satisfy the Forest Service's obligation to analyze whether the Project's effects may be significant and therefore require an EIS. Even if a project is found not likely to jeopardize the continued existence of a species protected under the ESA, NEPA still demands that any potential direct, indirect, and cumulative effects of the agency

action still be assessed in the NEPA document itself. *See Makua v. Rumsfeld*, 163 F. Supp. 2d 1202, 1218 (D. Haw. 2001) ("A FONSI … must be based on a review of the potential for significant impact, including impact short of extinction. Clearly, there can be a significant impact on a species even if its existence is not jeopardized.").[7] Where human-caused mortality is already a primary threat to Mexican wolves, even a slight worsening of conditions (including extending the time an affecting activity will occur) may threaten harm that is significant. *Grand Canyon Trust v. Fed. Aviation Admin.*, 290 F.3d 339, 343 (D.C. Cir. 2002) ("[E]ven a slight increase in adverse conditions that form an existing environmental milieu may sometimes threaten harm that is significant") (citation omitted).

[7] Under the ESA, "jeopardize the continued existence of" means the action would reasonably be expected, directly or indirectly, to reduce appreciably the likelihood of either the survival or recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species. *Nat'l Wildlife Fed'n v. Nat'l Marine Fisheries Serv.*, 524 F.3d 917, 931–33 (9th Cir. 2008). The "jeopardy" standard under the ESA is thus a much higher threshold to meet than "may adversely affect an endangered or threatened species" (the standard for preparing an EIS under NEPA). As a result, the courts have been clear that a finding of "no jeopardy" does not avoid the need for an EIS where a project may nonetheless adversely affect a listed species. *See Greater Yellowstone Coal. v. Flowers*, 359 F.3d 1257, 1275–76 (10th Cir. 2004) (recognizing that FWS's no jeopardy conclusion does not necessarily mean impacts are insignificant); *Makua v. Rumsfeld*, 163 F. Supp. 2d 1202, 1218 (D. Haw. 2001); *Portland Audubon Soc'y v. Lujan*, 795 F. Supp. 1489, 1509 (D. Or. 1992).

The Forest Service's brief cumulative effects section for *all* wildlife fares no better – it also is devoid of the consideration of effects to Mexican wolves. 2–ER–0115-16; *See supra* Part I. As explained, the Forest Service did not consider the cumulative effects of the Stateline project's authorized grazing and related infrastructure developments: against the backdrop of the species' limited numbers in the wild population; its expanding range into the Stateline allotments and across the MWEPA; the effects the displacement of native ungulates and prey in Mexican wolf habitat can have upon the species food resources; the high levels of both illegal killing and legal management removals due to wolf/livestock conflicts that the species is already facing; and the impacts that the Stateline project *may* have – additionally and cumulatively – to the recovery potential of the wild population, including to the species' genetic health. *See supra* Parts I (A), (B), (C) (discussing effects ignored by the agency, including in particular, the effects of conflict situations, management removals, and the associated genetic impacts to the population as a whole)].

The Forest Service ignored any actual or potential effects of the Stateline project on Mexican wolves and the species' overall recovery in the MWEPA, despite its location across 270,000 acres of the species' primary recovery area explicitly designated for Mexican wolf reintroduction to occur and within which Mexican

wolves are allowed to roam. With at least one recent wolf/livestock conflict in the Project area and expected movement of wolves into more allotments, the Forest Service recognized measures may be needed to protect livestock, 2–ER–0097-98, but did not identify measures to mitigate the impact on wolves. *Neighbors of Cuddy Mountain v. U.S. Forest Serv.,* 137 F.3d 1372, 1380 (9th Cir. 1998) (a "perfunctory description" or "mere listing" of mitigating measures, without supporting analytical data fails to satisfy NEPA). Here, the Forest Service only identified possible measures to mitigate threats to livestock. As Conservation Groups have pointed out – *See* 3–ER–0405 (Conservation Groups' scoping comments); 3–ER–0376 (Conservation Groups' comments on the draft EA); and 3–ER–0354 (Conservation Groups' objection to the Stateline Project); *see also supra* Part I – substantial questions exist whether effects to Mexican wolves and their recovery resulting from the Stateline project *may* be significant, warranting proper analysis and disclosure by the agency in an EIS. *Blue Mountains Biodiversity Project v. Blackwood*, 161 F.3d 1208,1212 (9th Cir. 1998); *Ocean Advocs.*, 402 F.3d at 865; 40 C.F.R. § 1508.27(b)(1); 40 C.F.R. § 1508.27(b)(7). A showing that effects *may* be significant is all that is required for preparing an EIS. *Blackwood*, 161 F.3d at 1212. This is a low bar. For this first–ever NEPA analysis of an extensive livestock grazing project that covers over 270,000 acres of Mexican wolves' primary recovery area over the next ten

years, an EIS must be prepared to properly assess the consequences of the agency action. 42 U.S.C. § 4332(2)(C); 40 C.F.R. § 1508.27(b)(7); *All. for the Wild Rockies*, 2023 WL 4172930, at *29; *Ocean Advocs.*, 402 F. 3d at 865.

The agency also failed to provide a "convincing statement of reasons" for why an EIS is not required here. *All. for the Wild Rockies*, 2023 WL 4172930, at *29; *Ocean Advocs.*, 402 F. 3d at 865. The only explanation provided by the Forest Service consists of (1) the three paragraphs in the EA that reference Mexican wolves, which merely reiterate the species' status under the ESA and relies on a "not likely to jeopardize" finding, 2–ER–0097-98, combined with (2) the agency's generic "cumulative effects" section for *all* wildlife, 2–ER–0115-16. With no meaningful analysis of the Project's effects on Mexican wolves, the Forest Service simply cannot know if the effects may be significant. 42 U.S.C. § 4332(2)(C); 40 C.F.R. § 1508.27(b)(7). With the Mexican wolf's long struggle to recover, well–known history of being nearly eradicated due to livestock conflict, and ongoing conflict with livestock and removals, Conservation Groups have raised substantial questions about the significance of the effects of the Project on Mexican wolves. As such, the agency's decision not to prepare an EIS should be vacated and remanded, as this factor alone warrants preparation of an EIS for the Stateline Project. *Ctr. for*

*Biological Diversity*, 538 F. 3d at 1220 ("[a]n action may be 'significant' if one of these factors is met" (citation omitted)).

### B. The effects to the unique characteristics of the Greater Gila bioregion may be significant, requiring an EIS

Additionally, substantial questions exist whether the Stateline Project may affect the Greater Gila's unique geographic characteristics, including its proximity to ecologically critical areas, requiring an EIS. 42 U.S.C. § 4332(2)(C); 40 C.F.R. § 1508.27(b)(3).

The Stateline Project authorizes grazing across over 270,000 acres of public lands in one of the Southwest's most wild and unique landscapes, the Greater Gila bioregion. This region is known worldwide for its unique, high-desert and mountain landscape, as well as its abundance of unique ecological and biological resources. The project area includes portions of two federally designated wilderness areas – including the nation's first, the Gila Wilderness – as well as the Blue Range Wilderness. 2–ER–0122. Over 21,589 acres of four of the Stateline Range EA allotments are located within these wildernesses. *Id.* The project area also includes 33,495 acres of the Blue Range Primitive Area, which is generally managed as wilderness. *Id.* Significant range "improvement" activities –– including the construction of 1.6 miles of fence, the installation of 3 water storage tanks, 3 troughs, a solar panel to operate a pump, and 2.9 miles of pipeline – are planned for

the Blue Range Primitive Area. *Id.* Recognizing the potential of such activities to degrade Wilderness areas, Congress generally sought to limit and prohibit these types of infrastructure in Wilderness areas. *See* 16 U.S.C. § 1133(c). Here, the Forest Service has not considered the impacts of the infrastructure. Roughly 79,900 acres of inventoried roadless areas are also within the project boundaries, including portions of the Hell Hole, Lower San Francisco, Mitchell Peak, San Francisco, and Sunset roadless areas. *Id.* Approximately 10 miles of fence, 11 miles of water pipeline, 1 well, 1 trick tank, 2 corrals, 9 water storage tanks, and 14 water troughs are planned in these inventoried roadless areas. 2–ER–0127.

The project area also includes three stretches of rivers that have been deemed eligible for inclusion in the National Wild and Scenic Rivers system: Little Blue Creek and the San Francisco River in Arizona, and Spruce Creek in New Mexico. 2–ER–0123. Six river stretches within the project area in New Mexico are designated as Outstanding National Resource Waters: those portions of Little Whitewater Creek, Big Dry Creek, Spruce Creek, Spider Creek, Little Dry Creek, and Sacaton Creek located in wilderness. 2–ER–0085. No consideration of the impacts to these Wild and Scenic Rivers is included in the EA

The entire project area lies within the heart of the Mexican wolf recovery area, but notably, the EA fails to mention this important fact, nor consider the special

management implications of this essential landscape for wolf recovery. 3–ER–0358 (presenting maps of MWEPA and Stateline project side-by-side); *see also* 80 Fed. Reg. 2,519–20 (explaining that all of the Gila and Apache-Sitgreaves National Forests are within the primary recovery area for Mexican wolves); *see also supra* Part I. This region represents some of the most suitable habitat for Mexican wolf recovery in the American Southwest. Its largely remote, expansive, and wild mountainous terrain, along with ample prey resource availability, make this region one of the most critical areas for furthering Mexican wolf recovery efforts in the wild. However, removal of Mexican wolves in this region due to livestock conflicts is one of the biggest threats facing the species. 3–ER–0331; *see also supra* Part I (A).

And, while the Forest Service's failure to assess the adverse (and cumulative) impacts of the Stateline Project on Mexican wolves is a sufficient defect to require preparation of an EIS, it is worth noting that the project also contemplates effects to numerous other listed species that rely upon the Greater Gila bioregion's unique geographic and ecological landscape, including: Southwest willow flycatchers, Gila chub, loach minnows, spikedace, Mexican spotted owls, Western yellow-billed cuckoos, Chiricahua leopard frogs, northern Mexican gartersnakes, narrow-headed gartersnakes, and Gila trout, all of which are listed as endangered or threatened under the ESA. 2–ER–0098-106.

The EA fails to acknowledge the crucial ecological importance and unique geographical significance of the Stateline Project area for Mexican wolves' and other listed species' recovery. The implementation of the Stateline Project in and near these Wilderness and roadless areas indicates that there may be significant effects to areas with "unique characteristics" such that an EIS is required. *Blackwood*, 161 F.3d at 1212; 40 C.F.R. § 1508.27(b)(1); 40 C.F.R. § 1508.27(b)(3). As such, the agency's finding that no EIS was required was arbitrary and capricious and in violation of law. 5 U.S.C. § 706(2)(A).

## CONCLUSION

NEPA mandates that an agency take a hard look at the effects of its proposed action on critically imperiled species and prepare an EIS when substantial questions exist whether significant effects may occur. The Forest Service failed in its duties under NEPA for the Stateline project. For the foregoing reasons, Conservation Groups urge the Court to reverse the challenged rulings of the district court, vacate the Forest Service's decision authorizing grazing on the Stateline project, and remand this matter back to the agency to conduct a proper analysis complying with NEPA.

Respectfully submitted this 3rd day of June, 2024.

/s/ Kelly E. Nokes
Kelly E. Nokes

Western Environmental Law Center
P.O. Box 218
Buena Vista, CO 81211
(575) 613-8051
nokes@westernlaw.org

/s/ Sarah K. McMillan
Sarah K. McMillan
Western Environmental Law Center
103 Reeder's Alley
Helena, MT 59601
(406) 708-3062
mcmillan@westernlaw.org

*Counsel for Appellants Western Watersheds Project and Wilderness Watch*

**UNITED STATES COURT OF APPEALS**
**FOR THE NINTH CIRCUIT**

## Form 8. Certificate of Compliance for Briefs

*Instructions for this form: http://www.ca9.uscourts.gov/forms/form08instructions.pdf*

**9th Cir. Case Number(s)** 23–3872

I am the attorney or self-represented party.

**This brief contains** 9913 **words,** including 41 words manually counted in any visual images, and excluding the items exempted by FRAP 32(f). The brief's type size and typeface comply with FRAP 32(a)(5) and (6).

I certify that this brief *(select only one)*:

- (●) complies with the word limit of Cir. R. 32-1.
- ( ) is a **cross-appeal** brief and complies with the word limit of Cir. R. 28.1-1.
- ( ) is an **amicus** brief and complies with the word limit of FRAP 29(a)(5), Cir. R. 29-2(c)(2), or Cir. R. 29-2(c)(3).
- ( ) is for a **death penalty** case and complies with the word limit of Cir. R. 32-4.
- ( ) complies with the longer length limit permitted by Cir. R. 32-2(b) because *(select only one)*:
  - [ ] it is a joint brief submitted by separately represented parties.
  - [ ] a party or parties are filing a single brief in response to multiple briefs.
  - [ ] a party or parties are filing a single brief in response to a longer joint brief.
- ( ) complies with the length limit designated by court order dated [ ].
- ( ) is accompanied by a motion to file a longer brief pursuant to Cir. R. 32-2(a).

**Signature** Kelly E. Nokes **Date** 06/03/2024
*(use "*s/[typed name]*" to sign electronically-filed documents)*

## CERTIFICATE OF SERVICE

I hereby certify that on this 3rd day of June, 2024, I electronically filed the foregoing document with the Clerk of Court for the United States Court of Appeals for the Ninth Circuit by using the appellate CM/ECF system. Participants in the case will be served by the appellate CM/ECF system.

/s/ Kelly E. Nokes

Exhibit 2

USDA United States Department of Agriculture
Forest Service
Gila National Forest
Supervisor's Office
3005 East Camino Del Bosque
Silver City, NM 88061

Apache-Sitgreaves National Forests
Supervisor's Office
30 South Chiricahua Drive
P.O. Box 640
Springerville, Arizona 85938

**File Code:** 1570
**Date:** November 1, 2019

Cyndi Tuell
Arizona and New Mexico Director
Western Watersheds Project
738 North 5th Avenue, Suite 200
Tucson, Arizona 85705

CERTIFIED MAIL 7014 1820 0000 7833 6617
RETURN RECEIPT REQUESTED

Dear Ms. Tuell:
On behalf of the Apache-Sitgreaves and Gila National Forests, we would like to thank you for your involvement in the Stateline Range NEPA project, Catron and Grant Counties, Gila National Forest, New Mexico, and Greenlee County, Apache-Sitgreaves National Forest, Arizona. This letter is in response to the objection you filed on behalf of the Western Watersheds Project and Wilderness Watch on the Final Environmental Assessment (EA) and draft Decision Notice (DN). We have read your objection, and reviewed the project record and final EA, including the environmental effects. Our review of your objection was conducted in accordance with the administrative review procedures found at 36 CFE 218, Subparts A and B.

## PROJECT OVERVIEW

The project would authorize grazing in the Apache-Sitgreaves and Gila National Forests in a manner that maintains or improves the project area resource conditions, and moves toward the objectives and desired conditions described in the respective forest land and resource management plans. Allotment management plans (AMPs) would provide long-term management direction for individual allotments, including permitted number and class of livestock, season of use, facilities associated with livestock grazing, allowable forage utilization levels, and associated permit classes.

## ADMINISTRATIVE REVIEW PROCESS

The legal notice for the objection filing period was published July 3, 2019. Your timely objection (19-03-06-0008-O218) was received on August 20, 2019. The regulations at 36 CFR 218 provide for a pre-decisional administrative review process in which the objector provides sufficient narrative description of the project, specific issues related to the project, and suggested remedies that would resolve the objections (36 CFR 218.8). On August 30, Adam Mendonca notified you that we were exercising our discretion to extend the response time, and that it was our intent to issue a final response by November 4, 2019. This letter, including an instruction to the Responsible Official, is our final written response to your objection.

**ISSUE 1:** The draft Decision violates ESA and NEPA.

**Contention 1a:** You contend the assertion that livestock grazing is specifically excluded from the list of activities that can adversely affect wolves is inaccurate (EA, p. 57), that there is no exception for trespass livestock, which are acknowledged to be present in the allotments, nor for the installation of new livestock infrastructure or the maintenance of livestock infrastructure. You contend you are unable to determine whether the agency met the duty to consult with USFWS, if conservation recommendations were received, and what those recommendations might be. You note the non-essential determination made by the FWS in 2015 was challenged and that based on the April 2018 decision by the court, the essential or non-essential status of the wolf as described in the EA is not correct and all analysis that flows from this error should be corrected.

In addition to the above, you contend information about the status of wolves (territory locations), depredation or planned administrative removal, and effects of grazing on wolf prey species are not included in the analysis as was requested in earlier comments. The current analysis as displayed does not support the statement the project is not likely to jeopardize the species, and that management and guidance to reduce wolf mortality and losses is also missing from this analysis. (Objection, pp. 4-6).

**Response:** You contend that the EA fails to analyze the impacts to the Mexican gray wolf from the decision to re-authorize livestock grazing. As the Mexican gray wolf (hereafter wolf) is a listed species, the standard of review is whether or not the analysis to the wolf was sufficient to determine if effects were likely to be significant as required under NEPA.

The forest analyzed the effects of livestock grazing on the wolf as part of its consultation packages for all of the allotments [PR 332, 333 334,335, 337, 338, 339, 340, 341, 343, 344, 345, 346, 348, 349, 350, 351, 352, 353, 354, 364]. These forms and the one Biological Assessment were submitted to the Fish and Wildlife Service for concurrence on the wolf [PR 336, 347, 403]. Concurrence of the determination of "not likely to jeopardize" was received for all allotments except Blackjack and Hickey [PR 356, 362]. The Blackjack and Hickey allotments are still in consultation.

Information on the effects to the wolf was summarized in the EA [PR 365 pp 57-58] and were sufficient to determine that there were no significant effects to the wolf.

In summary, the EA adequately summarized effects to the Mexican gray wolf.

**ISSUE 2:** The draft decision violates NEPA and NFMA.

**Contention 2a:** You contend effects to riparian areas are significant and are not sufficiently or correctly displayed in the analysis, making the analysis and FONSI invalid. You state there is a history of unauthorized grazing and trespass livestock that was neither disclosed nor analyzed with this document. Comments to the draft EA specifically identified the Alma, Dry Creek, and Citizen allotments, and the San Francisco River as having insufficient analysis of unauthorized grazing and there is no detailed information contained in the EA. You contend you have continued to report issues with downed fencing, yet the project identifies additional fencing as the mitigation for trespass cattle (EA, pp. 15, 80). You contend responsive documents you received in response to a FOIA request, though received after the close of the comment period, show that trespass livestock are a regular occurrence and that monitoring reports are outdated. In addition, you maintain a one-time proper functioning conditioning survey does not display

trends. As a result, the draft Decision is based on incorrect information and does not use current data.

You contend the analysis provided in the EA is not site-specific and the reports used to prepare the EA were not available for review. The existing condition for the riparian areas identifies 51 surveyed reaches, but provides only a descriptive sentence for the current status. There is no indication of the miles of riparian areas or reaches within the allotments; how the surveyed reaches are representative of the balance of the riparian areas; and whether the riparian protocol for grazing correlates with the requirements of the Gila and Apache-Sitgreaves forest plans. This information was requested with earlier comments. (Objection, pp. 7-8).

You also contend that the Forest Service failed to properly consult with U.S. Fish and Wildlife Service on multiple species (Objection, p. 20), and that the documented presence of trespass livestock in riparian areas negates a finding of no significant impact (FONSI) for significance factor 9 (the degree to which an action may adversely affect an endangered or threatened species or its habitat) and significance factor 10 (the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment (Objection, p. 21-22).

**Response:** You contend that the draft decision violates NEPA because it insufficiently analyzes unauthorized grazing and the EA does not disclose detailed or site specific information regarding riparian areas.

According to CEQ, an EA should briefly provide sufficient evidence and analysis, including the environmental impacts of the proposed action and alternatives, to determine whether to prepare an EIS or a finding of no significance (40 CFR 1508.9).

The Consideration of Comments for the Stateline Project addresses your contention, stating that exclusion of livestock grazing from the San Francisco River corridor is an issue identified during scoping. The San Francisco River, Mule Creek, and Webster Spring have been excluded from grazing and this project does not propose grazing in these areas. Many specific actions are listed that are to exclude livestock from the San Francisco River, including fence construction, water source installation, and limiting seasons of use. Additionally, the proposed action would exclude cattle from more areas [PR 367, pp. 27-28].

Regarding the lack of information on the riparian areas surveyed, the Consideration of Comments for the Stateline Project explains that six reaches within the project area were determined to be functioning at risk. Changes to management are proposed and analyzed to address the condition of each of these reaches. Data and maps of surveyed stream reaches are contained in the project planning record and in the Watershed Report. [PR 367, pp. 102-103]. The Watershed Report also lists the Properly Functioning Condition survey results, by allotment. Maps showing the locations of the survey are also in the report [PR 366, pp. 32-53]. The project record contains the PFC Assessment for the San Francisco River [PR 401, 12 pages].

The final EA summarizes the site specific information in the Watershed Report [PR 365, pp. 43-53] and contains adequate information to determine that an EIS was not required.

Also in this contention, you ask whether the riparian protocol for grazing correlates with the requirements of the Gila and Apache-Sitgreaves forest plans. You clarify by asking, "In other words, can it be ascertained whether the results of the surveys clearly meet the goals, objectives, standards, guidelines, or monitoring and evaluation to protect riparian areas in those Forest Plans?" The surveys themselves do not correlate to forest goals, objectives, standards and

guidelines. The surveys act as a tool to determine conditions on the ground. It is the project that must correlate, and be in compliance with, forest plan direction. A forest plan consistency review was completed for both the Apache-Sitgreaves' and Gila's forest plans [PR02, 202]. The project was found to be consistent with both.

In addition, you contend that the determinations of effect made by the forest to receive concurrence on effects to listed species did not include the impacts of excess livestock within excluded areas. The standard of review is whether or not the current condition of riparian and aquatic habitat was fully disclosed to the Fish and Wildlife Service during consultation.

The forest prepared consultation forms as part of its consultation package for the above listed [PR 332, 333 334,335, 337, 338, 339, 340, 341, 343, 344, 345, 346, 348, 349, 350, 351, 352, 353, 354, 364]. These consultation forms included disclosure of what streams were excluded and the current condition of riparian and aquatic systems on each allotment. The current condition is the consequence of multiple factors, including wildfires, water withdrawals, and livestock grazing. Where there were issues in riparian and aquatic systems, these were fully disclosed. These forms and the one Biological Assessment were submitted to the Fish and Wildlife Service for consultation [PR 336, 347, 403]. Concurrence was received for all allotments except Blackjack and Hickey [PR 356, 362]. The Blackjack and Hickey allotments are still in consultation. This information was summarized in the EA [PR 365 pp. 54-72].

The consultation with the Fish and Wildlife Service disclosed the condition of riparian and aquatic systems in the allotments.

**Contention 2b:** You contend the effects to climate change have not been adequately disclosed or analyzed. While the Forest Service acknowledges climate change, you contend the analysis does not include impacts of the project on the environment that consider the hotter and drier conditions, decreasing available water, and whether the project will exacerbate impacts of climate change on game species, among other considerations. (Objection, p. 8-9).

**Response:** You contend that the climate change analysis in the EA is "... inadequate and the focus of the analysis is misplaced." At this scale, climate change effects would not be a significant issue worthy of detailed study for the Stateline Range project since the effects cannot be meaningfully evaluated in a global context. According to USDA Forest Service guidance, "For a site-specific action [i.e. this project] significance usually depends on the effects in the locale rather than the world as a whole. Therefore, actions potentially having effects on climate change that are not discernible at the global scale are unlikely to be determined significant from a climate change standpoint for that reason. Because the context of individual projects and their effects cannot be meaningfully evaluated globally to inform individual project decisions, it is not possible and it is not expected that climate change effects can be found to be "significant" under NEPA..." (Climate Change Considerations in Project Level NEPA Analysis, USDA Forest Service Washington Office memo, January 13, 2009).

Changes to GHG emissions and carbon cycling that contribute to climate change occur at a much larger scale than the Stateline project area. Therefore, it would not be possible for the responsible official to meaningfully analyze the effects of the Stateline project on climate change. Climate change is addressed qualitatively in the EA [PR 365, pp. 88-89]. Effects to rangeland resources are also addressed [PR 365, pp. 31-42], as are effects to water resources [PR 365, pp. 42-54], and to game species, threatened and endangered species and special status species [PR 365, pp. 54-75].

The Forest appropriately acknowledged potential climate change impacts and responded to comments on the matter.

**Contention 2c:** You contend the EA fails to address or discuss range suitability, nor does it verify determinations in the forest plan regarding livestock suitability. The EA does not disclose whether allotments are monitored, or what the monitoring displays. From the response to your FOIA request (see contention 2a) it appears that many allotments have not been monitored since 2007. You contend the EA only relates range status to desired condition in general terms, and further fails to report how close any given range is to desired condition or whether it is even possible for individual transects to meet desired conditions. (Objection, p. 9).

In addition, you note adaptive management protocols will be based upon monitoring, yet information such as found in the FOIA request shows monitoring to be more aspirational than practical. You contend this is not reflected in the analysis. (Objection, pp. 14-15).

**Response:** You contend that the forests failed to conduct suitability analyses for the allotments in the projects area, and that the EA does not adequately disclose what monitoring information was used to determine the existing condition. You also contend that desired conditions are not adequately described, and that adaptive management protocols are simply aspirational.

Grazing suitability is analyzed and determined at the forest plan level under the 1982 Planning Rule. Both the Apache-Sitgreaves and Gila National Forests have current forest plans that fall under the 1982 Rule, and there is no requirement under NEPA or the forest plans that a suitability analysis be conducted at the project level. Existing conditions are extensively described for each allotment in the Range Report, with a site-specific description at each permanent monitoring cluster [PR 330, pp. 14-58]. The years in which trend data were collected, and a general description of livestock use on the allotment over the past 15 years, are included in the descriptions of each cluster.

Desired conditions are also described for each forest as determined by their respective forest plans, as well as a number of allotment-specific desired conditions identified by the interdisciplinary team [PR 330, pp. 4-10]. The contention that monitoring will not be conducted to appropriately inform adaptive management decisions is speculative. The monitoring to be conducted to inform adaptive management is adequately described in the EA, including implementation monitoring, effectiveness monitoring, and how monitoring will be used to inform adaptive management decisions [PR 365, pp. 29-30].

**Contention 2d:** You contend the project fails to consider the amount of infrastructure proposed with the project, and the EA fails to address or discuss impacts associated with livestock waterers on species in the project area or impacts livestock have on the areas immediately surrounding water sources. Also, that the EA fails to explain the effect to water sources related to having water removed from a given source (streams, springs, etc.). You contend that dewatering a stream or spring can have devastating effects, and that the analysis fails to display or discuss how many gallons of water will be removed and what the associated impacts will be. Your objection notes that noise impacts from pumps to move water through miles of pipeline were not disclosed; noise associated with pumps can negatively impact wildlife; and where threatened and endangered species or their habitat are present, these impacts can trigger formal consultation. These effects are not disclosed in the EA. You contend the EA fails to analyze the effects of continuous operation of solar panel powered wells on springs and streams in terms of impacts to water levels. (Objection pp. 10-11).

**Response:** You contend that the forest did not adequately analyze water withdrawals and dewatering due to infrastructure, and the effects these would have on aquatic species. The standard of review is whether these activities were analyzed sufficiently to determine that there were no significant effects.

The forest prepared consultation forms as part of its consultation package for the above listed [PR 332, 333 334,335, 337, 338, 339, 340, 341, 343, 344, 345, 346, 348, 349, 350, 351, 352, 353, 354, 364]. These consultation forms included disclosure of what streams were excluded and the current condition of riparian and aquatic systems on each allotment. The current condition is the consequence of multiple factors, including wildfires, water withdrawals, and livestock grazing. Where there were issues in riparian and aquatic systems, these were fully disclosed. These forms and the one Biological Assessment were submitted to the Fish and Wildlife Service for consultation [PR 336, 347, 403]. Concurrence was received for all allotments except Blackjack and Hickey [PR 356, 362]. The Blackjack and Hickey allotments are still in consultation. The forest prepared an Aquatic Biological Resources Report [PR 363] to analyze effects to sensitive aquatic species. This report analyzed effects of water withdrawals on aquatic species.

This information was summarized in the EA [PR 365 pp. 54-72]. The analysis supports the finding of no significant effects.

The overall effects of water withdrawals proposed for the implementation of this project are summarized in the Environmental Consequences section of the EA [PR 365, p. 48] and the Watershed Report [PR 366 pp. 114-115]. The proposed action would develop 3 new wells in Arizona and 2 new wells in New Mexico. Additional storage tanks and troughs would be added to existing water developments. Water systems that would include solar powered pumps would be designed for the pumps to automatically turn off when the troughs and storage tanks are full to avoid continuous pumping. For some of the additional troughs, the livestock would still drink from the same water source, just not have as far to travel to reach it. Currently, permitted livestock numbers consume an estimated 109 acre feet of water annually across the entire project area. With the proposed 3 percent decrease in total permitted numbers the amount of water needed would decrease slightly to an estimated 106 acre feet of water annually.

There would be less dependence on surface water, such as springs and streams, which would provide some benefit to springs in those areas. The Blackjack allotment would have the greatest shift from surface water to groundwater use. However, the majority of the water supply across the project area would still come from surface water with 4 allotments depending entirely on surface water. Considering the size of the project area (271,665 acres), the amount of water needed is considered to be insignificant and discountable with no measurable effects at the project level; that is, the San Francisco River.

**Contention 2e:** You contend the EA fails to address or discuss impacts of fencing on habitat and ask how the fragmentation of the landscape by fencing and other improvements will impact species. In addition, you note it appears that not all mileage of fencing planned is included and disclosed in the proposed action and analysis. (Objection, p. 11).

**Response:** You contend that the forest did not adequately analyze fencing, and the effects these would have on wildlife species. The standard of review is whether these activities were analyzed sufficiently to determine that there were no significant effects.

The forest prepared consultation forms as part of its consultation package for the above listed [PR 332, 333 334,335, 337, 338, 339, 340, 341, 343, 344, 345, 346, 348, 349, 350, 351, 352, 353, 354, 364]. These consultation forms included disclosure of what streams were excluded by fences on each allotment. The current condition is the consequence of multiple factors, including fences. Where there were issues on wildlife, these were fully disclosed. These forms and the one Biological Assessment were submitted to the Fish and Wildlife Service for consultation [PR 336, 347, 403]. Concurrence was received for all allotments except Blackjack and Hickey [PR 356, 362]. The Blackjack and Hickey allotments are still in consultation.

The forest prepared an Aquatic Biological Resources Report [PR 363] and Terrestrial Wildlife and Plant Report [PR 359] to analyze effects to sensitive aquatic species. These reports discussed the amount of and purpose of fences to be constructed.

This information was summarized in the EA [PR 365 pp. 54-72]. The analysis supports a finding of no significant effects.

**Contention 2f:** You contend analysis of roads is insufficient. The project proposes adding existing routes as ML2; you assert that just because roads are currently "on the ground" does not mean there are not impacts. You contend the impacts of these and other roads have not been analyzed, and that the document does not display how adding roads may impact the road density at the level of 6HUC watershed. (Objection, pp. 11-12).

Furthermore, you contend the analysis should disclose and discuss known unauthorized and/or illegal actions such as a road bulldozed into an IRA by a rancher in the Sunflower allotment and the bulldozing of a road into an IRA crossing the San Francisco River. (Objection, p. 21).

**Response:** You contend that the EA does not sufficiently analyze proposed additions of existing routes as maintenance level 2 roads, nor display how road additions would impact road density at 6HUC watershed level. You further contends that unauthorized road building activities into inventoried roadless areas in the Sunflower Allotment and across the San Francisco River should be addressed in the EA. No alleged violation by this project of law, regulation, or policy is cited as part of this assertion, and the Sunflower Allotment is not included as part of this analysis.

Forest Service policy at FSH 7709.55 Chapter 20 indicates the level of analysis required for travel planning including examining key issues, agency objectives and priorities, environmental issues, ability to meet user needs, etc. The project record indicates there is analysis of proposed additions of maintenance level 2 roads to the transportation network. For example, watershed and soil impacts and improvements are identified and analyzed in reference to road designations in the watershed and soil specialist report [PR 366, pp. 105, 109, 114]. Road density changes for the 6$^{th}$ order hydrologic unit code (HUC) watersheds are also included in the watershed and soils report [PR 366, p. 120] and in the EA [PR 365, p. 19]. Additionally, the heritage specialist report analyzes the proposed roads for site impacts and indicates measures of protection [PR 342, pp. 45, 57].

In regards to the objector's contention, the Forest does analyze the addition of maintenance level 2 roads and indicates measures to be taken for resource protection.

**Contention 2g:** You contend the range of alternatives is insufficient because "all or nothing" does not recognize the differences in conditions between allotments. You suggest the no grazing alternative should be considered on an allotment-by-allotment basis; that the restoration and recovery needs of individual allotments are different. (Objection, p. 15).

**Response:** You contend that the draft decision violates NEPA and NFMA because the range of alternatives is insufficient. According to CEQ regulations, the Forest Service is to develop alternatives to address unresolved conflicts concerning alternative uses of available resources (40 CFR 1501.2(c)). Forest Service regulations state that an alternative should meet the purpose and need and address one or more significant issues related to the proposed action (36 CFR 220.5(e)).

The Consideration of Comments for the Stateline Project addresses your contention, stating that the proposed action meets the purpose and need for the project. The proposed action was modified in response to issues developed from scoping comments [PR 367, p. 61]. These modifications are described in a document titled Proposed Changes from the Scoping Notice to the Preliminary EA, 8/27/2018 [PR 203].

Changes between the preliminary and final EA are found in the Alternative Descriptions. Here it is explained that the overall permitted number would be for 3,808 to 3,838 head of cattle and horses, depending on the season, for 44,186 animal unit months. This would be a decrease of 1,276 from current permitted numbers [PR 365, p. 8]. Though the preliminary EA did not disclose these numbers in the description of Alternative 2 [PR 209], the final EA contains more explanation of adaptive management [PR 365, p. 8], and two tables were added to the final EA to display the proposed utilization standards and current utilization standards [PR 365, pp. 9-10].

According to the final EA, the purpose of the project is to authorize grazing, meet the Rescissions Act of 1995 requirements, maintain or improve resource conditions, and incorporate adaptive management [PR 365, pp. 4-5]. Issues identified through scoping included concerns for grazing's effects on soil and watershed health, wildlife, cultural resources, recreation, special management areas, and socioeconomic resources. The final EA concluded that the comments received did not result in the need to create additional alternatives [PR 365, pp. 6-7]. While this does seem like an all or nothing approach, the responsible officials can choose components of the proposed action or something less. The range of alternatives is adequate.

**Contention 2h:** You contend the economic analysis is flawed because it does not apply current grazing fees, but uses a historic, larger fee in its calculations, and that even utilizing that fee, grazing will result in a loss. You note it is also unclear whether this analysis includes the costs to government, thus taxpayers, to manage livestock grazing leases. In addition, while the analysis discusses the amount of beef consumption and relates the number of people who could be fed on beef produced in this area, you contend it does not display or discuss the costs in terms of health or economic costs from conflicts with recreation use, including hunting, and wildlife displacement. (Objection, p. 17).

**Response:** NEPA requires agencies to assess their actions' environmental impacts only. Economic and social impacts that are caused by an action's effect on the physical environment qualify as environmental impacts, but economic and social impacts that flow directly from agency action are not (Jarita Mesa Livestock v. U.S. Forest Service, decided 2017). Economic impacts for this action flow directly from the 3-percent reduction in livestock numbers proposed in Alternative 2 compared to existing permitted numbers. Consequently, NEPA does not require the agency to consider those alleged impacts, nor was the EA required to study them. However, the responsible line officer determines the scope, appropriate level, and complexity of economic and social evaluations to meet overall objectives and policy (FSM 1970.2 and 1970.3). For this project, the Responsible Officials chose to highlight potential socioeconomic effects that may

occur from the proposed action and identified it as an issue to be analyzed by the interdisciplinary team in the environmental analysis.

The EA compared the effects of the proposed action and the no action alternative on ten different resources, including "Socioeconomics." The proposed action would reduce the current permitted number of livestock by 1,276 animal unit months or 3 percent of the total for the 14 allotments within the project area. The draft DN/FONSI indicates that "livestock grazing activities will continue to contribute to the social, economic, and cultural diversity and the stability of the adjacent rural communities."

In terms of grazing fees, since 1981, grazing fees have ranged from $1.35 per animal unit month (AUM) to $2.31 per AUM. The fee averaged $1.55 per AUM over this period. From 2015 through 2019, the fee has changed every year, ranging from $1.35 to $2.11. Fees are set annually under a formula that uses a base value per AUM. The base value is adjusted by three factors: lease rates for grazing on private lands, beef cattle prices, and the cost of livestock production. Given the variation in annual grazing fees, the use of a ten-year average of $1.52 per AUM was appropriate for this analysis. (Grazing Fees: Overview and Issues. (2019). Congressional Research Service, RS21232, 3–4.)

Your objection questions the basis for the figures used to estimate economic contributions. On page 90, the EA notes that the estimated value per animal unit month was $85.11 based on data from the New Mexico Range Improvement Task Force, adjusted for inflation. This figure was multiplied by the number of AUMs that would be authorized under the proposed action (44,186), totaling $3,760,670. This same calculation was used for estimated future stocking rates as well, assuming actual use 50-67% of permitted numbers, to obtain the contribution range based on actual use ($1,880,335-$2,519,649). The source for the $80.34 estimated value of an animal unit month for the Catron County area can be found in the project record as Document #90.

In response to the discussion on beef product production and consumption on page 93, the objector states the EA "must also analyze the well-known economic costs of beef production" and requests disclosure of "whether or not the livestock grazing in the project area is actually consumed in the local region." NEPA implementing regulations directing agencies to focus only on issues "that are truly significant to the action in question rather than amassing needless detail," 40 C.F.R. § 1500.1(b), and to discuss environmental impacts "in proportion to their significance" 40 C.F.R. § 1502.2(b). Non-significant issues include those that are irrelevant to the decision to be made, and conjectural and not supported by scientific or factual evidence. For the purposes of this analysis, the flow of cattle produced on the 14 allotments through the beef production chain into local markets in Greenlee and Catron counties is not relevant to the decision to made and cannot be meaningfully analyzed based on available data.

**ISSUE 3:** The draft decision violates the Wilderness Act and Roadless Rule.

**Contention 3a:** You contend that there is insufficient analysis of the effects of this action on Wilderness character and impacts to Wilderness, Wilderness Study Areas (WSAs), and Inventoried Roadless Areas (IRAs), individually. As a result, the impacts have not been fully disclosed. You question whether livestock distribution issues could be solved by means other than grazing in wilderness areas. The effects have also not been quantified, and there is no response to your earlier question as to whether grazing could be excluded from these areas entirely if it is, as portrayed, a minimal portion of these allotments. In addition, you contend the

EA does not disclose whether the wilderness character of the WSAs are being maintained as it was in 1980.

You noted specific concerns around motorized access and further development within the Blue Range Primitive Area. The EA refers to a minimum requirements analysis, but this analysis was not available to you. In addition, you contend grazing guidelines state improvements should be primarily for the purpose of resource protection and effective management, but do not provide for the use of motorized equipment in the construction of new facilities. You contend, therefore, motorized use cannot be used for construction of new facilities in the Blue Range Primitive Area. (Objection, p. 12-14).

As a result of these issues, you contend that the analysis does not support FONSI significance factor 3 (unique characteristics of the geographic area). (Objection, p. 19).

**Response:** The EA states that no new improvements are proposed within designated wilderness or wilderness study areas [PR 365, p. 82]. Given that no new range improvements are proposed within such areas, there are no potential effects to the undeveloped quality of wilderness character in designated wilderness or wilderness study areas that would result from the proposed action.

The EA also states that the Blue Range Primitive Area is managed as wilderness, and summarizes the effects of the proposed action, including the development of new improvements, on wilderness values in the Primitive Area [PR 365, pp. 82, 84-88]. These effects are analyzed in detail in a Minimum Requirements Decision Guide, and suggest that the proposed improvements will result in improved natural conditions and visitor experiences in the Blue Range Primitive Area [PR 319, pp. 13-15].

The EA clearly states that under the No Action (no grazing) Alternative, one or more qualities of wilderness character would likely improve throughout the project area. And while the EA does not specifically address the effects to each quality of wilderness character resulting from the continued authorization of grazing under the Proposed Action, the project record implies that there will be no new effects to wilderness values as follows:

- None of the allotments that overlap with designated wilderness, wilderness study areas, or the Blue Range Primitive Area as depicted in "Figure 2. Special management areas in the Stateline Range project area" [PR 365, p. 83] are proposed for any increase in the number of AUMs authorized. This suggests that there are likely to be no new effects to any quality of wilderness character from the continued authorization of grazing.
- The Purpose and Need for the project lists one purpose and one need for the project as authorizing livestock grazing in the project area in a manner that maintains or improves resource conditions, and achieves objectives and desired conditions in the project area [PR 365, pp. 4-5]. This suggests that the proposed management of livestock grazing in wilderness, wilderness study areas, and the Blue Range Primitive Area will result in wilderness values and wilderness character being maintained or improved.
- The discussion of existing conditions in the EA states that the vast majority of range transects and riparian areas surveyed demonstrate trends toward improving conditions [PR 365, p. 5]. This suggests that the natural quality of wilderness character in designated wilderness, wilderness study areas, and the Blue Range Primitive Area is improving in most or all circumstances due to ongoing management of livestock grazing.

- The Recreation and Special Management Areas Report contains short statements indicating that direct, indirect, and cumulative effects to the two wildernesses and wilderness study areas resulting from the proposed action would remain unchanged from existing conditions [PR 361, pp. 21, 23].

With respect to questions about resolving livestock distribution issues by discontinuing grazing in wilderness, the Congressional Grazing Guidelines state, "1. There shall be no curtailments of grazing in wilderness areas simply because an area is or has been designated as wilderness, nor should wilderness designations be used as an excuse by administrators to slowly 'phase out' grazing. Any adjustments in the numbers of livestock permitted to graze in wilderness areas should be made ... giving consideration to legal mandates, range condition, and the protection of the range resource..." Further, "It is anticipated that the numbers of livestock permitted to graze in wilderness would remain at the approximate levels existing at the time an area enters the wilderness system" [PR 35, p. 2]. As such, it would be counter to the Congressional Grazing Guidelines to discontinue grazing in wilderness to resolve livestock distribution issues, and further, such an approach would be counter to the purpose and need for the project [PR 365, pp. 4-5].

The 1980 "New Mexico Wilderness Act" (P.L. 96-550) states, "Subject to valid existing rights, the wilderness study areas designated by this section shall, until Congress determines otherwise, be administered by the Secretary of Agriculture so as to maintain their presently existing wilderness character..." As discussed above, analysis and information provided in the EA and project record implies that the project will maintain the existing wilderness character of the wilderness study areas within the project area, thereby meeting the associated mandate in the 1980 enabling legislation.

The project record includes the minimum requirements decision guide (MRDG) referenced in this contention [PR 319]. The cover letter transmitted with the approved MRDG states that due to limited regulatory guidance on the management of primitive areas, the MRDG will be used to analyze the effects of the on the primitive area's values, and to ensure for the protection of the primitive area's values [PR 320, p. 1]. However, because the Blue Range Primitive Area is not designated wilderness, the Congressional Grazing Guidelines and associated requirements related to the use of motorized equipment do not apply to its management. Further, regulatory guidance on the management of primitive areas listed at 36 CFR 293.17 allows for the grazing of livestock and administrative use of aircraft and motor vehicles. As such, there is no legal or regulatory prohibition related to the limited use of aircraft and/or motorized equipment associated with this project.

Concerning effects related to Inventoried Roadless Areas (IRAs) resulting from the proposed action, the EA states that the IRAs will maintain their overall Roadless characteristics [PR. 365, p. 87]. The analysis supporting this statement can be found in the Recreation and Special Management Areas Report [PR 361, pp. 19-20].

In sum, in the context of wilderness, wilderness study areas, the Blue Range Primitive Area, and Inventoried Roadless Areas, this project provides an appropriate level of analysis and meets existing legal, regulatory, and policy guidance, and a Finding of No Significant Impact (FONSI) is appropriate in the context of these values.

**ISSUE 4:** You contend the analysis does not support a FONSI.

**Contention 3a:** Significance factor 1. You contend that there are or may be significant effects from livestock grazing, and that the analysis of these effects relative to intensity is insufficient and does not support a FONSI. (Objection, p. 18-19).

Significance Factor 2: You contend public health and safety have not been sufficiently addressed because air quality, fuels/fire management, visual quality, soils, and water quality (impacts from *E. coli*) have not been analyzed and discussed. (Objection, pp. 15-16, 19).

Significance Factor 4: You contend that science supports the finding there are detrimental effects from grazing to wildlife and watershed. You also contend that even without any scientific controversy, livestock grazing on federal public lands is highly controversial and this controversy has not been addressed in this EA. (Objection, p. 19).

Significance Factor 5: You contend you have highlighted several areas of uncertainty or where there may be unique risks. (Objection, p. 19).

Significance Factor 6: You contend that the widespread authorization of livestock grazing appears to ensure that in the future, grazing will continue, and that this represents a decision in principle about a future consideration. (Objection, pp. 19-20).

Significance Factor 7: You contend the EA fails to explain why these allotments were grouped into a single project, and why other allotments were excluded (Objection, p. 3). The analysis does not display effects from and to each allotment, and contend they are grouped so as to minimize the impacts of grazing on federal public lands. Though you contend that breaking projects into small parts (allotment-by-allotment basis) can minimize cumulative effects, you also contend the Forest Service has an obligation to analyze the impacts of grazing on each allotment, to display these effects, and allow public comment. (Objection, p. 20).

Significance Factor 8: You contend a significant lack of compliance with management recommendations within the project area such that the Forest Service cannot rely on compliance to minimize impacts to cultural and historic sites. You also contend, therefore, the analysis does not support a finding of no significance in this significance factor. (Objection, p. 21).

**Response:** You contend that the analysis does not support a FONSI, specifically the 8 significance factors.

- *Significance Factor 1: You contend there may be significant effects from livestock grazing, and that the analysis of these effects relative to intensity is insufficient.*

CEQ NEPA regulations explain that use of the term "significantly" requires considerations of both context and intensity. Considering intensity, agencies are to evaluate impacts that may be both beneficial and adverse (40 CFR 1408.27). According to the Draft Decision Notice and Finding of No Significant Impact, both beneficial and adverse impacts were considered in the Affected Environment and Environmental Impacts section of the final EA. Grazing may result in removal of herbaceous vegetation, up to conservative use levels (31-40 percent), except riparian areas not in properly functioning condition, where use levels would be limited to light to non-use level (or zero to 30 percent). Structural improvements will benefit resources over the long term. Rangelands, soil, riparian, and watershed conditions are expected to maintain or improve [PR 27, p. 22]. The final EA summarizes the effects to riparian and soils resources, by allotment, as mostly beneficial, but acknowledges that mitigation is needed for some areas [PR 365, pp. 50-

51]. Similarly, the final EA summarizes the effects to watershed-related resources as mostly localized and short-term [PR 365, pp. 52-53].

- *Significance Factor 2: You contend public health and safety have not been sufficiently addressed, including air quality, fuels/fire management, visual quality, soils, and water quality (impacts from E. coli).*

In considering intensity, CEQ NEPA regulations state that agencies are to evaluate the degree to which the proposed action affects public health and safety (40 CFR §1508.27b (2)). The draft Decision Notice and Finding of No Significant Impact states that no significant effects on public health or safety were identified. Water quality was considered, including and impaired streams containing E. coli; however, livestock grazing is only one of several likely sources for the impairment [PR 27, p. 23]. The final EA describes the E. coli contamination along 25 miles of the Blue River and 19 miles of the San Francisco River. The proposed action would continue to limit access to the San Francisco River, as well as implement adaptive management and improve livestock distribution, contributing to improved water quality [PR 365, p. 44 and 49].

For soil quality, as mentioned above (significance factor 1): Rangelands, soil, riparian, and watershed conditions are expected to maintain or improve [PR 27, p. 22]. The final EA summarizes the effects to riparian and soils resources, by allotment, as mostly beneficial, but acknowledges that mitigation is needed for some areas [PR 365, pp. 50-51].

For air quality, the final EA states that the two national forests' management activities do not contribute to the increase of pollutants except for particulate matter from road dust and smoke emissions. No direct or indirect impacts to air quality are expected from either alternative [PR 365, p. 94].

Fuels/fire management was considered in the final EA as part of the ongoing and reasonably foreseeable future activities for cumulative effects analysis for recreation. Prescribed fire activities are expected to continue within the Hickey and Blackjack allotments [PR 365, p. 81].

Visual quality is not formally addressed, although the proposed improvements are described as having some impact on visual aesthetics in Recreation effects section [PR 365, p. 80]. Visual quality does not seem to be related to public health and safety.

- *Significance Factor 4: You contend that science supports the finding that detrimental effects from grazing to wildlife and watershed and livestock grazing on federal public lands is highly controversial.*

In considering intensity, CEQ NEPA regulations state that agencies are to evaluate the degree to which the effects on the quality of the human environment are likely to be highly controversial (40 CFR §1508.27b (4)).

The draft Decision Notice and Finding of No Significant Impact states that the term "controversial" refers to cases where substantial scientific dispute exists as to the size, nature, or effects of a major Federal action on a human environmental factor rather than to public opposition of a proposed action. The draft DN/FONSI further explains that the management practices proposed are commonly used resource management practices described in agency directives and prescribed in forest plans while acknowledging that some members of the public are opposed to grazing. It concludes that the effects of the proposed action are not highly controversial within the context of the National Environmental Policy Act [PR 27, p. 24].

- *Significance Factor 5: You contend you have highlighted several areas of uncertainty or where there may be unique risks.*

In considering intensity, CEQ NEPA regulations state that agencies are to evaluate the degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks (40 C.F.R § 1508.27b (5)). According to the draft Decision Notice and Finding of No Significant Impact, the effects analysis in the final EA indicates that the project's effects are not uncertain and do not involve unique or unknown risk. The effects described are based on experienced resource management professionals' judgement, using the best available information [PR 27, p. 24].

- *Significance Factor 6: You contend that the widespread authorization of livestock grazing appears to ensure that in the future, grazing will continue, and this represents a decision in principle about a future consideration.*

In considering intensity, CEQ NEPA regulations state that agencies are to evaluate the degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration (40 CFR § 1508.27b (6)). According to the draft DN/FONSI, the decision to reissue grazing permits for the Stateline group of allotments does not establish a precedent for future actions with significant effects. It is a stand-alone decision, and each grazing allotment is evaluated independently on its own merits. Future actions will be evaluated on a project-by-project basis through the environmental analysis process and will stand on their own as to environmental effects and project feasibility [PR 27, p.25].

- *Significance Factor 7: You contend that the EA fails to explain why these allotments were grouped into a single project, and that the analysis groups effects so as to minimize the impacts of grazing. The analysis should display the impacts of grazing on each allotment.*

In considering intensity, CEQ NEPA regulations state that agencies are to evaluate whether the action is related to other actions with individually insignificant, but cumulatively significant impact (40 CFR § 1508.27b (7)). The draft DN/FONSI states that the cumulative impacts of the action were considered and disclosed in the final EA. No past or future actions have been identified that will combine with the effects of the proposed action to cause cumulatively significant effects [PR 27, p. 25]. The Affected Environment and Environmental Impacts section of the final EA addresses cumulative effects for rangeland resources, soil and watershed condition, wildlife, cultural resources, recreation, special management areas, socioeconomics, environmental justice, and air quality [PR 365, pp. 41-42, 53, 75-76, 78, 81, 87, 93-94, 95].

The final EA describes rangeland resources effects to each allotment [PR 365, pp. 38-40]. The Range Report contains further explanation for each allotment [PR 330, pp. 60-63, 66-69, and 70-72]. The Consideration of Comments addresses why the allotments were grouped into a single project, explaining that the project was needed for allotments without recent NEPA analysis to comply with the 1995 Rescissions Act. Grouping several allotments together also helps to better address cumulative effects and effects to a watershed or multiple watersheds [PR 367, p. 59].

- *Significance Factor 8: You contend a significant lack of compliance with management recommendations within the project area such that the Forest Service cannot rely on compliance to minimize impacts to cultural and historic sites. You also contend,*

*therefore, the analysis does not support a finding of no significance in this significance factor. (Objection, p. 21).*

In considering intensity, CEQ NEPA regulations state that agencies are to evaluate the degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources (40 CFR § 1508.27b (8)). The draft DN/FONSI states that areas proposed for ground-disturbing activities have been, or will be, surveyed prior to construction, and all cultural resources or historic sites will be avoided. Proposed management activities are likely to maintain or improve vegetation cover and stable soils which would benefit cultural resources by reducing the visibility of sites and the movement of artifacts [PR 27, p. 25]. The final EA further explains that coordination with the archaeologist is a condition for implementing proposed range improvements [PR 330, p. 78].

## CONCLUSION

We have reviewed the project in light of the issues presented in the objection letters received. Our review finds the project is in compliance with all applicable laws and the Apache-Sitgreaves and Gila National Forest Plans.

However, we also find there is an opportunity to better describe or clarify some information within the Final EA or Final Decision Notice (DN) and are issuing the following instructions. This clarification is not outside of the analysis provided in the NEPA or project record documents, and thus does not require supplemental NEPA.

**Instructions:**

- To address questions and concerns around impacts to characteristics of inventoried roadless areas, wilderness, wilderness study areas, and the Blue Range Primitive Area, provide clarification on how the EA's determination of effects was made, specifically including the determination of effects considering the nine roadless characteristics listed in the 2001 Roadless Rule (per 26 CFR Part 294.11).
- Include a citation for the AUM value used on page 90 of the environmental assessment.
- One objection highlighted that the project incorrectly applied the term 'wetland'. We are instructing the forests to amend the finding of no significant impact (FONSI) to extend the definition of wetlands to include cienegas, seeps, springs, riparian areas, and other bodies of water, including ephemeral wetlands. With this change, we are also instructing the forest to correct the FONSI where it describes wetlands as not occurring in the project area.
- Part of the rationale for applying adaptive management to grazing allotments is the ability of the decision maker to make changes to the way grazing is managed in any given year. These changes are in response to many factors and assist a forest in achieving the desired conditions for various resources within the project area. We are instructing the forest to provide more explanation of the intention and application of adaptive management.

The District Rangers, Edwin Holloway, Clifton Ranger District, and Erick Stemmerman, Glenwood Ranger District, may sign the Decision Notice for this project once these instructions have been addressed. Our review constitutes the final administrative determination of the

Department of Agriculture; no further review from any other Forest Service or Department of Agriculture official of our written response to your objection is available. [36 CFR 218.11(b)(2)].

Sincerely,

M. STEPHEN BEST
Forest Supervisor
Apache-Sitgreaves National Forests

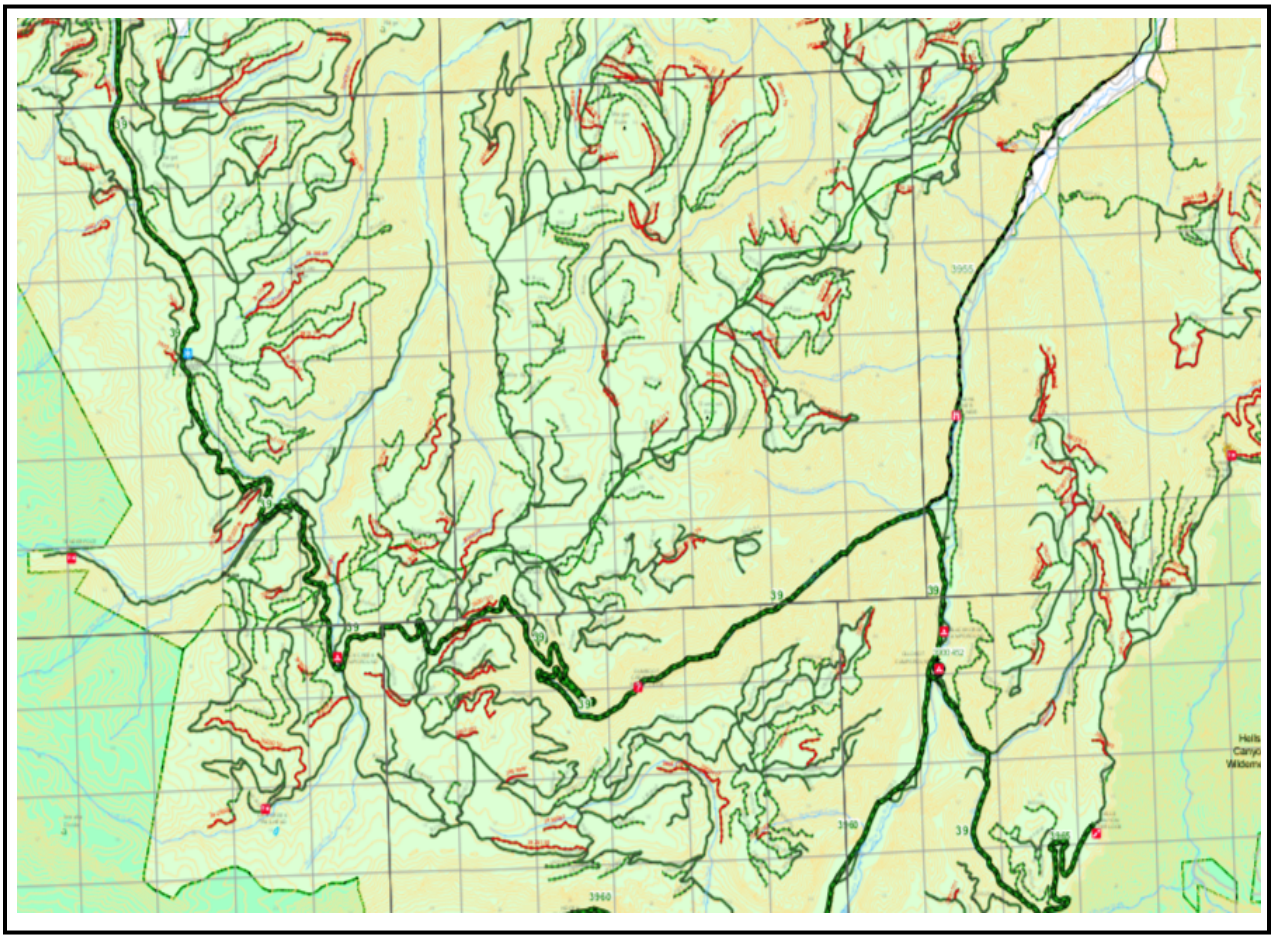
ADAM MENDONCA
Forest Supervisor
Gila National Forest

# Exhibit 3

WILDEARTH GUARDIANS
A FORCE FOR NATURE

# A Dilapidated Web of Roads -

## The Forest Service's Departure From a "Sustainable" Forest Road System



**January 2021**

**Cover image:** Birds eye view of a typical network of roads on national forest lands. Green lines signify the roads that the agency determined are "needed" and red lines are those that are "unneeded". Significant "needed" roads remain.

**WildEarth Guardians.** A Dilapidated Web of Roads -The Forest Service's Departure From a "Sustainable" Forest Road System. January 2021.

## Table of Contents

## Introduction

National forests spread from coast to coast across 40 states, spanning 193 million acres. These forests provide habitat for over 30% of the threatened and endangered species in the U.S., supply 20% of the nation's water to rivers and streams, offer countless places for Americans to recreate and are essential for the cultural, spiritual and personal survival of tribal nations. How these millions of acres are managed - $1/12^{th}$ of U.S. lands and waters – is vitally important, yet often overlooked.

The Forest Service (USFS), part of the U.S. Department of Agriculture, is the agency that has the responsibility to manage these forests – as set forth in the policy direction of the 1897 Organic Act:

> "…to improve and protect the forest within the reservation, or for the purpose of securing favorable conditions of water flows, and to furnish a continuous supply of timber for the use and necessities of citizens of the United States."[1]

Later laws like the 1960 Multiple-Use Sustained Yield Act broadened policy and directed that lands and waters be managed "for outdoor recreation, range, timber, watershed, and wildlife and fish purposes."[2] Despite these policies, the Forest Service has a long history of heavily supporting, subsidizing, and prioritizing extractive uses like logging, grazing, and mining over water protection, wildlife recovery, and recreation. The result is a legacy of mismanagement that has degraded the ecological integrity of forests and grasslands, and left in its wake polluted streams and fragmented habitats.

In order to log, mine, and graze, the Forest Service carved and spliced a vast network of roads across millions of acres of national forest lands. The agency built many roads in poor locations and did not construct them to last. Today, with over 370,000 miles of roads and a draconian budget that leaves 90% of the roads unmaintained, the Forest Service is facing a severe crisis that is exponentially worsened due to climate change. The agency does not have the resources to repair or maintain the entire forest road system. Left unchecked, forest roads will continue to fall apart, bridges will keep collapsing, and access to public lands will further be unreliable at best and unsafe at worst.

The Forest Service, along with numerous conservation and recreation groups, recognized this problem decades ago and developed a blueprint for a sustainable road system through the 2001 Roads Rule.[3] The goal was to establish a road system that would provide access for recreation and management, is aligned with budget realities, while also reducing impacts to ecological functions and wildlife.

On the $20^{th}$ Anniversary of the Roads Rule, it is important to review where the agency is today. This paper provides background on the rule, analysis of the progress to date and opens the door to a broader discussion on what is needed to truly meet the goals of the Roads Rule. As innocuous as forest roads may seem, healthy forests, waterways, wildlife are at risk, particularly as impacts from climate change become more pronounced.

---

[1] Organic Administrative Act of 1897. 30 Stat. 34-36; codified U.S.C. vol. 16, sec. 551.
[2] Multiple Use Sustained Yield Act of 1960. 16 U.S.C. §§528-531 and U.S. Forest Service. "Managing Multiple Uses on National Forests, 1905-1985. A 90-year Learning Experience And It Isn't Finished Yet." Available: http://npshistory.com/publications/usfs/fs-628/chap1.htm (last accessed January 4, 2020).
[3] Road Management Policy. 2001. 36 CFR Parts 212, 261 and 295.

## The 2001 Roads Rule - An Important Step Forward

Road construction across national forest lands always existed to support extractive industry demands, but rose exponentially after World War II. Housing demands created a large market for building supplies and lumber, which meant that forests were being cut at record paces. Congress supported the logging industry by dedicating millions of taxpayer dollars to the Forest Service to construct forest roads everywhere and anywhere. Roads were bulldozed through floodplains and up river valleys. Roads were cut along steep hillsides and over mountain tops. There was little thought or planning involved with the primary road construction driver being the need to cut trees. The figure below illustrates the rapid road construction over two decades.

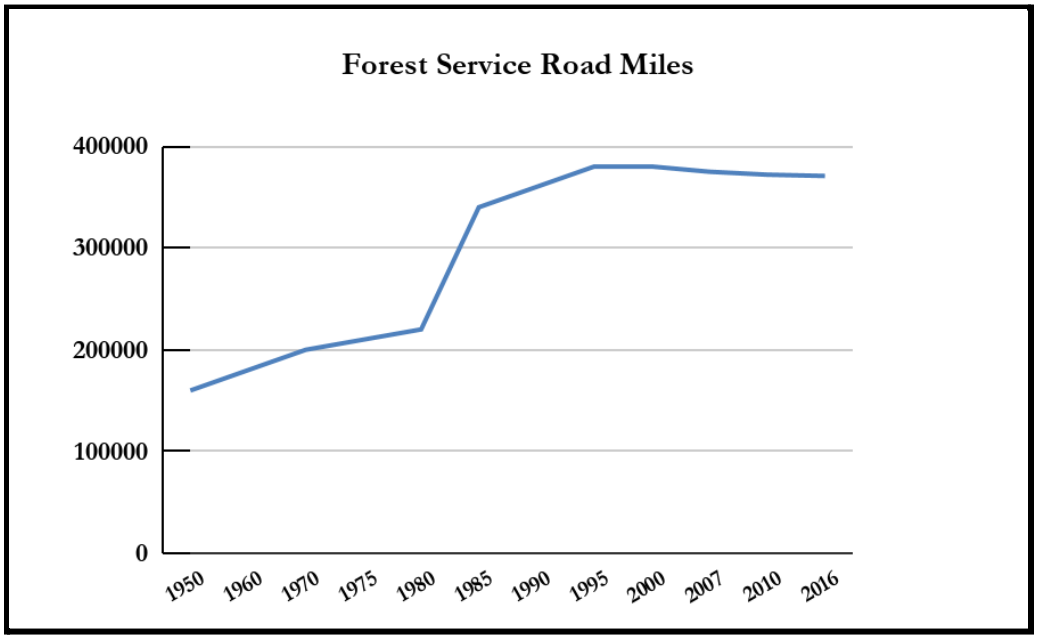



**Figure 1. Growth of Forest Service road system from 1960-2016.**[4]

By the late 1990's, as timber markets changed, the Forest Service began to acknowledge the growing body of evidence illustrating the harmful consequences from its poorly located, constructed, and managed forest road system. At the same time, the billions of dollars in Congressional appropriations that largely paid for building the road system were dropping at a rapid pace. Conservation groups, fueled by a groundswell of public support, pushed the agency to change. As a result, the Forest Service initiated a process to overhaul its road management policies. In 1998, the Forest Service issued an Advance Notice of Proposed Rulemaking announcing its intent to revise regulations concerning the management of the National Forest Transportation System.[5] The multi-year effort resulted in the landmark 2001 Roadless Rule, that most people are familiar with, protecting millions of acres of national forests from logging and road building. At the same time, then Forest Service Chief Mike Dombeck signed the Road Management Strategy Rule and Policy that went into effect on January 12, 2001, otherwise known as the "Roads Rule."[6]

[4] Adapted from Gerald Coghlan and Richard Sowa. *National Forest Road System and Use Draft Report.* USDA Forest Service. 1998.
[5] 63 FR 4350
[6] See 66 Fed. Reg. 3217 (Jan 12, 2001). See also, March 1, 2001 USDA Road Management Policy Notice

The "Roadless Rule" protected the last remaining wild places from road building and the associated impacts that roads bring. The "Roads Rule"was developed to deal with the vastly oversized and harmful forest road system that was already constructed. It required the Forest Service "to set a standard that each forest identify the minimum road system required to balance access objectives with ecosystem health goals; and to use a science-based roads analysis to identify the road network needed to serve the public and land administrators".[7] The new "Roads Rule" also required the Forest Service to identify unneeded roads for decommissioning, or other uses, and to give priority to those that pose the greatest risk to public safety or environmental quality. The "Roads Rule's" intent was to move the forest road system toward a more "sustainable" condition, one that balanced ecological, economic, and social needs. One main failing was its lack of compliance deadline. In fact, the only deadline was the requirement for each forest to complete the "science-based roads analysis" by July 2003, with some exceptions.[8] Most national forests did meet this one deadline, but did so by only analyzing a fraction of their roads—those managed for passenger vehicles that account for less than 20% of the overall system. The other 80% of their road system, the dirt roads or those managed for "high-clearance" vehicles, were ignored.

**Figure 2. The photo on the left illustrates a typical "passenger vehicle" maintained road often with paved surface, wider road footprint, safety features such as guardrails and higher maintenance costs. The photo on the right illustrates a typical "high-clearance" vehicle road that is often natural surface, narrow road footprint, less maintenance costs which leads to gullies, ruts and potholes. As of 2018, 83% of nationalforest roads are minimally maintained in the "high-clearance" category.**

This narrow review meant that the roads problem wasn't getting resolved. At the same time, the Forest Service was taking a broader look at the impacts of roads and motor vehicles (i.e. off-highway vehicles (OHV's) and snowmobiles), leading to the adoption of the Travel Management Rule in 2005. The agency determined that there was a need for a new rule because the types and uses of motorized vehicles had increased, the road system was continuing to deteriorate, and all of this was harming the environment. The Travel Management Rule has three subparts: Subpart A — Administration of the Forest Transportation System; Subpart B - Designation of Roads, Trails and Areas for Motor Vehicle Use; and Subpart C — Use by Over-Snow Vehicles (see Table 1). The agency immediately focused on Subpart B in order to reduce the most harm by restricting off-road vehicles to specific designated roads, trails, and areas.[9] As a result, the agency devoted its time and resources toward addressing poorly managed motorized recreation.

[7] 2001 Roads Rule. 36 CFR Parts 212, 261 and 295.
[8] 66 FR 3235
[9] See 70 Fed. Reg 68264 (Nov. 9, 2005).

| Table 1. Overview of the Differences Between Subparts of the Travel Management Rule | | | |
|---|---|---|---|
| **36 C.F.R. §212** | **Objective:** | **Requires:** | **Product(s):** |
| Subpart A; Roads Rule | To achieve a sustainable national forest road system. | Use a science-based analysis to identify the minimum road system and roads for decommissioning | - Travel Analysis Report<br><br>- Map with roads identified as "likely needed" and "likely unneeded" |
| Subpart B; Travel Management Rule | To protect forests from unmanaged off-road vehicle use by ending cross-country travel and ensuring the agency minimizes the harmful effects from motorized recreation. | Designating a system of roads, trails, and areas available for off-road vehicle use according to general and specific criteria. | - Motor Vehicle Use Maps that indicate what roads/trails are open for motorized travel |
| Subpart C; Travel Management Rule | To protect forests from unmanaged over-snow vehicle use in a manner that minimizes their harmful effects. | Designating specific roads, trails, and/or areas for oversnow vehicle use according to the criteria per Subpart B. | - Oversnow vehicle maps designating trails and areas for winter motorized recreation |

In 2009, the Forest Service updated its directives pertaining to the "science-based analysis" required under Subpart A, thereby establishing the Travel Analysis Process (TAP) that could support, separately or together, the planning process for both Subparts A and B. Once completed, the resulting Travel Analysis Reports were meant to inform National Environmental Policy Act (NEPA)-level analysis and decisions for the identification of the minimum road system. Yet, upon the release of the new travel analysis process directives, many national forests were already far along in their efforts to designate off-road vehicle use, and either did not produce a Travel Analysis Report or did so only for the purposes of meeting Subpart B requirements. As such, compliance with Subpart A languished.

Then, in 2010, the Forest Service's Washington Office issued a memorandum reaffirming its commitment to identify a minimum road system and unneeded roads as required under Subpart A.[10] The memo explained

[10] See Forest Service Memorandum, November 10, 2010 by Deputy Chief Joel Holtrop (stating, "[b]y completing the applicable sections of Subpart A, the Agency expects to identify and maintain an appropriately sized and environmentally sustainable road system that is responsive to ecological, economic, and social concerns."

that "[b]y completing the applicable sections of Subpart A, the Agency expects to identify and maintain an appropriately sized and environmentally sustainable road system that is responsive to ecological, economic, and social concerns."[11] The memo directed that each forest must complete a travel analysis process, which analyzed the risks, benefits (i.e. access needs), and costs of their road system that incorporated ***all*** system roads. The new deadline was set as the end of fiscal year 2015. The resulting travel analysis reports were to be accompanied by a map and list of roads identifying which are "likely needed" and which are "likely unneeded." Upon concerns by some local governments and proponents of motorized recreation, the Washington Office replaced the 2010 memo with another in 2012 that explained, "...travel analysis does not trigger the NEPA. The completion of the Travel Analysis Process is an important first step towards the development of the future minimum road system (MRS)."[12] The 2012 memo included the triangle diagram (below) describing where the agency viewed roads analysis in relation to NEPA analysis.

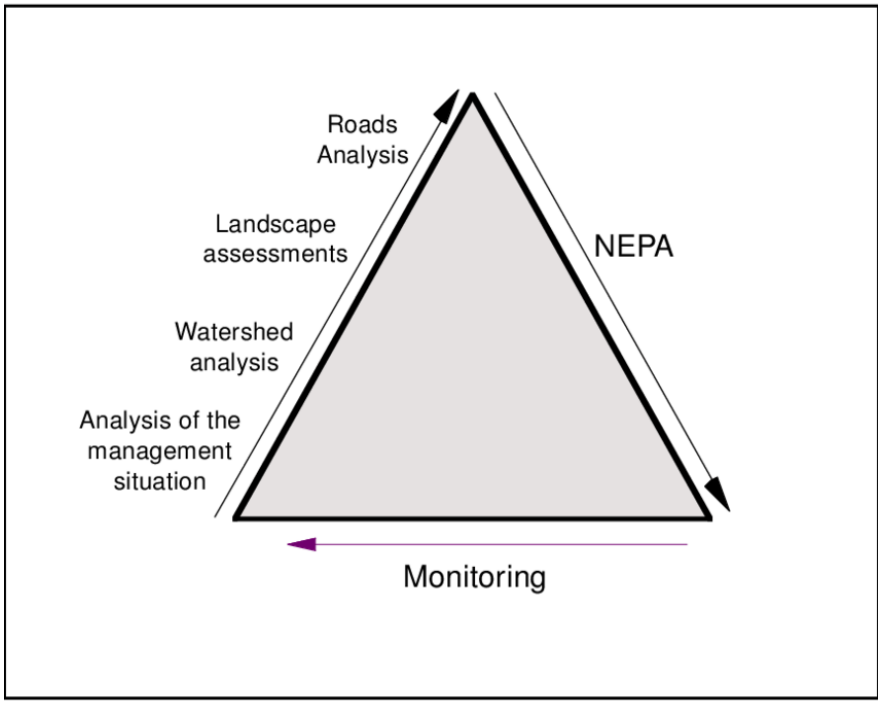



**Figure 3. Excerpted from the 2012 Forest Service memo explaining the distinction between the analysis step and minimum road system decisions.**

The 2012 memo retained the requirement that each forest complete travel analysis by 2015, which most did. The next step was to use travel analysis recommendations to inform NEPA analyses (the right side of the triangle diagram) and decisions to identify a minimum road system, a process that has yet to occur across most Forest Service lands.

[11] See Forest Service Memorandum, November 10, 2010 by Deputy Chief Joel Holtrop.
[12] See Forest Service Memorandum, March 29, 2012 by Deputy Chief Leslie Weldon, (stating, "[t]he next step in identification of the MRS is to use the travel analysis report to develop proposed actions to identify the MRS. These proposed actions generally should be developed at the scale of a 6th code subwatershed or larger. Proposed actions and alternatives are subject to environmental analysis under NEPA. Travel analysis should be used to inform the environmental analysis.").

## Reviews of the Forest Service Travel Analysis Process

The Travel Analysis Process had flaws from the beginning. In an effort to support individual forest autonomy, the Washington Office provided very little direction in how forests should analyze their road systems, how to estimate costs and what criteria to use in determining needed vs. unneeded roads. This led to travel analysis processes that varied widely between regions, with some containing systemic flaws.

In 2016, after repeated examples of problematic processes and reports brought to the attention of the USFS Washington Office (WO) by The Wilderness Society and WildEarth Guardians, the U.S. Department of Transportation John A. Volpe National Transportation Systems Center (Volpe) was contracted to review a random sample of travel analysis reports from each region to provide third-party feedback. In total, Volpe reviewed the travel analysis processes and reports from 38 of the 154 forests. The Volpe Center shared its findings in a draft report shared internally within the Forest Service.[13] The draft report contained several important observations and listed three overarching concerns:

- A lack of clarity regarding the process;
- Failure to follow 36 CFR 212.5(b) direction and Washington Office guidance; and
- Omission of required documents, referenced appendices, or key supporting materials.

Out of numerous critical observations, one top issue was ambiguity in how a given road was rated overall (e.g., high risk, low risk, high benefit, etc.[14]). Volpe found that 14 travel analysis reports, 37% of total reviewed, failed to explain what particular combination of factors led a road to be classified as high risk or high benefit. Some forests used flow charts or prioritized certain factors (e.g., all roads covered by easements or cooperative agreements are considered overall high benefit roads), while others simply broke down the scoring ranges arithmetically (e.g., after adding the scores for all risk factors on each road, those roads with scores in the top 33 percent of possible scores are high risk). The review team even flagged travel analysis reports where no methodology was described or justified at all.

Another top issue was how the results informed recommendations related to the minimum road system. Most forests identified particular risk/benefit categories, such as all high-risk and low-benefit roads, to recommend as "likely not needed" or for specific actions, such as changing the road maintenance level (a lower maintenance level means the road is less costly to maintain). Yet, Volpe found 15 travel analysis reports (39%) did not describe any method for developing recommendations, although a few simply did not explain their rationale for making exceptions to an overall approach.

Further, Subpart A directs that the minimum road system should "reflect long-term funding expectations." Volpe found that forests and regions differed widely in how they analyzed and presented estimates of future funding available for road maintenance. In most cases, forests estimated only an annual basic maintenance cost for the current road system, which omitted costs for the recommended minimum road system or for the backlog of deferred maintenance. The review found few forests' proposed minimum road systems that were actually in alignment with expected budgets. Ten travel analysis reports (26%) either did not include a financial analysis or the numbers were vague with no discussion of how they were derived.

[13] Volpe Travel Analysis Subpart A Review – Summary of Observations – Draft. U.S. Department of Transportation Volpe Center for the U.S. Forest Service. June 20, 2016.
[14] Road risk referenced how big of an impact the road had on natural resources such as wildlife, fish and water quality. Road benefit referenced how important the road was for recreation, timber, and wildfire management.

The Volpe review demonstrated the poor quality of the travel analysis reports and a need for the entire process to be redone using more consistent guidelines, which has yet to occur. If an entire new process is not feasible forest wide or at a district level, then at a minimum, each national forest should update their minimum road system recommendations during project development. Additionally, updating previous travel analysis reports consistently as part of project-level planning will ensure forest officials incorporate the best available science and changing resource conditions when determining specific road risks and benefits. Ideally, each national forest will fully comply with Subpart A by identifying their minimum road system through NEPA and move forward with implementation on a landscape scale, such as at the district, multi-district, or forest level. Until the Forest Service fully complies with its Subpart A duties, there will be a need to reevaluate and revise travel analysis reports on a consistent basis, and the objectives of the 2001 Roads Rule are left unaddressed.

## Lack of Progress Towards Identifying a Minimum Road System

It's important to remember that the overall goals of the Travel Management Rule are to reduce the harm to wildlife, habitat, landscapes, and water from an oversized and deteriorating road system. Establishing a minimum road system is a critical step, which then can more strategically direct restoration efforts. Roads restoration will increase climate resiliency, improve ecological integrity, and decrease habitat fragmentation across the entire forest system, thereby facilitating better connectivity for fish and wildlife. Numerous authors have suggested removing roads is necessary to: 1) restore water quality and aquatic habitats, and 2) improve habitat security and restore terrestrial habitat.[15] However, given declining Forest Service capacity to maintain or treat roads, there is a need for some prioritization. At a landscape scale, certain roads and road segments pose greater risks to terrestrial and aquatic habitat integrity than others. Hence, restoration strategies must focus on identifying and removing, or at least mitigating the higher risk roads. Many forests identified these "high risk roads" in Travel Analysis Reports, but have not yet reduced those risks. Additionally, areas with the highest ecological values, such as being adjacent to a roadless area or dissecting critical wildlife habitat, should also be prioritized for restoration efforts. Yet, few forests are prioritizing road removal or moving towards the sustainable transportation system that was called for over 20 years ago.

Overall, the Forest Service has made limited progress complying with the 2001 Roads Rule, even though most national forests completed some version of a Travel Analysis Report in 2015. As noted in the section above, evaluations of those reports reveal numerous inconsistencies and a systemic failure to identify an affordable road system. Most forests have yet to fully use travel analysis recommendations to identify a minimum road system in NEPA decisions on a broad scale, such as at a forest or district level. Rather, when the agency does include Subpart A compliance in its NEPA decisions, it is often at a project level. Even then, such inclusion is the exception and rarely results in actually identifying a minimum road system that is both ecologically and economically sustainable.

For example, the Payette National Forest's Huckleberry Landscape Restoration Project decision identified a minimum road system that failed to consider how its deferred maintenance backlog would affect the agency's ability to maintain the system after project completion, and failed to disclose the long-term ecological

[15] Gucinski et al. 2000, Hebblewhite et al. 2009. See also: The Environmental Consequences of Forest Roads and Achieving a Sustainable Road System (WildEarth Guardians, 2020).

consequences from its acknowledged lack of maintenance capacity. In addition, all the subwatersheds in the project area are functioning at unacceptable risk for road densities and location, yet the identified minimum road system fails to move these rankings even to the next category of functioning at risk (FR), let alone functioning appropriately (FA). When asked to at least decommission enough roads to improve the rankings for just the Riparian Conservation Areas (RCAs), the Forest Service refused, stating that "*[i]ncluding enough RCA road decommissioning to achieve FR in the Road Density/Location WCI would not address... the Forest Plan emphasis on active management in these subwatersheds.*"[16] Few examples exist that so clearly show the agency's bias for cutting trees over identifying a minimum road system that will provide for the protection of national forest system lands and reflect long-term funding expectations.

As more years pass with the Forest Service failing to identify, let alone implement, an ecologically and economically sustainable forest road system, recommendations in travel analysis reports are becoming more outdated.

The graph below illustrates this lack of progress. Total system miles (blue line) have barely changed since the 2001 Roads Rule. Although there is a slight decrease in open roads and an increase in closed roads, this is likely more indicative of storms washing out roads, forcing closure, rather than thoughtful moves towards a sustainable transportation system.

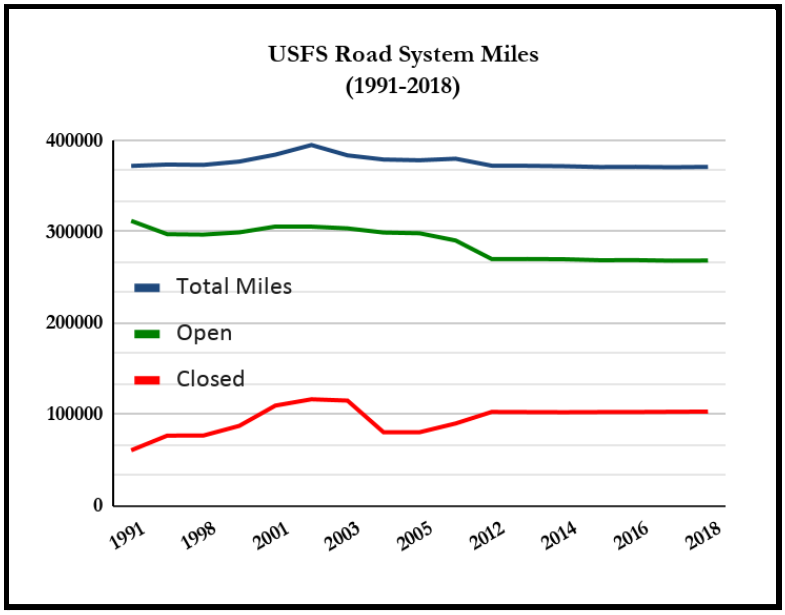



**Figure 4. Road system mileage shows only minor changes in the past 30 years. Source: USFS**

Notably, Forest Service Region 6 (Pacific Northwest) has shown some commitment toward identifying and implementing a minimum road system. Many forests in the region identify road challenges in their NEPA project purpose/need statements, use information from their travel analysis reports, develop matrices displaying all information for each road and recommendations from travel analysis reports, include detailed maps and photos, and some even identify the minimum road system within the project boundary. The following are example purpose/need statements from projects in the region:

[16] Huckleberry Landscape Restoration Project FEIS Vol 2. Appendix 8, p. 14

- "reduce the density of open road systems in this project area through closure or decommissioning";
- "identify a road system that meets transportation needs while reducing aquatic risk associated with specific roads";
- "sustainably manage the network of roads in the project area"; and
- "identify the minimum road system needed for safe and efficient travel, and for administration, utilization, and protection of National Forest System lands".

Even with the incorporation of roads in most projects in Region 6 and the identification of the minimum road system in some projects, nearly all forests across the U.S. have yet to fully comply with Subpart A requirements, let alone, achieve a sustainable transportation system that is "appropriately sized and environmentally sustainable... that is responsive to ecological, economic, and social concerns".[17] Few remedies exist that can effectively spur the Forest Service to comply with its duties under Subpart A, even within the courts.

## Case Law Addressing Compliance with Subpart A

There is limited case law addressing the Forest Service's duty to identify the minimum road system and prioritize roads for decommissioning under Subpart A of the Travel Management Rule. The only Circuit Court decision on point is from the Ninth Circuit Court of Appeals in *Alliance for the Wild Rockies v. U.S. Forest Service*, 907 F.3d 1105 (9th Cir. 2018). There, the Ninth Circuit determined that the Forest Service has discretion to designate a minimum road system that exceeds the number of miles in the minimum road system recommended by the project's travel analysis report.[18] Alliance for the Wild Rockies (Alliance) challenged the Forest Service's approval of the Lost Creek-Boulder Creek Landscape Restoration Project on 80,000 acres of the Payette National Forest in Idaho for violations of the National Forest Management Act (NFMA), National Environmental Policy Act (NEPA) Endangered Species Act (ESA), and Subpart A of the Travel Management Rule (TMR).[19] The District Court for the District of Idaho entered summary judgment for the Forest Service on all claims.[20] On appeal, the Ninth Circuit affirmed in part as to the NEPA and TMR claims, and reversed and remanded in part as to the NFMA claims, dismissing the ESA claim as moot.

Specific to the TMR claim, Alliance alleged that the Forest Service's decision to designate a minimum road system for the project area that exceeded the number of miles in the minimum road system recommended in the Forest Service's travel analysis report was arbitrary and capricious.[21] The Forest Service prepared a travel analysis report for the Lost Creek Project that identified 474 existing miles of roads in the project area, 240 miles of which it recommended for the minimum road system and 68 miles for decommissioning.[22] However, in the final record of decision for the project, the Forest Service designated 401 miles as the minimum road system and identified 68 miles identified for decommissioning.[23] The Ninth Circuit reasoned that the agency's decision did not render the project's minimum road system arbitrary or capricious where the Forest Service

[17] 36 C.F.R. 212.5(b)
[18] 907 F.3d 1105 (9th Cir. 2018) at 1118.
[19] *Id.* at 1109-1112.
[20] *Id.* at 1112.
[21] *Id.* at 1117-18.
[22] *Id.* at 1117-18.
[23] *Id.* at 1118.

fully explained its decision, and considered all of the factors listed under 36 C.F.R. § 212.5.[24] (noting the Final Environmental Impact Statement (FEIS) contained "a robust discussion of maintenance costs . . . and accounts for 'long-term funding expectations'").

The few lower court decisions addressing Subpart A[25] afford the Forest Service considerable discretion in how to identify the minimum road system consistent with the rule. For example, in *Bark v. United States Forest Service*, 393 F. Supp. 3d 1043 (D. Or. 2019), *rev'd and remanded on other grounds*, 958 F.3d 865 (9th Cir. 2020), conservation groups challenged the Forest Service's forest thinning project on Mt. Hood National Forest as violating NEPA, NFMA, and the TMR. The groups claimed the project improperly identified a minimum road system without complying with Subpart A of the TMR.[26] The District Court for the District of Oregon rejected the challenge, holding that the project did not actually identify a minimum road system, and it was not required to do so;[27] (stating, "I find no statutory basis for requiring the Forest Service to identify a minimum road system as part of the CCR Project."). The court explained that minimum road system "proposals may be incorporated into landscape-level restoration projects such as this one," or the Forest Service "may also choose to identify a minimum road system as a stand-alone proposal."[28]

In addition to discretion about how to identify the minimum road system, lower courts have concluded the Forest Service has discretion about when to identify it. In *Center for Sierra Nevada Conservation v. U.S. Forest Service*, 832 F.Supp.2d 1138 (E.D. Cal. 2011), the District Court held the Forest Service has discretion to complete travel management planning under Subpart B of the TMR before identifying a minimum road system under Subpart A. The Court explained, "the Forest Service Manual suggests that the Forest Service may address Subparts A and B in any order."[29]

Regardless of this broad discretion, courts have required the Forest Service to be clear about its actions. In *Idaho Conservation League v. Guzman*, 766 F. Supp. 2d 1056 (D. Idaho 2011), the District Court directed the Forest Service to amend its decision to eliminate any suggestion that the agency made a minimum road system determination. The Court noted, "there is no dispute that the Forest Service could not properly designate a minimum road system, because it did not follow the requisite public notice requirements."[30]

The District Court in *Friends of Bitterroot v. Marten*, No. 9:20-cv-00019-DLC, 2020 WL 5804251 (D. Mont. Sept. 29, 2020), reached a similar result. Conservation groups challenged the Forest Service's designation of a minimum road system for a vegetation management project on the Bitterroot National Forest for violating the TMR, NEPA, and APA by omitting the required analysis and as "substantially different" than what was recommended in the project travel analysis report with explanation.[31] The Court concluded the Forest Service's implementation of a minimum road system lacked the necessary analysis where it addressed only one

[24] *Id.* at 1118.
[25] In *MN Center for Environmental Advocacy v. Forest Service*, 914 F. Supp. 2d 957 (D. Minn. 2012), conservation groups challenged the Superior National Forest's Forest Plan, alleging violations of NFMA, NEPA, ESA, and the Executive Orders and the agency's own regulations. Specifically, the plaintiffs alleged the Forest Service failed to identify the minimum road system. *Id.* at 981 (describing Count VII). Yet because the groups did not brief any argument for that claim, the court deemed the issue abandoned. *Id.* at 981 n.14.
[26] 393 F. Supp. 3d at 1062.
[27] *Id.*
[28] *Id.*
[29] 832 F.Supp.2d 1138 (E.D. Cal. 2011), at 1149-57.
[30] 766 F. Supp. 2d 1056 (D. Idaho 2011), at 1078-79.
[31] *Friends of Bitterroot v. Marten*, No. 9:20-cv-00019-DLC, 2020 WL 5804251 (D. Mont. Sept. 29, 2020) at *10.

of the four factors required under 36 C.F.R. § 212.5(b)(1).[32] However, recognizing that the agency's decision to implement a minimum road system is wholly discretionary, the Court remanded without vacatur and instructed the Forest Service to strike any language in the decision that refers to implementation of a minimum road system.[33]

These are discouraging results from the courts resulting in ongoing delays in identifying the minimum road system, but more importantly, implementation that begins to reverse the harm caused by decades of unfettered road construction.

## Recommendations for Achieving a Sustainable Forest Road System

Since the 2001 Roads Rule went into effect, the Forest Service has yet to identify a minimum road system or take action to significantly decrease its massive forest road network that exceeds 370,000 miles and has a deferred maintenance backlog of over $3 billion. USDA National Forest System statistics from Fiscal Years 2012 to 2018 show only a 0.35% decrease in road system miles. Numerous factors demonstrate the need for the agency to correct this situation, not the least of which is the growing climate crisis, a failure to substantially reduce the deferred maintenance backlog, the continued harmful effects to fish, wildlife, and their habitats, and the road washouts/failures that eliminate recreational access for millions of Americans to public lands. Given the agency's failure thus far to rightsize the forest road system, Congress and the new administration must step in and take decisive action not only to ensure identification of a minimum road system for each national forest and grassland, but also to direct that the agency takes measurable actions to reduce road-related ecological impacts as it moves to achieve a more sustainable system. Toward this end, we offer the following recommendations:

- **National Forest Units:**
  - **Projects**

    *NEPA Analysis Stage*
    - Update travel analysis reports, including reevaluating risks and benefits and incorporating economics as part of the project analysis based on new consistent methods developed at the national level (see below).
    - Use travel analysis reports, with updated information and field verification, to inform proposed actions.
    - Include road-related actions and road decommissioning in every project.
    - Include the need "to identify and implement a minimum road system" as a project purpose and then identify the minimum road system.
    - Include the need "to reduce risks to aquatic resources and wildlife from roads" as a project purpose.
    - Incorporate analysis of transportation vulnerabilities due to climate change and actions for increasing resilience.
    - Identify high priority roads that should be removed to expand a roadless area or connect/improve a wildlife corridor or reduce fragmentation of key habitat.

[32] *Id.* at 12.
[33] *Id.*

- Include unauthorized or other non-system roads/trails/routes in project analysis and incorporate in road/route density calculations.
- Improve understanding of road-related risks/benefits among the public by sharing information, such as photos on road conditions (i.e. driveability), storm-damage, road maintenance costs and budgets, etc.

*Project Implementation Stage*

- Prioritize timing of road decommissioning and treatments in locations where roads impact water quality, wildlife, and/or habitat.
- Use road decommissioning methods that restore natural ecological conditions, and fully remove road features (i.e. decompacting hardened road surfaces hydrologically disconnecting from streams; native vegetation seeding/planting).
- Hire contractors that are experienced in road treatments and adjust as specific field conditions warrant.
- Perform Best Management Practices (BMP) audits and use field monitoring data to analyze the effectiveness of specific design criteria and practices, making adjustments as necessary. Release monitoring reports and audits annually.
- Monitor decommissioned roads to ensure illegal motorized vehicle incursions have not occurred or caused additional harm.
- Share outcomes and environmental benefits to the public via multiple outreach methods.

**o Land management plans**

- Include specific components that will ensure the forest achieves an ecologically sustainable road system that also provides for the viability of fish and wildlife species.
- Include specific components that ensure all system roads are maintained to their objective standard through standards and guidelines.
- Incorporate ecologically-based road/motorized trail density standards as part of each revised forest plan.
- Set the identification of the minimum road system as an objective, with annual decommissioning targets to ensure the forest actually implements its identified minimum road system.

- **National Forest Regions**
  - Set regional requirements that forest units include the need "to identify and implement a minimum road system" as a project purpose where the agency has yet to do so.
  - Ensure accountability by requiring annual road decommissioning targets be met by each forest supervisor in the region and is a performance metric reviewed by the Regional Forester.
  - Prioritize existing funding to remove excessive and damaging roads from the system.
  - Incorporate robust outreach and education to increase understanding of the risks, benefits and costs of the road system.

- **USFS Washington Office**
    - Develop updated and consistent methods for the travel analysis process that will ensure the proper assessment and measurement of road-related risks and benefits based on science, and for determining long-term funding expectations. As part of the updated travel analysis process, the methods would direct each forest to consider issues not fully analyzed in previous efforts, specifically climate change vulnerabilities, road/motorized/unauthorized road and trail densities, habitat connectivity, and the increased wildfire risks from the forest road system.
    - Issue a new memorandum establishing a deadline for each national forest to identify unneeded roads and identify the minimum road system for each national forest unit in compliance with Subpart A. The memo would also direct each forest unit to update their Travel Analysis Reports using consistent methods that have been established at the national level.
    - Demand accountability for Subpart A implementation by developing performance metrics that Regional Foresters must achieve.
    - Provide annual reports for the public and Congress on progress towards achieving a sustainable road system, an update on road-related challenges, and an accurate accounting of costs.
    - At all levels, incorporate climate change assessments to drive strategic implementation plans.
    - At all levels, improve coordination between engineering and resource staff to facilitate integrated restoration projects that involve road projects to meet ecological goals.

- **Congress**
    - Reinstate, permanently authorize, and adequately fund the Legacy Roads and Trails program as a budgetary line item that is specifically targeted to reduce impacts to water quality and wildlife from the road system through effective decommissioning of both system and unauthorized roads.
    - Require annual accounting and reporting of Legacy Roads and Trails accomplishments and ongoing needs.
    - Require annual accounting and reporting of the Forest Service's progress in achieving a sustainable road system.

As climate change impacts on national forests increase and intensify, the Forest Service has the ability to make progress on at least one front—reducing the oversized and harmful road system to one that is more sustainable. The tools are already present: various roads analyses, budgetary benefits, an expansive roads database, and an urgent need. With support from Congress and clear administrative guidance, the Forest Service can actually make real progress in achieving a road system that ensures protection of national forest lands and provides sustainable access. There is no more time to waste.

# Exhibit 4

WildEarth GUARDIANS
A FORCE FOR NATURE

# The Environmental Consequences of Forest Roads and Achieving a Sustainable Road System

**March 2020**

**Table of Contents**



Acknowledgements: We thank The Wilderness Society for the report titled, *Transportation Infrastructure and Access on National Forests and Grasslands: A Literature Review. May 2014*. This paper updates and revises the original report adding 59 additional citations, and featuring several new sections. We also thank Adam Switalski, Principal of InRoads Consulting, LLC for the bulk of this report's research and technical writing.

Cover photos credits: Mt. Baker-Snoqualmie National Forest, 2016. WildEarth Guardians.

## Introduction

The Forest Service faces many challenges with its vastly oversized, under-maintained, and unaffordable transportation system. With 370,643 miles of system roads and 137,409 miles of system trails (USDA Forest Service 2019), the network extends broadly across every national forest and grassland and through a variety of habitats, ecosystems and terrains. An impressive body of scientific literature addresses the various effects of roads on the physical, biological and cultural environment. Numerous studies demonstrate the harmful environmental consequences to water, fish, wildlife, and ecosystems.

In recent years, the scientific literature has expanded to address the effects of roads on climate change adaptation and conversely the effects of climate change on roads, as well as the multiple benefits of road removal on the physical, biological and cultural environments.

The first section of this paper provides a literature review summarizing the most recent science related to the environmental impacts of forest roads and motorized trails. The second section focuses on climate change effects and strategies to address the growing ecological consequences to forest resources. The third section provides background and specific direction for the Forest Service to provide for an ecologically and economically sustainable road system, including recommendations for future action.

## I. Impacts of Transportation Infrastructure and Access to the Ecological Integrity of Terrestrial and Aquatic Ecosystems and Watersheds

It is well understood that transportation infrastructure provides access to national forests and grasslands and also harms aquatic and terrestrial environments at multiple scales. In general, the more roads and motorized trails the greater the impacts. Since its emergence, the field of road ecology and the resulting research has proven the magnitude and breadth of ecological issues related to roads; entire books have been written on the topic (e.g., Forman et al. 2003, van der Ree et al. 2015), and research centers continue to expand their case studies, including the Western Transportation Institute at Montana State University and the Road Ecology Center at the University of California - Davis.[1]

Below, we provide a summary of the current understanding of the impacts of roads and motorized access on terrestrial and aquatic ecosystems, supplementing long-established, peer-reviewed literature reviews on the topic, including Gucinski et al. (2000), Trombulak and Frissell (2000), Coffin (2007), and Robinson et al. (2010). More targeted reviews have been published on the effects of roads on insects (Munoz et al. 2015), vertebrates (da Rosa 2013), and animal abundance (Fahrig and Rytwinski 2009, Benítez-López et al. 2010). Literature reviews on the ecological and social impacts of motorized recreation include Gaines et al. (2003), Davenport and Switalski (2006), Ouren

[1] See http://www.westerntransportationinstitute.org/programs/road-ecology and http://roadecology.ucdavis.edu/

et al. (2007), Switalski and Jones (2012), and, more recently, Switalski (2017). In addition to the physical and environmental impacts of roads, increased visitation has resulted in intentional and unintentional damage to many cultural and historic sites (Spangler and Yentsch 2008, Sampson 2009, Hedquist et al. 2014).

### A. Impacts on geomorphology and hydrology

The construction and presence of forest roads can dramatically change the hydrology and geomorphology of a forest system leading to reductions in the quantity and quality of aquatic habitat (Al-Chokhachy et al. 2016). While there are several mechanisms that cause these impacts (Wemple et al. 2001, Figure 1), most fundamentally, compacted roadbeds reduce rainfall infiltration, intercepting and concentrating water, and providing a ready source of sediment for transport (Wemple et al. 2001). In fact, roads contribute more sediment to streams than any other land management activities on Forest Service lands (Gucinski et al. 2000). Surface erosion rates from roads can be up to three orders of magnitude greater than erosion rates from undisturbed forest soils (Endicott 2008).

Erosion and sediment produced from roads occur both chronically and catastrophically. Every time it rains, sediment from the road surface and from cut-and fill-slopes is picked up by rainwater that flows into and on roads (fluvial erosion). The sediment that is entrained in surface flows are often concentrated into road ditches and culverts and directed into streams. The degree of fluvial erosion varies by geology and geography, and increases with increased motorized use (Robichaud et al. 2010). Closed roads produce significantly less sediment than open drivable roads (Sosa Pérez and Macdonald 2017, Foltz et al. 2009).

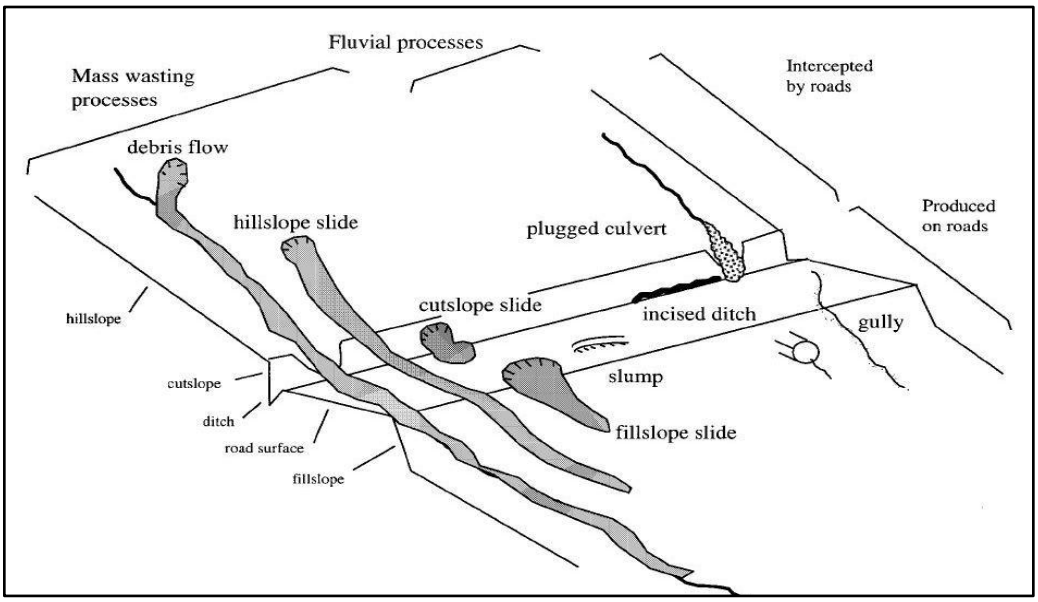



Figure 1: Typology of erosional and depositional features produced by mass-wasting and fluvial processes associated with forest roads (reprinted from Wemple et al. 2001).

Roads also precipitate catastrophic failures of road beds and fills (mass wasting) during large storm events leading to massive slugs of sediment moving into waterways (Gucinski et al. 2000, Endicott 2008). This typically occurs when culverts are undersized and cannot handle the volume of water funneled through them, or they simply become plugged with debris and sediment. The saturated roadbed can fail entirely and result in a landslide, or the blocked stream crossing can erode the entire fill down to the original stream channel.

The erosion of road- and trail-related sediment and its subsequent movement into stream systems affects the geomorphology of the drainage system in a number of ways. It directly alters channel morphology by embedding larger gravels as well as filling pools. It can also have the opposite effect of increasing peak discharges and scouring channels, which can lead to disconnection of the channel and floodplain, and lowered base flows (Gucinski et al. 2000). The width/depth ratio of the stream changes can trigger changes in water temperature, sinuosity and other geomorphic factors important for aquatic species survival (Trombulak and Frissell 2000).

## B. Impacts on aquatic habitat and fish

Roads can have dramatic and lasting impacts on fish and aquatic habitat. Increased sedimentation in stream beds has been linked to decreased fry emergence, decreased juvenile densities, loss of winter carrying capacity, increased predation of fish, and reductions in macro-invertebrate populations that are a food source to many fish species (Gucinski et al. 2000, Endicott 2008). Roads close to streams reduce the number of trees available for large wood recruitment, and reduce stream-side shade (Meredith et al. 2014.) On a landscape scale, these effects add up to: changes in the frequency, timing and magnitude of disturbance to aquatic habitat and changes to aquatic habitat structures (e.g., pools, riffles, spawning gravels and in-channel debris), and conditions (food sources, refugia, and water temperature; Gucinski et al. 2000).

**River fragmentation**

Roads also act as barriers to migration and fragment habitat of aquatic species (Gucinski et al. 2000). Where roads cross streams, road engineers usually place culverts or bridges. Undersized culverts interfere with sediment transport and channel processes such that the road/stream crossing becomes a barrier for fish and aquatic species movement up and down stream (Erikinaro et al. 2017). For instance, a culvert may scour on the downstream side of the crossing, actually forming a waterfall up which fish cannot move. Undersized culverts can infringe upon the channel or floodplain and trap sediment causing the stream to become too shallow and/or warm such that fish will not migrate past the structure. Or, the water can move through the culvert at too high a gradient or velocity to allow fish passage (Endicott 2008).

River fragmentation is problematic for many aquatic species but especially for anadromous species that must migrate upstream to spawn. Well-known native aquatic species affected by roads include salmon such as coho (*Oncorhynchus kisutch*), Chinook (*O. tshawytscha*), and chum (*O. keta*); steelhead

(*O. mykiss*), a variety of trout species including bull trout (*Salvelinus confluentus*) and cutthroat trout (*O. clarki*), as well as other native fish and amphibians (Endicott 2008). The restoration and mitigation of impassable road culverts has been found to restore connectivity and increase available aquatic habitat (Erikinaro et al. 2017), and the quality of aquatic habitat (McCaffery et al. 2007).

### C. Impacts on terrestrial habitat and wildlife

Roads and trails impact wildlife through a number of mechanisms including: direct mortality (poaching, hunting/trapping), changes in movement and habitat-use patterns (disturbance/avoidance), as well as indirect impacts including altering adjacent habitat and interference with predator/prey relationships (Coffin 2007, Fahrig and Rytwinski 2009, Robinson et al. 2010, da Rosa and Bager 2013). Some of these impacts result from the road itself, and some result from the uses on and around the roads (access). Ultimately, numerous studies show that roads reduce the abundance, diversity, and distribution of several forest species (Fayrig and Ritwinski 2009, Benítez-López et al. 2010, Munoz et al. 2015).

#### *Abundance and distribution*

The extensive research on roads and wildlife establish clear trends of wildlife population declines. Fahrig and Rytwinski (2009) reviewed the empirical literature on the effects of roads and traffic on animal abundance and distribution looking at 79 studies that addressed 131 species. They found that the number of documented negative effects of roads on animal abundance outnumbered the number of positive effects by a factor of 5. Amphibians, reptiles, and most birds tended to show negative effects. Small mammals generally showed either positive effects or no effect, mid-sized mammals showed either negative effects or no effect, and large mammals showed predominantly negative effects. Benítez-López et al. (2010) conducted a meta-analysis on the effects of roads and infrastructure proximity on mammal and bird populations. They found a significant pattern of avoidance and a reduction in bird and mammal populations in the vicinity of infrastructure. Muñoz et al. (2015) found that many insect populations have declined as well.

#### *Direct mortality, disturbance, and habitat modification*

Road and motorized trail use affect many different types of species. For example, trapping, poaching, collisions, negative human interactions, disturbance and displacement significantly impact wide ranging carnivores (Gaines et al. 2003, Table 1). Hunted game species such as elk (Cervus canadensis), become more vulnerable from access allowed by roads and motorized trails resulting in a reduction in effective habitat among other impacts (Rowland et al. 2005). Slow-moving migratory animals such as amphibians, and reptiles who use roads to regulate temperature, are also vulnerable (Gucinski et al. 2000, Brehme et al. 2013). Roads and motorized trails also affect ecosystems and habitats because they are major vectors of non-native plant and animal species (Gelbard and Harrison 2003). This can have significant ecological and economic impacts when aggressive invading species overwhelm or significantly alter native species and systems.

Table 1: Road- and recreation trail-associated factors for wide-ranging carnivores (Reprinted from Gaines et al. (2003)[2]

| Focal species | Road-associated factors | Motorized trail-associated factors | Nonmotorized trail-associated factors |
|---|---|---|---|
| Grizzly bear | Poaching<br>Collisions<br>Negative human interactions<br>Displacement or avoidance | Poaching<br>Negative human interactions<br>Displacement or avoidance | Poaching<br>Negative human interactions<br>Displacement or avoidance |
| Lynx | Down log reduction<br>Trapping<br>Collisions<br>Disturbance at a specific site | Disturbance at a specific site<br>Trapping | Disturbance at a specific site |
| Gray wolf | Trapping<br>Poaching<br>Collisions<br>Negative human interactions<br>Disturbance at a specific site<br>Displacement or avoidance | Trapping<br>Disturbance at a specific site | Trapping<br>Disturbance at a specific site |
| Wolverine | Down log reduction<br>Trapping<br>Disturbance at a specific site<br>Collisions | Trapping<br>Disturbance at a specific site | Trapping<br>Disturbance at a specific site |

### *Habitat fragmentation*

At the landscape scale, roads fragment habitat blocks into smaller patches that may not be able to support interior forest species. Smaller habitat patches result in diminished genetic variability, increased inbreeding, and at times local extinctions (Gucinski et al. 2000; Trombulak and Frissell 2000). For example, a narrow forest road with little traffic was a barrier in Arizona to the Mt. Graham red squirrel (*Tamiasciurus hudsonicus grahamensis*; Chen and Koprowski 2013). Fragmentation intensifies concerns about grizzly bear population viability, especially since roads increase human/bear interactions exacerbating the problem of excessive mortality (Proctor et al, 2012)

Roads also change the composition and structure of ecosystems along buffer zones, called edge-affected zones. The width of edge-affected zones varies by what metric is being discussed; however, researchers have documented road-avoidance zones a kilometer or more away from a road (Robinson et al.2010; Table 2). In heavily roaded landscapes, edge-affected acres can be a significant percentage of total acres. For example, in a landscape where the road density is 3 mi/mi$^2$ and where the edge-affected zone is estimated to be 500 ft from the center of the road to each side, the edge-affected zone is 56% of the total acreage.

[2] For a list of citations see Gaines et al. (2003).

Table 2: A summary of some documented road-avoidance zones for various species (adapted from Robinson et al. 2010).

| Species | Avoidance zone m (ft) | Type of disturbance | Reference |
|---|---|---|---|
| Snakes | 650 (2133) | Forestry roads | Bowles (1997) |
| Salamander | 35 (115) | Narrow forestry road, light traffic | Semlitsch (2003) |
| Woodland birds | 150 (492) | Unpaved roads | Ortega and Capen (2002) |
| Spotted owl | 400 (1312) | Forestry roads, light traffic | Wasser et al. (1997) |
| Marten | <100 (<328) | Any forest opening | Hargis et al. (1999) |
| Elk | 500–1000 (1640-3281) | Logging roads, light traffic | Edge and Marcum (1985) |
| Grizzly bear | 3000 (9840) | Fall | Mattson et al. (1996) |
| | 500 (1640) | Spring and summer | |
| | 1122 (3681) | Open road | Kasworm and Manley (1990) |
| | 665 (2182) | Closed road | |
| Black bear | 274 (899) | Spring, unpaved roads | Kasworm and Manley (1990) |
| | 914 (2999) | Fall, unpaved roads | |

### *Migration disruption*

Roads disrupt migration of large ungulates, such as elk, impeding travel at multiple scales, including seasonal home range use and migration to winter range (Buchanan et al. 2014, Prokopenko et al. 2017). For example, a recent study found migrating elk changed their behavior and stopover use on migration routes that were roaded (Paton et al. 2017). The authors suggest this disturbance may lead to decreased foraging, displacement of high-quality habitat, and affect the permeability of the migration route. In addition, roads disrupt grizzly bear movements influencing dispersal away from the maternal home range and ultimately influencing population-level fragmentation." (Proctor et al. 2018).

Oil and gas development (and associated roads) reduced the effectiveness of both mule deer and pronghorn migration corridors in western Wyoming. (Sawyer et al. 2005). Multiple studies found that mule deer increased their rate of travel during migrations, reducing stop over time and their use of important foraging habitats (Sawyer et al. 2012, Lendrum et al. 2012; Ledrum et al. 2013;). A study in Colorado found that female mule deer changed their migration timing which may change alignment with vegetative phenology and potentially result in energetic and demographic costs (Lendrum et al. 2013).

## D. Road density thresholds for fish and wildlife[3]

It is well documented that, beyond specific road density thresholds, certain species will be negatively affected, and some risk being extirpated (Robinson et al. 2000, Table 3). Most studies that look into the relationship between road density and wildlife focus on the impacts to large endangered carnivores or hunted game species, although high road densities certainly affect other species. Grizzly bears have been found to have a higher mortality risk as road density increases (Boulanger and Stenhouse 2014). Gray wolves (*Canis lupus*) in the Great Lakes region and elk in Montana and Idaho also face increased mortality risk, and have undergone the most long-term and in-depth analysis. Forman and Hersperger (1996) found that in order to maintain a naturally functioning landscape with sustained populations of large mammals, road density must be below 0.6 km/km$^2$ (1.0 mi/mi$^2$).

A number of studies show that higher road densities also impact aquatic habitats and fish (Table 3). Carnefix and Frissell (2009) provide a concise review of studies that correlate cold water fish abundance and road density, and from the cited evidence concluded that:

> 1) no truly "safe" threshold road density exists, but rather negative impacts begin to accrue and be expressed with incursion of the very first road segment; and 2) highly significant impacts (e.g., threat of extirpation of sensitive species) are already apparent at road densities on the order of 0.6 km/km$^2$ (1.0 mi/mi$^2$) or less, (Carnefix and Frissell (2009), p. 1).

Cold water salmonids such as threatened bull trout, are particularly sensitive to the impacts of forest roads. The U.S. Fish and Wildlife Service's Final Rule listing bull trout as threatened (USDI Fish and Wildlife Service 1999) addressed road density stating:

> … assessment of the interior Columbia Basin ecosystem revealed that increasing road densities were associated with declines in four non-anadromous salmonid species (bull trout, Yellowstone cutthroat trout, westslope cutthroat trout, and redband trout) within the Columbia River Basin, likely through a variety of factors associated with roads (Quigley & Arbelbide 1997). Bull trout were less likely to use highly roaded basins for spawning and rearing, and if present, were likely to be at lower population levels (Quigley and Arbelbide 1997). Quigley et al. (1996) demonstrated that when average road densities were between 0.4 to 1.1 km/km$^2$ (0.7 and 1.7 mi/mi$^2$) on USFS lands, the proportion of subwatersheds supporting "strong" populations of key salmonids dropped substantially. Higher road densities were associated with further declines (USDI Fish and Wildlife Service (1999), p. 58922).

Anderson et al. (2012) showed that watershed conditions tend to be best in areas protected from road construction and development. Using the U.S. Forest Service's Watershed Condition Framework assessment data, they showed that National Forest lands protected under the Wilderness Act tend to have

[3] We intend for the term "road density" to refer to the density of all roads within national forests, including system roads, closed roads, non-system roads, temporary roads and motorized trails, and roads administered by other jurisdictions (private, county, state).

the healthiest watersheds. In support of this conclusion, McCaffery et al. (2005) found that streams in roadless watersheds had less fine sediment and higher quality habitat than roaded watersheds. Miller et al. (2017) showed that in 20 years of monitoring forests managed by the Northwest Forest Plan there were measurable improvements in watershed conditions as a result of road decommissioning, finding "...the decommissioning of roads in riparian areas has multiple benefits, including improving the riparian scores directly and typically the sedimentation scores."

Table 3: A summary of some road-density thresholds and correlations for terrestrial and aquatic species and ecosystems (reprinted from Robinson et al. 2010).

| **Species (Location)** | **Road density (mean, guideline, threshold, correlation)** | **Reference** |
|---|---|---|
| Wolf (Minnesota) | 0.36 km/km2 (mean road density in primary range); 0.54 km/km² (mean road density in peripheral range) | Mech et al. (1988) |
| Wolf | >0.6 km/km² (absent at this density) | Jalkotzy et al. (1997) |
| Wolf (Northern Great Lakes region) | >0.45 km/km² (few packs exist above this threshold); >1.0 km/km² (no pack exist above this threshold) | Mladenoff et al. (1995) |
| Wolf (Wisconsin) | 0.63 km/km² (increasing due to greater human tolerance | Wydeven et al. (2001) |
| Wolf, mountain lion (Minnesota, Wisconsin, Michigan) | 0.6 km/km² (apparent threshold value for a naturally functioning landscape containing sustained populations) | Thiel (1985); van Dyke et al. (1986); Jensen et al. (1986); Mech et al. (1988); Mech (1989) |
| Elk (Idaho) | 1.9 km/km² (density standard for habitat effectiveness) | Woodley 2000 cited in Beazley et al. 2004 |
| Elk (Northern US) | 1.24 km/km² (habitat effectiveness decline by at least 50%) | Lyon (1983) |
| Elk, bear, wolverine, lynx, and others | 0.63 km/km² (reduced habitat security and increased mortality) | Wisdom et al. (2000) |
| Moose (Ontario) | 0.2-0.4 km/km2 (threshold for pronounced response) | Beyer et al. (2013) |
| Grizzly bear (Montana) | >0.6 km/km² | Mace et al. (1996); Mattson et al. (1996) |
| Black bear (North Carolina) | >1.25 km/km² (open roads); >0.5 km/km2 (logging roads); (interference with use of habitat) | Brody and Pelton (1989) |
| Black bear | 0.25 km/km² (road density should not exceed) | Jalkotzy et al. (1997) |
| Bobcat (Wisconsin) | 1.5 km/km² (density of all road types in home range) | Jalkotzy et al. (1997) |
| Large mammals | >0.6 km/km² (apparent threshold value for a naturally functioning landscape containing sustained populations) | Forman and Hersperger (1996) |
| Bull trout (Montana) | Inverse relationship of population and road density | Rieman et al. (1997); Baxter et al. (1999) |

| | | |
|---|---|---|
| Fish populations (Medicine Bow National Forest) | (1) Positive correlation of numbers of culverts and stream crossings and amount of fine sediment in stream channels<br>(2) Negative correlation of fish density and numbers of culverts | Eaglin and Hubert (1993) cited in Gucinski et al. (2001) |
| Macroinvertebrates | Species richness negatively correlated with an index of road density | McGurk and Fong (1995) |
| Non-anadromous salmonids (Upper Columbia River basin) | (1) Negative correlation likelihood of spawning and rearing and road density<br>(2) Negative correlation of fish density and road density | Lee et al. (1997) |

## E. Roads and Fires

Wildland forest fire plays an essential role in many forest ecosystems, and with climate change, fire will increasingly shape National Forest lands. Humans have made fire more common on the landscape, and studies have found that forest roads can affect fire regimes and localized fuel regimes. Changes in the timing and location of fire can alter the natural fire regime and has negative, cascading effects in ecological communities. For example, a change in timing and frequency of fire can result in habitat loss and fragmentation, shift forest composition, and affect predator-prey interactions (DellaSalla et al. 2004). Following a fire, exposed bare ground on roads can result in chronic erosion, catastrophic culvert failures, and noxious weed invasion.

Forest roads can increase the occurrence of human-caused fires, whether by accident or arson, and road access has been correlated with the number of fire ignitions (Syphard et al. 2007, Yang et al., 2007, Narayanaraj and Wimberly 2012, Nagy et al. 2018). A recent study found that humans ignited four times as many fires as lightning. This represented 92% of the fires in the eastern United States and 65% of the fire ignitions in the western U.S. (Nagy et al. 2018). Another study that reviewed 1.5 million fire records over 20 years found human-caused fires were responsible for 84% of wildfires and 44% of the total area burned (Balch et al. 2017).

In addition to changes in frequency, human-caused fires change the timing of fire occurring when fuel moisture is significantly higher than lightning-started fires (Nagy et al. 2018.). Forest roads may also limit fire growth acting as a fire break and providing access for suppression (Narayanaraj and Wimberly 2011, Robbinne et al. 2016). The result is a spatial and temporal distribution of fire that differs from historical fire regimes.

Roaded areas create a distinct fire fuels profile which may influence ignition risk and burn severity (Narayanaraj and Wimberly 2013). Forest roads create linear gaps with reduced canopy cover, and increased solar radiation, temperature, and wind speed. Invasive weeds and grasses common along roadsides also create fine fuels that are highly combustible. These edge effects can change

microclimates far into the forest (Narayanaraj and Wimberly 2012, Ricotta et al. 2018). While there is little definitive research on roads and burn severity, an increase in the prevalence of lightning-caused fires in roaded areas may be due to roadside edge effects (Arienti et al 2009, Narayanaraj and Wimberly 2012). Furthermore, watersheds that have been heavily roaded have typically received intensive management in the past leaving forests in a condition of high fire vulnerability (Hessburg and Agee 2003).

Roadless areas are remote and secure from many human impacts such as unintentional fire starts or arson. A forest fire is almost twice as likely to occur in a roaded area than a roadless area (USDA Forest Service 2000). In fact, human-ignited wildfire is almost five times more likely to occur in a roaded area than in a roadless area. (USDA Forest Service 2000). Higher road density correlates with an increased probability of human-caused ignitions. (Syphard et al. 2007).

After a forest fire, roads that were previously well vegetated often burn or are bladed for fire suppression access or firebreaks leaving them highly susceptible to erosion and weed invasion. Roads are a source of chronic erosion following a fire, and pulses of hillslope sediment and large woody debris can result in culvert failures (Bisson et al. 2003). Fine sediment is frequently delivered to streams and reduces the quality of aquatic habitat. Noxious weeds are established on many forest roads, and post-fire weed invasion can be facilitated by creating a disturbance, reducing competition, and increasing resource availability (Birdsaw et al. 2012).

## II. Climate Change and Transportation Infrastructure

Before the Trump administration took office, the Forest Service recognized the importance of considering and adapting to changing climate conditions. The USDA Strategic Plan for Fiscal Years 2014-2018 set a goal to: "Ensure our national forests and private working lands are conserved, restored, and made more resilient to climate change, while enhancing our water resources." (USDA 2014, p 3). As climate change impacts grow more profound, forest managers must consider the impacts *on* the transportation system as well as *from* the transportation system. In terms of the former, changes in precipitation and hydrologic patterns will strain infrastructure, resulting in damage to streams, fish habitat, and water quality as well as threats to public safety and loss of access. As to the latter, the fragmenting effect of roads on habitat will impede the movement of species which is a fundamental element of adaptation. Through planning, forest managers can proactively address threats to infrastructure, and can actually enhance forest resilience by removing unneeded roads to create larger patches of connected habitat.

### A. Climate change, forest roads, and fragmented habitat

It is expected that climate change will be responsible for more extreme weather events, leading to increasing flood severity, more frequent landslides, changing hydrographs, and changes in erosion and sedimentation rates and delivery processes (Schwartz et al. 2014, USDA FS 2018). The Forest

Service Office of Sustainability and Climate has compiled climate change vulnerability assessments for several regions of the Forest Service discussing near-term consequences for managers to consider. (Halofsky et al. 2017, 2018a, 2018b, 2019, with additional vulnerabilities displayed below in Table 4).

> Warmer locations will experience more runoff in winter months and early spring, whereas colder locations will experience more runoff in late spring and early summer. In both cases, future peakflows will be higher and more frequent, (Halofsky et al. 2018b at ii).
>
> The frequency and extent of midwinter flooding are expected to increase. Flood magnitudes are also expected to increase because rain-on-snow-driven peak flows will become more common," (*Id.* at 83).
>
> Roads and other infrastructure that are near or beyond their design life are at considerable risk to damage from flooding and geomorphic disturbance (e.g., debris slides). If road damage increases as expected, it will have a profound impact on access to Federal lands and on repair costs, (*Id.* at viii).

Magnifying these consequences is the fact that roads, culverts and trails in national forests were designed for storms and water flows typical of past decades, and may not be designed for the storms in future decades. Hence, climate driven changes may cause transportation infrastructure to malfunction or fail (USDA Forest Service 2010, ASHTO 2012). The likelihood is higher for facilities in high-risk settings—such as rain-on-snow zones, coastal areas, and landscapes with unstable geology. The following consequences may occur (USDA Forest Service 2010):

- access to national forests will be interrupted temporarily or permanently as roads wash-out due to landslides or blown-out culverts during events of heavier precipitation or flooding;
- public safety will be compromised as roads, trails and bridges become unstable due to landslides, undercut slopes, or erosion of water-logged slopes due to heavy rainfall; and
- infrastructure may be compromised or abandoned along coastal areas or low-lying estuaries when inundated during high tides and coastal storms as sea-levels rise.

Forests fragmented by roads will likely demonstrate less resistance and resilience to stressors, like those associated with climate change (Noss 2001, see also Table 4. below). First, the more a forest is fragmented (and therefore the higher the edge/interior ratio), the more the forest loses its inertia characteristic, and becomes less resilient and resistant to climate change. Second, the more a forest is fragmented, characterized by isolated patches, the more likely the fragmentation will interfere with the ability of species to track shifting climatic conditions over time and space.

> Hence, roads may impede the movement of many species in response to climate change. Closing unnecessary roads and providing wildlife crossings on roads with heavy traffic might mitigate some of these effects (Noss 1993; Clevenger & Waltho 2000), (Noss (2001) p. 584).

Watershed types within national forests may change which will impact hydrology and when high streamflows occur (Halofsky et. al. 2011). A study in Washington's Mt. Baker-Snoqualmie National

Forest (MBSNF) shows that currently 27% of the roads are in watersheds classified as rain-dominated but that will increase to 75% by 2080 - increasing risk of damage to infrastructure (Strauch 2014). By 2040, 300 miles of forest roads in this forest will be located in watersheds that are projected to see a 50% increase in 100-year floods. Landslide risk will be higher during the winter and spring and decline during summer and autumn. These changes reinforce the importance of transportation analysis that incorporates the impacts of climate change.

Earlier snowmelt may open previously snow-closed roaded areas for a greater portion of the year. While this may appear to benefit visitors that wish to access trails and camps early in the spring, this may also put them in harm's way with melting snow-bridges, avalanche chutes and flooding events (Strauch 2015). Wildlife historically protected by snow-closed roads would be more vulnerable.

### B. Modifying infrastructure to increase resilience

To prevent or reduce road-triggered landslides and culvert failures, and other associated hazards, forest managers will need to take a series of actions. In December 2012, the USDA Forest Service published a report entitled, *Assessing the Vulnerability of Watersheds to Climate Change* (Furniss et al., 2013) which reinforces that forest managers need to be proactive in reducing erosion potential from roads:

> Road improvements were identified as a key action to improve condition and resilience of watersheds on all the pilot forests. In addition to treatments that reduce erosion, road improvements can reduce the delivery of runoff from road segments to channels, prevent diversion of flow during large events, and restore aquatic habitat connectivity by providing for passage of aquatic organisms. As stated previously, watershed sensitivity is determined by both inherent and management-related factors. Managers have no control over the inherent factors, so to improve resilience, efforts must be directed at anthropogenic influences such as instream flows, roads, rangeland, and vegetation management…. [Watershed Vulnerability Analysis (WVA)] results can also help guide implementation of travel management planning by informing priority setting for decommissioning roads and road reconstruction/maintenance. As with the Ouachita NF example, disconnecting roads from the stream network is a key objective of such work. Similarly, WVA analysis could also help prioritize aquatic organism passage projects at road-stream crossings to allow migration by aquatic residents to suitable habitat as streamflow and temperatures change, (Furniss et al., 2013, p. 22-23).

Other Forest Service reports support road-related actions to increase climate resilience including replacing undersized culverts with larger ones, prioritizing maintenance and upgrades, and restoring roads to a natural state when they are no longer needed and pose erosion hazards (USDA Forest Service 2010, USDA Forest Service 2011a, Furniss et al., 2013, USDA FS 2018, Halofsky et al. 2018a).

The Forest Service has developed several resources to identify and mitigate climate change impacts on forests and infrastructure. The aforementioned climate change vulnerability assessments for each

region focus on causes, consequences, and options to address them. For example, Halofsky et al. (2018a) reviews the effects and adaptation options for Region 1 (Northern Region) of the Forest Service, and identifies the increased magnitude of peak streamflows as a primary impact to road infrastructure. Adaptation strategies identified in the report include:

> ...increasing the resilience of stream crossings, culverts, and bridges to higher peakflows and facilitating response to higher peakflows by reducing the road system and disconnecting roads from streams. Tactics include completing geospatial databases of infrastructure (and drainage) components, installing higher capacity culverts, and decommissioning roads or converting them to alternative uses. (Halofsky et al. 2018a)

*U.S. Forest Service Transportation Resiliency Guidebook* provides a review of the impacts of climate change on Forest Service infrastructure, and a process to assess and address climate change impacts at local and regional levels (USDA FS 2018; Table 4). Included in the guidebook is a step-by-step guide for identifying vulnerabilities and preparedness planning within their transportation network (USDA FS 2018). In addition, the guidebook recommends using the forest plan revision process as "an opportunity to analyze baseline conditions and climate change vulnerabilities and to develop climate resilient strategies for the future." (USDA FS 2018). The Forest Service should use the transportation resilience guidebook to inform forest plan revision analysis and plan components to address climate change in the context of the forest's transportation system.

Table 4. Role of adaptation strategies in reducing climate change impacts of Forest Service lands (reprinted from USDA FS 2018).

| | **Impacts on Transportation** | **Example Strategies to Reduce Impacts** |
|---|---|---|
| Heavy Precipitation / Flooding | Flooded roadways interrupting service<br>Damage/destruction of roads and bridges<br>Pavement buckling<br>Erosion comprising soil stability and transportation assets<br>Slope failures<br>Landslides damaging and disrupting routes<br>Plugged or blown out culverts | Retrofit facilities<br>Relocate facilities<br>Upgrade culverts and drainage facilities<br>Build new facilities to climate ready standards<br>Protect existing infrastructure<br>Divest in assets |
| Wildfires | Additional woody debris that plug culverts<br>Reduced slope stability causing increased landslides<br>Increased heavy vehicle traffic wear and tear on FS roadways | Sustain forest ecology<br>Protect forests from severe fire and wind disturbance |
| Tree Mortality | Fallen trees disrupt access along transportation routes<br>Increased need for clearing hazard trees along roadways<br>Provide forest fuel for wildfire | Facilitate Forest community adjustments through species transitions |

Individual forests have also drafted climate mitigation strategies. The Olympic National Forest in Washington, has developed documents oriented at protecting watershed health and species in the face of climate change, including a 2003 travel management strategy and a report entitled, *Adapting to*

*Climate Change in Olympic National Park and National Forest* (USDA FS 2011a). The report calls for road decommissioning, relocation of roads away from streams, enlarging culverts as well as replacing culverts with fish-friendly crossings (Table 5). In the travel management strategy, Olympic National Forest recommended that one third of its road system be decommissioned and obliterated. In addition, the plan called for addressing fish migration barriers in a prioritized and strategic way – most of these are associated with roads.

Table 5: Current and expected sensitivities of fish to climate change and associated adaptation strategies and action for fisheries and fish habitat management and relevant to transportation management at Olympic National Forest and Olympic National Park (reprinted from USDA Forest Service 2011a).

| **Current and expected sensitivities** | **Adaptation strategies and actions** |
|---|---|
| Changes in habitat quantity and quality | Implement habitat restoration projects that focus on re-creating watershed processes and functions and that create diverse, resilient habitat. |
| Increase in culvert failures, fill-slope failures, stream adjacent road failures, and encroachment from stream-adjacent road segments | Decommission unneeded roads.<br>Remove sidecast, improve drainage, and increase culvert sizing on remaining roads.<br>Relocate stream-adjacent roads. |
| Greater difficulty disconnecting roads from stream channels | Design more resilient stream crossing structures. |
| Major changes in quantity and timing of streamflow in transitional watersheds | Make road and culvert designs more conservative in transitional watersheds to accommodate expected changes. |
| Decrease in area of headwater streams | Continue to correct culvert fish passage barriers.<br>Consider re-prioritizing culvert fish barrier correction projects. |
| Decrease in habitat quantity and connectivity for species that use headwater streams | Restore habitat in degraded headwater streams that are expected to retain adequate summer streamflow (ONF). |

### C. Reducing fragmentation to enhance aquatic and terrestrial species adaptation

Reconnecting fragmented forests has been shown to benefit native species (e.g., Damschen et al. 2019). Decommissioning and upgrading roads can reduce fragmentation of both aquatic and terrestrial systems. For example, reducing the amount of road-generated fine sediment deposited on salmonid nests can increase the likelihood of egg survival and spawning success (Switalski et al. 2004, McCaffery et al. 2007). Strategically removing or mitigating barriers such as culverts has been shown to restore aquatic connectivity and expand habitat (Erkinaro et al. 2017). Decommissioning roads in riparian areas may provide further benefits to salmon and other aquatic organisms by permitting reestablishment of streamside vegetation, which provides shade and maintains a cooler, more moderated microclimate over the stream (Battin et al. 2007, Meridith et al. 2014). Coordinating

the repair of an aging road system with the mitigation of aquatic organism passage may allow for restoring connectivity while improving infrastructure (Nesson et al. 2018).

One of the most well documented impacts of climate change on wildlife is a shift in the ranges of species (Parmesan 2006). As animals migrate, landscape connectivity will be increasingly important (Holman et al. 2005), and restoring and mitigating migration routes in key wildlife corridors will increase wildlife resiliency. Access management in important elk migration sites would reduce disturbance and improve connectivity (Parton et al. 2017). Similarly, a recent study found grizzly bear population density increased 50 percent following the restriction of motorized recreation (Lamb et al. 2018). Decommissioning roads in key wildlife corridors will also reduce the many road-related stressors. Road decommissioning restores wildlife habitat by providing security and food such as grasses, forbs, and fruiting shrubs (Switalski and Nelson 2011, Tarvainen and Tolvanen 2016).

Forests fragmented by roads and motorized trail networks will likely demonstrate less resistance and resilience to stressors, such as weeds. As a forest is fragmented and there is more edge habitat, Noss (2001) predicts that weedy species with effective dispersal mechanisms will increasingly benefit at the expense of native species. However, decommissioned roads when seeded with native species can reduce the spread of invasive species (Grant et al. 2011), and help restore fragmented forestlands. Off-road vehicles with large knobby tires and large undercarriages are also a key vector for weed spread (e.g., Rooney 2006). Strategically closing and decommissioning motorized routes, especially in roadless areas, will reduce the spread of weeds on forestlands (Gelbard and Harrison 2003).

### D. Transportation infrastructure and carbon sequestration

The relationship of road restoration and carbon has only recently been explored. There is the potential for large amounts of carbon (C) to be sequestered by restoring roads to a more natural state. When roads are decompacted during reclamation, vegetation and soils can develop more rapidly and sequester large amounts of carbon. Research on the Clearwater National Forest in Idaho estimated total soil C storage increased 6-fold compared to untreated abandoned roads (Lloyd et al. 2013). Another study concluded that reclaiming 425 km (264 miles) of logging roads over the last 30 years in Redwood National Park in Northern California resulted in net carbon savings of 49,000 Megagrams (54,013 tons) of carbon to date (Madej et al. 2013, Table 5). A further analysis found that recontouring roads had higher soil organic carbon than ripping (decompacting) the roads (Seney and Madej 2015). Finally, a recent study in Colorado found that adding mulch or biochar to decommissioned roads can increase the amount of carbon stored in soil (Ramlow et al. 2018).

Kerekvliet et al. (2008) used Forest Service estimates of the fraction of road miles that are unneeded, and calculated that restoring 126,000 miles of roads (i.e. 30% of the road system) to a natural state would be equivalent to revegetating an area larger than Rhode Island. In addition, they calculate that

the net economic benefit of road treatments are always positive and range from US $0.925-1.444 billion.

Table 6. Carbon budget implications in road decommissioning projects (reprinted from Madej et al. 2013).

| Road Decommissioning Activities and Processes | Carbon Cost | Carbon Savings |
|---|---|---|
| Transportation of staff to restoration sites (fuel emissions) | X | |
| Use of heavy equipment in excavations (fuel emissions) | X | |
| Cutting trees along road alignment during hillslope recontouring | X | |
| Excavation of road fill from stream crossings | | X |
| Removal of road fill from unstable locations | | X |
| Reduces risk of mass movement | | X |
| Post-restoration channel erosion at excavation sites | X | |
| Natural revegetation following road decompaction | | X |
| Replanting trees | | X |
| Soil development following decompaction | | X |

## E. The importance of Roadless Areas and intact mature forests

Undeveloped natural lands provide numerous ecological benefits. They contribute to biodiversity, enhance ecosystem representation, and facilitate connectivity and provide high quality or undisturbed water, soil and air (Strittholt and Dellasala 2001, DeVelice and Martin 2001, Crist and Wilmer 2002, Loucks et al. 2003, Dellasalla et al. 2011, Anderson et al. 2012, Selva et al. 2015). They can also serve as ecological baselines to help us better understand our impacts to other landscapes, and contribute to landscape resilience in the face of climate change.

Forest Service roadless lands, in particular, are heralded for the conservation values they provide. The benefits are described at length in the preamble of the Roadless Area Conservation Rule (RACR)[4] as well as in the Final Environmental Impact Statement (FEIS) for the RACR[5], and include: high quality or undisturbed soil, water, and air; sources of public drinking water; diversity of plant and animal communities; habitat for threatened, endangered, proposed, candidate, and sensitive species and for those species dependent on large, undisturbed areas of land; primitive, semi-primitive non- motorized, and semi-primitive motorized classes of dispersed recreation; reference landscapes; natural appearing landscapes with high scenic quality; traditional cultural properties and sacred sites; and other locally identified unique characteristics (e.g., include uncommon geological formations, unique wetland complexes, exceptional hunting and fishing opportunities).

The Forest Service, National Park Service, and the U.S. Fish and Wildlife Service recognize that protecting and connecting roadless or lightly roaded areas is an important action agencies can take to

[4] Federal Register, Vol. 66, No. 9. January 12, 2001. Pages 3245-3247.
[5] Final Environmental Impact Statement, Vol. 1, 3–3 to 3–7

enhance climate change adaptation. For example, the *Forest Service National Roadmap for Responding to Climate Change* (USDA Forest Service 2011b) establishes that increasing connectivity and reducing fragmentation are short- and long-term actions the Forest Service should take to facilitate adaptation to climate change. The National Park Service also identifies connectivity as a key factor for climate change adaptation along with establishing "blocks of natural landscapes large enough to be resilient to large-scale disturbances and long-term changes," and other factors. The agency states that: "The success of adaptation strategies will be enhanced by taking a broad approach that identifies connections and barriers across the landscape. Networks of protected areas within a larger mixed landscape can provide the highest level of resilience to climate change."[6] Similarly, the *National Fish, Wildlife and Plants Climate Adaptation Partnership's Adaptation Strategy* (2012) calls for creating an ecologically-connected network of conservation areas.[7]

Crist and Wilmer (2002) looked at the ecological value of roadless lands in the Northern Rockies and found that protection of national forest roadless areas, when added to existing federal conservation lands in the study area, would 1) increase the representation of virtually all land cover types on conservation lands at both the regional and ecosystem scales, some by more than 100%; 2) help protect rare, species-rich, and often-declining vegetation communities; and 3) connect conservation units to create bigger and more cohesive habitat "patches."

Roadless lands also are responsible for higher quality water and watersheds. Anderson et al. (2012) assessed the relationship of watershed condition and land management status and found a strong spatial association between watershed health and protective designations. Dellasalla et al. (2011) found that undeveloped and roadless watersheds are important for supplying downstream users with high-quality drinking water, and developing these watersheds comes at significant costs associated with declining water quality and availability. The authors recommend a light-touch ecological footprint to sustain the many values that derive from roadless areas including healthy watersheds.

---

[6] National Park Service. Climate Change Response Program Brief. http://www.nature.nps.gov/climatechange/adaptationplanning.cfm. Also see: National Park Service, 2010. Climate Change Response Strategy. http://www.nature.nps.gov/climatechange/docs/NPS_CCRS.pdf. Objective 6.3 is to "Collaborate to develop cross-jurisdictional conservation plans to protect and restore connectivity and other landscape-scale components of resilience."

[7] See http://www.wildlifeadaptationstrategy.gov/pdf/NFWPCAS-Chapter-3.pdf. Pages 55- 59. The first goal and related strategies are:

Goal 1: Conserve habitat to support healthy fish, wildlife, and plant populations and ecosystem functions in a changing climate.

Strategy 1.1: identify areas for an ecologically-connected network of terrestrial, freshwater, coastal, and marine conservation areas that are likely to be resilient to climate change and to support a broad range of fish, wildlife, and plants under changed conditions.

Strategy 1.2: Secure appropriate conservation status on areas identified in Strategy 1.1 to complete an ecologically-connected network of public and private conservation areas that will be resilient to climate change and support a broad range of species under changed conditions.

Strategy 1.4: Conserve, restore, and as appropriate and practicable, establish new ecological connections among conservation areas to facilitate fish, wildlife, and plant migration, range shifts, and other transitions caused by climate change.

Allowing roadless and other intact forested areas to reach their full ecological potential is an effective and crucial strategy for atmospheric carbon dioxide removal. Moomaw et al (2019) termed this approach as "proforestation" and explained,

> [f]ar from plateauing in terms of carbon sequestration (or added wood) at a relatively young age as was long believed, older forests (e.g., >200 years of age without intervention) contain a variety of habitats, typically continue to sequester additional carbon for many decades or even centuries, and sequester significantly more carbon than younger and managed stands, (Luyssaert et al., 2008; Askins, 2014; McGarvey et al., 2015; Keeton, 2018).

The authors recommend "scaling up" proforestation, which includes both protecting and expanding designations of intact forested areas, as a cost-effective means to increase atmospheric carbon sequestration.

## III. Achieving a Sustainable Minimum Road System on National Forest Lands

### A. Background

For two decades, the Travel Management Rule, 36 C.F.R. Part 212, has guided Forest Service road management and use by motorized vehicles. It is divided into three parts: Subpart A, the administration of the forest transportation system; Subpart B, designation of roads, trails, and areas for motor vehicle use; and Subpart C, use by over-snow vehicles. *See* 36 C.F.R. Part 212.

Table 7. Travel Management Rule Subparts – Objectives, Requirements & Products

| 36 C.F.R. §212 | Objective: | Requires: | Product(s): |
|---|---|---|---|
| Subpart A; Roads Rule 2001 | To achieve a sustainable national forest road system. | Use a science-based analysis to identify the minimum road system and roads for decommissioning | - Travel Analysis Report<br>- Map with roads identified as "likely needed" and "likely unneeded" |
| Subpart B; Travel Management Rule 2005 | To protect forests from unmanaged off-road vehicle use by ending cross-country travel and ensuring the agency minimizes the harmful effects from motorized recreation. | Designating a system of roads, trails and areas available for off-road vehicle use according to general and specific criteria. | - Motor Vehicle Use Maps that indicate what roads/trails are open for motorized travel |
| Subpart C; Travel Management Rule | To protect forests from unmanaged over-snow vehicle use in a manner that minimizes their harmful effects. | Designating specific roads, trails and/or areas for oversnow vehicle use according to the criteria per | - Oversnow vehicle maps designating trails and areas for winter motorized recreation |

| | | | |
|---|---|---|---|
| | | Subpart B. | |

This broad-based national rule is needed because at over 370,000 miles, the Forest Service road system is long enough to circle the earth over 14 times and it is over twice the size of the National Highway System.[8] It is also indisputably unsustainable from ecological, economic and management perspectives. The majority of the roads were constructed decades ago when design and management techniques did not meet current standards (Gucinski et al. 2000, Endicott 2008), making them more vulnerable to erosion and decay. Further, current design standards and best management practices have not been updated to address climate change realities. Exacerbating the problem are massive Forest Service road maintenance backlogs that forces the agency to forego actions necessary to ensure proper watershed function, such as preventing sediment pollution and sustaining aquatic organism passages. Nationally, the total deferred maintenance backlog reached $5.5 billion in FY 2019 of which $3.1 billion is associated with roads.[9] As a result, the road network is not only a massive economic liability, it is also actively harming National Forest System lands, waters, fish and wildlife.

Over the past two decades the Forest Service - largely due to the Travel Management Rule - has made some limited efforts to identify and implement a sustainable transportation system. Yet, overall the agency has yet to meet the requirements of Subpart A. The challenge for forest managers is figuring out what is a sustainable road system and how to achieve it – a challenge exacerbated by climate change. It is reasonable to define a sustainable transportation system as one where all the roads and trails are located, constructed, and maintained in a manner that minimizes harmful environmental consequences while providing social benefits and within budget constraints. This could potentially be achieved through the use of effective best management practices. However, the reality is that even the best transportation networks can be problematic simply because they exist and usher in land uses that, without the access, would not occur (Trombulak and Frissell 2000, Carnefix and Frissell 2009, USDA Forest Service 1996), and when they are not maintained to the designed level they result in environmental problems (Endicott 2008; Gucinski et al. 2000). Moreover, what was sustainable yesterday may no longer be sustainable under climate change realities since roads designed to meet older climate criteria may no longer hold up under new scenarios (USDA Forest Service 2010, USDA Forest Service 2011b, AASHTO 2012, Furniss et al., 2013, Schwartz et al. 2014, USDA FS 2018, Halofsky et al. 2018a, 2018b).

Given consistent budget shortfalls and increasing risks from climate change vulnerabilities, it is clear the agency has an urgent need to both identify and implement a minimum road system, one that will ensure the protection of all Forest Service system lands. However, without specific direction from the Forest Service's Washington D.C. office or Congress, it is reasonable to expect the agency will

[8] USDOT Federal Highway Administration, Office of Highway Policy Information. https://www.fhwa.dot.gov/policyinformation/pubs/hf/pl11028/chapter1.cfm
[9] USDA Forest Service. 2019. FY2020 Budget Justification. p.83.

continue to rely on piecemeal, project-level analyses to identify the minimum road system. Such an approach is inefficient, and insufficient to achieve a sustainable road system forestwide.

Further, where the Forest Service does act to comply with Subpart A, it typically fails to consider shortcoming in its previous travel analysis processes. In fact, an independent review of 38 Travel Analysis Processes and corresponding reports conducted in 2016 by the U.S. Department of Transportation John A. Volpe National Transportation Systems Center found three overarching concerns:

- A lack of clarity regarding the process;
- Failure to follow 36 CFR 212.5(b) direction and Washington Office guidance; and
- Omission of required documents, referenced appendices, or key supporting materials.

Compounding these concerns is the fact that not only do project-level NEPA analyses fail to account for the TAP shortcomings, they also fail to consider real road/motorized densities when identifying the minimum road system. Moreover, these analyses erroneously assume best management practices and project-specific design features will be effective when the Forest Service authorizes actions to achieve a sustainable road system. Finally, if the project-level decision includes actual road decommissioning, the analysis typically fails to consider or specify treatments, resulting in a legacy of ghost-roads persisting on the landscape. The following sections expand on these shortcomings, which the Forest Service must consider in all project-level analyses, and when revising its land and travel management plans.

## B. Using Real Road and Motorized Trail Densities to Identify a Minimum Road System

As the Forest Service works to comply with Subpart A, it is crucial that the agency incorporate the true road and motorized trail densities in both its travel analysis process and NEPA-level analyses. Further, the agency must establish standards in land management plan revisions and amendments to ensure each forest achieves an ecologically sustainable minimum road system. Road density analyses should include closed roads, non-system roads, temporary roads, and motorized trails. Typically, the Forest Service calculates road density by looking only at open system road density. From an ecological standpoint, this is a flawed approach since it leaves out the density calculations of a significant percent of roads and motorized trails on the landscape. These additional roads and motorized trails impact fish, wildlife, and water quality, and in some cases, have more of an impact than open system roads. In this section, we provide justification for why a road density analyses should include more than just open road density whenever the Forest Service evaluates the ecological health of an area during NEPA-level analysis or other processes such as for watershed assessments, forest plan revisions or during travel analysis.

### *Impacts of closed roads*

It is crucial to distinguish the density of roads physically present on the landscape, whether closed to vehicle use or not, from "open-road density." An open-road density of 1.5 mi/mi² has been established as a standard in some national forests as protective of some terrestrial wildlife species. However, many areas with an open road density of 1.5 mi/mi² often have more miles of closed roads which are still hydrologically connected and negatively affecting aquatic and wildlife habitat. This higher density occurs because many road "closures" may block vehicle access, but do nothing to mitigate the hydrologic alterations the road causes. The problem is often further compounded by the existence of "ghost" roads that are not captured in agency inventories, but that are nevertheless physically present and causing hydrologic alteration (Pacific Watershed Associates 2005).

Closing a road to public motorized use can mitigate the impacts on water, wildlife, and soils only if proper closure and storage techniques are followed. Flow diversions, sediment runoff, and illegal incursions will continue unabated if the road is not hydrologically stabilized and adequately blocked from motorized traffic. The Forest Service's National Best Management Practices for non-point source pollution recommends the following management techniques for minimizing the aquatic impacts from closed system roads: eliminate flow diversion onto the road surface, reshape the channel and streambanks at the crossing-site to pass expected flows without scouring or ponding, maintain continuation of channel dimensions and longitudinal profile through the crossing site, and remove culverts, fill material, and other structures that present a risk of failure or diversion (USDA Forest Service 2012).

As noted above, many species benefit when roads are closed to motorized use. However, the fact remains that closed system roads are often breached resulting in impacts to fish and wildlife. A significant portion of gates and closure devices are ineffective at preventing motorized use (Griffin 2004, USFWS 2007). For example, in a legal decision from the Utah District Court, *Sierra Club v. USFS*, Case No. 1:09-cv-131 CW (D. Utah March 7, 2012), the court found that, as part of analyzing alternatives in a proposed travel management plan, the Forest Service failed to examine the impact of continued illegal use. In part, the court based its decision on the Forest Service's acknowledgement that illegal motorized use is a significant problem and that the mere presence of roads is likely to result in illegal use.

In addition to the disturbance to wildlife from motorized use, incursions and the accompanying human access can also result in illegal hunting and trapping of animals. The Tongass National Forest refers to this in its EIS to amend the Land and Resources Management Plan. Specifically, the Forest Service notes in the EIS that Alexander Archipelago wolf mortality due to legal and illegal hunting and trapping is related not only to roads open to motorized access, but to all roads, and that *total road densities* of 0.7-1.0 mi/mi² or less may be necessary (USDA Forest Service 2008).

### *Impacts of unauthorized (non-system) roads*

As of 1998, there were approximately 130,000 miles of non-system roads in national forests (USDA Forest Service, 1998). However, the creation of unauthorized roads continues to be a problem as the Forest Service struggles to properly enforce travel management plans protecting areas from motorized travel. No requirements are in place directing the agency to track or inventory unauthorized roads, therefore currently their precise number is unknown. These roads contribute significantly to the environmental impacts of the transportation system on forest resources, just as forest system roads do. Because the purpose of a road density analysis is to measure the impacts of roads at a landscape level, the only way to do this is for the Forest Service to include all roads, including non-system roads, when measuring impacts. An all-inclusive analysis will provide a more accurate representation of the environmental impacts of the road network within the analysis area.

### *Impacts of temporary roads*

Temporary roads are not considered system roads. Most often they are constructed in conjunction with timber sales. Temporary roads have the same types of environmental impacts as system roads, although at times the impacts can be worse if the road persists on the landscape because they are not built to last. It is important to note that although they are termed temporary roads, their impacts are not temporary. According to Forest Service Manual (FSM) 7703.1, the agency is required to "Reestablish vegetative cover on any unnecessary roadway or area disturbed by road construction on National Forest System lands within 10 years after the termination of the activity that required its use and construction."

Regardless of the FSM 10-year direction, temporary roads often remain for much longer because timber sale contracts typically last 3-5 years or more. If the timber purchaser builds a temporary road in the first year of a five-year contract, its intended use may not end until the full project is complete, which can include post-harvest actions such as prescribed burning. Even though the contract often requires the purchaser to close, obliterate and seed the roadbed with native vegetation, this work typically occurs after a few years of treatment activities. The temporary road, therefore, could remain open for 7-8 years or longer before the FSM ten-year clock starts ticking. Therefore, temporary roads can legally remain on the ground for up to 20 years or more, yet they are constructed with fewer environmental safeguards than modern system roads. Exacerbating the problem is the rise of landscape-scale projects that last between 10-20 years. Unless there is explicit direction requiring temporary road removal within a certain time after treatment activities, it is likely these roads could persist for decades.

### *Impacts of motorized trails*

Motorized use on trails has serious harmful effects similar to roads, and it is crucial for the Forest Service to include motorized trails in its density calculations. As we note several times in Section I above, scientific research and agency publications find similar impacts between motorized trails and roads. Off-road vehicle (ORV) use on trails impact multiple resources, resulting in soil compaction

and erosion, trampling of vegetation, as well as wildlife habitat loss, disturbance, and direct mortality. Many of these impacts increase on trails not planned or designed for vehicles, as is often the case when the Forest Service designates ORVs on trails built for hiking or equestrian uses. In many instances the agency designates motorized use on unauthorized trails created through illegal use or from a legacy of unmanaged cross-country travel, further exacerbating the related harmful effects. For a full review of the environmental and cultural impacts on forest lands see Switalski and Jones (2012), and for a review of impacts in arid environments see Switalski (2018).

## C. Using Best Management Practices to Achieve a Sustainable Road System

Numerous Best Management Practices (BMPs) were developed to help create a more sustainable transportation system and identify restoration opportunities. BMPs provide science-based criteria and direction that land managers follow in making and implementing decisions about human uses and projects that affect natural resources. Several states have developed BMPs for road construction, maintenance, and decommissioning practices (e.g., Logan 2001, Merrill and Cassaday 2003). The report entitled, National Best Management Practices for Water Quality Management on National Forest System Lands, includes specific road BMPs for controlling erosion and sediment delivery into waterbodies and maintaining water quality (USDA FS 2012). These BMPs cover road system planning, design, construction, maintenance, and decommissioning as well as other transportation-related activities.

### *Forest Service BMPs - Implementation and Effectiveness*

While national BMPs have been established, the effectiveness of individual BMPs, and whether they are implemented at all, is in question. Furthermore, design features are increasingly replacing BMPs for project-level mitigation of road-related environmental impacts. These design features are not consistent among projects, but rather adapted from forest plans and state BMPs, rather than national Forest Service guidelines. Design features need to be standardized, and their rate of implementation and effectiveness systematically reviewed.

When considering how effective BMPs are at controlling nonpoint pollution on roads, both the rate of implementation, and their effectiveness should both be considered. The Forest Service tracks the rate of implementation and the relative effectiveness of BMPs from in-house audits. This information is summarized in the *National BMP Monitoring Summary Report* with the most recent data being the fiscal years 2013-2014 (Carlson et al. 2015). The rating categories for implementation are "fully implemented," "mostly implemented," "marginally implemented," "not implemented," and "no BMPs." "No BMPs" represents a failure to consider BMPs in the planning process. More than a hundred evaluations on roads were conducted in FY2014. Of these evaluations, only about one third of the road BMPs were found to be "fully implemented" (Carlson et al. 2015, p. 12).

The monitoring audit also rated the relative effectiveness of the BMP. The rating categories for effectiveness are "effective," "mostly effective," "marginally effective," and "not effective."

"Effective" indicates no adverse impacts to water from project or activities were evident. When treated roads were evaluated for effectiveness, almost half of the road BMPs were scored as either "marginally effective" or "not effective" (Carlson et al. 2015, p. 13). However, BMPs for completed road decommissioning projects showed approximately 60 percent were effective and mostly effective combined, but it was unclear what specific BMPs account for this success (Carlson et al. 2015, p. 35). As explained below, road recontouring that restores natural hillside slopes is a more effective treatment compared to those that leave road features intact.

A recent technical report by the Forest Service entitled, *Effectiveness of Best Management Practices that Have Application to Forest Roads: A Literature Synthesis* summarized research and monitoring on the effectiveness of different BMP treatments for road construction, presence and use (Edwards et al. 2016). They found that while several studies have found some road BMPs are effective at reducing delivery of sediment to streams, the degree of each treatment has not been rigorously evaluated (Edwards et al. 2016). Few road BMPS have been evaluated under a variety of conditions, and much more research is needed to determine the site-specific suitability of different BMPs (Edwards et al. 2016, also see Anderson et al. 2011).

Edwards et al. (2016) cites several reasons for why BMPs may not be as effective as commonly thought. Most watershed-scale studies are short-term and do not account for variation over time, sediment measurements taken at the mouth of a watershed do not account for in-channel sediment storage and lag times, and it is impossible to measure the impact of individual BMPs when taken at the watershed scale. When individual BMPs are examined there is rarely broad-scale testing in different geologic, topographic, physiological, and climatic conditions. Further, Edwards et al. (2016) observes, "The similarity of forest road BMPs used in many different states' forestry BMP manuals and handbooks suggests a degree of confidence validation that may not be justified," because they rely on just a single study. Therefore, BMP effectiveness would require matching the site conditions found in that single study, a factor land managers rarely consider.

Climate change will further put into question the effectiveness of many road BMPs (Edwards et al. 2016). While the impacts of climate will vary from region to region (Furniss et al. 2010), more extreme weather is expected across the country which will increase the frequency of flooding, soil erosion, stream channel erosion, and variability of streamflow (Furniss et al. 2010). BMPs designed to limit erosion and stream sediment for current weather conditions may not be effective in the future. Edwards et al. (2016) states, "More-intense events, more frequent events, and longer duration events that accompany climate change may demonstrate that BMPs perform even more poorly in these situations. Research is urgently needed to identify BMP weaknesses under extreme events so that refinements, modifications, and development of BMPs do not lag behind the need."

The uncertainties about BMP effectiveness as a result of climate change, compounded by the inconsistencies revealed by BMP evaluations, suggest that the Forest Service cannot simply rely on them, or design features/criteria, as a means to mitigate project-level activities. This is especially relevant where the Forest Service relies on the use of BMPs instead of fully analyzing potentially

harmful environmental consequences from road design, construction, maintenance or use, in studies and/or programmatic and site-specific NEPA analyses.

## D. Effectiveness of Road Decommissioning Treatments

In order to truly achieve a sustainable minimum road system, the Forest Service must effectively remove unneeded roads. According to the Forest Service, the objective of road decommissioning is to "stabilize, restore, and revegetate unneeded roads to a more natural state to protect and enhance NFS lands" (FSM 7734.0). However, rather than actively removing roads, the Forest Service is increasingly relying on abandoning roads to reach decommissioning treatment objectives (Apodaca et al.2018). Simply closing or abandoning roads will lead to continued resource damage. Other treatments such as ripping the roadbed or installing drainage such as waterbars or dips, have limited and often short-term benefits to natural resources (e.g., Luce 1997, Switalski et al. 2004, Nelson et al. 2010). Recontouring roads is the only proven method to attain the intended outcome of road decommissioning.

Several studies have documented the benefits of fully recontouring roads for ecological restoration. Lloyd et al. (2013) found that rooting depths were much deeper in recontoured roads than in abandoned roads in Idaho, and soil organic matter was an order of magnitude higher on recontoured roads than abandoned roads. Further studies show that soil carbon storage is much higher on recontoured roads as well. A study in Northern California found that recontouring roads resulted in higher soil organic carbon than ripping the roads (Seney and Madej 2015). Higher tree growth and wildlife use has also been found on and near recontoured roads than ripped or abandoned roads (Kolka and Smidt 2004, Switalski and Nelson 2011). Switalski and Nelson (2011) found increased use by black bears on recontoured roads than closed or abandoned roads due to increased food availability and increased habitat security. In addition, removing culverts at stream crossings results in restoring aquatic connectivity and expanding habitat (Erkinaro et al. 2017).

### *Legacy Roads Monitoring Project*

Since 2008, the Forest Service Rocky Mountain Research Station has conducted systematic monitoring on the effectiveness of decommissioned roads in reducing hydrologic and geomorphic impacts from the Forest Service road network. One intent of the monitoring project was to gauge the success of the Legacy Roads and Trails Program that Congress established to provide dedicated funding for the treatment and removal of unnecessary forest roads. The monitoring found that recontouring roads and restoring stream crossings results in dramatic declines in road-generated sediment. Storm-proofing treatments lead to fewer benefits, and on control sites (untreated or abandoned roads), high levels of sediment delivery continued, and the risk of culvert failures remained. For example, a study on the Lolo Creek Watershed on the Clearwater National Forest

found a 97% reduction in road/stream connectivity following road recontour (Cissel et al. 2011). Using field observations and the Geomorphic Roads Analysis and Inventory Package (GRAIP), they found a reduction of fine sediments from 38.1 tonnes/year to 1.3 tonnes/year along 3.5 miles of road. Furthermore, they found that restoring road/stream crossings eliminated the risk of culverts plugging, stream diversions, and fill lost at culverts (Table 8).

On the other hand, monitoring conducted on the Caribou-Targhee National Forest found only a 59% reduction of fine sediment delivery from a combination of storm proofing (installation of drain dips), ripping, tilling, and outsloping techniques. There was a reduction of 34.9 tons/year to 14.1 ton/year – leaving a significant amount of sediment continuing to be delivered to streams. Additionally, some stream crossing culverts were not treated and the risk of plugging remained leaving 330 $m^3$ of fill material at risk. While trail conversion and decommissioning treatments reduced slope failure risks, in some cases storage treatments actually increased the risk of failure (Nelson et al. 2010). Additional monitoring studies conducted in Montana, Idaho, Washington, Oregon, and Utah have similar results.[10]

Table 8. Summary of GRAIP road risk predictions for a watershed on the Clearwater National Forest road decommissioning treatment project (reprinted from Cissel et al. 2011).

| **IMPACT/RISK TYPE** | **EFFECT OF TREATMENT: INITIAL GRAIP PREDICTION** |
|---|---|
| Road-stream hydrologic connectivity | -97%, -2510 m |
| Fine Sediment Delivery | -97%, -36.8 tonnes/yr. |
| Landslide Risk | Reduced to near natural condition |
| Gully Risk | Reduced from very low to negligible |
| Stream Crossing Risk<br>-plug potential<br>-fill at risk<br>-diversion potential | <br>-100% eliminated at 9 sites<br>-100%, 268 $m^3$ fill removed<br>-100%, eliminated at 3 sites |
| Drain Point Problems | 17 problems removed, 4 new problems |

[10] For reports visit https://www.fs.fed.us/GRAIP/LegacyRoadsMonitoringStudies.shtml

The Forest Service recognizes that fundamental to road decommissioning is revegetating the roadbed. FSM 7734 states, "Decommission a road by reestablishing vegetation and, if necessary, initiating restoration of ecological processes interrupted or adversely impacted by the unneeded road." However, roads are inherently difficult to revegetate because of compaction, lack of soil and organic material, low native seedbank, and presence of noxious weeds (Simmers and Galatowitsch 2010, Ramlow et al. 2018). Many recently acquired industrial timberlands (e.g. Legacy Lands) have road systems with limited canopy cover, little woody debris available, and a large weed seedbank. Thus, revegetation is going to be particularly challenging on these lands.

Consistent application of BMPs that direct recontouring roads for decommissioning will be essential to ensure the treatments best achieve improvements in ecological conditions. More than any other treatment, road recontouring ensures complete decompaction of the roadbed, incorporates native soils that were side-cast during construction, and prevents motorized use. This in turn increases plant rooting depths, soil carbon storage, tree growth, and wildlife use. Any earth disturbing activity can create conditions favorable to noxious weeds, so treating weeds before any treatment and ensuring quick revegetation can limit weeds spread. Applying road recontour BMPs that also mitigate risks associated with noxious weed expansion will help prevent their spread

## Conclusion

Numerous studies show that roads and motorized trails negatively impact the ecological integrity of terrestrial and aquatic ecosystems and watersheds. There is ample evidence to confirm the harm to wildlife, aquatic species, water quality, and natural processes from forest roads and motorized use. In addition, the evolving science surrounding roads and wildfire demonstrate a direct link between access and human-caused ignitions, and also suggests that land managers must consider how roads affect fire behavior. Minimizing these impacts by reducing road densities could be an effective solution.

An increasing body of literature exists demonstrating that not only is the Forest Service's transportation infrastructure highly vulnerable to climate change, but also that roads exacerbate climate change's harmful effects to other resources. The agency itself has published multiple reports and guidelines for adaptation, yet few forests are fully translating the information into tangible actions. The Forest Service must implement climate change adaptations as soon as possible, including protecting and expanding intact forests as part of a growing effort to promote natural climate change solutions. Opportunities exist to reduce fragmentation, sequester carbon, and expand roadless areas by implementing a minimum road system.

The Forest Service must fulfil its mandate to achieve an ecologically and economically sustainable forest road system by fully complying with the Roads Rule's requirement to identify a minimum road system. Inconsistent policy interpretations, inadequate travel analysis reports and lack of accountability has largely left this goal wholly out of reach. Yet this work remains vitally important,

especially in the context of climate change. The Forest Service should reinvigorate its efforts to comply with the rule's requirements. Towards this end, the agency must include current science, particularly related to future climate conditions. All road and motorized trail densities should be included in the analysis. When the agency actually does identify a minimum road system and proposes to remove unneeded roads, it must carefully evaluate the effectiveness of all proposed BMPs and design features, and fully implement the most effective decommissioning treatments to maximize restoring ecological integrity to the area. These actions will ensure the Forest Service finally achieves its goal to establish a truly sustainable forest road system.

Recontoured road, Olympic National Forest - Skokomish Watershed, 2017. By WildEarth Guardians

## REFERENCES


1. AASHTO. 2012. Adapting Infrastructure to Extreme Weather Events: Best Practices and Key Challenges. Background Paper. AASHTO Workshop. Traverse City, Michigan, May 20, 2012. Available at: http://climatechange.transportation.org/pdf/adapt_background5-20-12.pdf.

2. Adams, J.C., and S.F. McCool. 2009. Finite recreation opportunities: The Forest Service, the Bureau of Land Management, and off-road vehicle management. Natural Areas Journal 49: 45–116.

3. Al-Chokhachy, R., T. A Black, C. Thomas C. H Luce, B. Rieman, R. Cissel, A. Carlson, S. Hendrickson, E. K. Archer, and J. L. Kershner. 2016. Linkages between unpaved forest roads and streambed sediment: why context matters in directing restoration. Restoration Ecology 24(5).

4. Anderson, C.J.; Lockaby, B.G. 2011. Research gaps related to forest management and stream sediment in the United States. Environmental Management. 47: 303-313.

5. Anderson, H.M., C. Gaolach, J. Thomson, and G. Aplet. 2012. Watershed Health in Wilderness, Roadless, and Roaded Areas of the National Forest System. Wilderness Society Report. 11 p.

6. Arienti, M.C., S.G. Cumming, M.A. Krawchuk, and S. Boutin. 2009. Road network density correlated with increased lightning fire incidence in the Canadian western boreal forest. International Journal of Wildland Fire 18 (8): 970–982.

7. Apodaca, M., M. Tippie, A.M Verde, V. Barandino, B. Jones, J. Rios. 2018. Guidelines for storing and decommissioning roads. USDA Forest Service, National Technology and Development Program. 58p.

8. Balch, J.K., B.A. Bradley, J.T. Abatzoglou, R.C. Nagy, E.J. Fusco, and A.L. Mahood. 2017. Human-started wildfires expand the fire niche across the United States. PNAS 114(11): 2946-2951.

9. Battin J., M.W. Wiley, M.H. Ruckelshaus, R.N. Palmer, E. Korb, K.K. Bartz, and H. Imaki. 2007. Projected impacts of climate change on salmon habitat restoration. Proceedings of the National Academy of Sciences of the United States of America 104: 6720–6725.

10. Baxter, C.V., C.A. Frissell, and F.R. Hauer. 1999. Geomorphology, logging roads, and the distribution of bull trout spawning in a forested river basin: implications for management and conservation. Transactions of the American Fisheries Society 128: 854–867.

11. Baxter, G. 2002. All terrain vehicles as a cause of fire ignition in Alberta forests. Advantage (Publication of the Forest Engineering Research Institute of Canada) 3(44): 1-7.

12. Beazley, K., T. Snaith, F. MacKinnon, and D. Colville. 2004. Road density and the potential impacts on wildlife species such as American moose in mainland Nova Scotia. Proceedings of the Nova Scotia Institute of Science 42: 339-357.

13. Benítez-López , A., R. Alkemade, and P.A. Verweij. 2010. The impacts of roads and other infrastructure on mammal and bird populations: a meta-analysis. Biological Conservation 143: 1307-1316.

14. Beyer, H.L., R. Ung, D.L. Murray, and M.J. Fortin. 2013. Functional responses, seasonal variation and thresholds in behavioural responses of moose to road density. Journal of Applied Ecology 50: 286–294.

15. Birdsall, J.L, W. McCaughey, and J.B. Runyon. 2012. Roads Impact the distribution of Noxious Weeds more than restoration treatments in a lodgepole pine forest in Montana, USA. Restoration Ecology 20(4): 517-523.

16. Bisson, P.A., B.E. Rieman, C. Luce, P.F. Hessburg, D.C. Leed, J.L. Kershner, G.H. Reeves, R.E. Gresswell. Fire and aquatic ecosystems of the western USA: current knowledge and key questions. Forest Ecology and Management 213-229.

17. Boulanger J., and G.B. Stenhouse. 2014. The impact of roads on the demography of grizzly bears in Alberta. PLoS ONE 9(12). Available at: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0115535

18. Bowles, A.E. 1997. Responses of wildlife to noise. In Wildlife and recreationists: coexistence through management and research. Edited by R.L. Knight and K.J. Gutzwiller. Island Press, Washington, DC. p. 109–156.

19. Brehme, C.S., and J.A. Tracey, L.R. McClenaghan, and R.N. Fisher. 2013. Permeability of roads to movement of scrubland lizards and small mammals. Conservation Biology 27(4): 710–720.

20. Brody, A.J., and M.R. Pelton. 1989. Effects of roads on black bear movements in western North Carolina. Wildlife Society Bulletin 17: 5-10.

21. Buchanan, C.B., J.L. Beck, T.E. Bills, S.N. Miller. 2014. Seasonal resource selection and distributional response by elk to development of a natural gas field. Rangeland Ecology and Management 67(4): 369-379.

22. Carlson, J. P. Edwards, T. Ellsworth, and M. Eberle. 2015. National best management practices monitoring summary report. Program Phase-In Period Fiscal Years 2013-2014. USDA Forest Service. Washington, D.C.

23. Carnefix, G., and C. A. Frissell. 2009. Aquatic and Other Environmental Impacts of Roads: The Case for Road Density as Indicator of Human Disturbance and Road-Density Reduction as Restoration Target; A Concise Review. Pacific Rivers Council Science Publication 09-001. Pacific Rivers Council, Portland, OR and Polson, MT.

24. Chen, H.L, and J.L. Koprowski, Barrier effects of roads on an endangered forest obligate: influences of traffic, road edges, and gaps, Biological Conservation 199: 33-40.

25. Cissel, R., T. Black, and C. Luce. 2011. Legacy Roads and Trails Monitoring Project: Road Decommissioning on the Lolo Creek Watershed Clearwater National Forest. Boise, ID. 27p. https://www.fs.fed.us/GRAIP/downloads/case_studies/LegacyRoadsClearwaterNF_LoloCreek2009Decomission_FinalReport.pdf

26. Coffin, A. 2006. From roadkill to road ecology: A review of the ecological effects of roads. Journal of Transport Geography 15: 396-406.

27. Crist, M.R., and B. Wilmer. 2002. Roadless Areas: The Missing Link in Conservation. The Wilderness Society, Washington D.C.

28. da Rosa, C.A., and A. Bager. Review of the factors underlying the mechanisms and effects of roads on vertebrates. Oecologia Australis 17(1): 6-19.

29. Damschen, E.I., L.A. Brudvig, M.A. Burt, R.J. Fletcher, N.M. Haddad, D.J. Levey, J.L. Orrock, J. Resasco, and J.J. Tewksbury. 2019. Ongoing accumulation of plant diversity through habitat connectivity in an 18-year experiment. Science 365(6460): 1478-1480. https://science.sciencemag.org/content/365/6460/1478.abstract

30. Davenport, J., and T.A. Switalski. 2006. Environmental impacts of transport related to tourism and leisure activities. In: The ecology of transportation: managing mobility for the environment, editors: J Davenport and Julia Davenport. Dordrecht, Netherlands: Kluwer Academic Publishers. 333-360.

31. DellaSalla, D.A., J.E. Williams, C.D. Williams, and J.F. Franklin. 2004. Beyond smoke and mirrors: a synthesis of fire policy and science. Conservation Biology 18:976–986.

32. DellaSala, D., J. Karr, and D. Olson. 2011. Roadless areas and clean water. Journal of Soil and Water Conservation, vol. 66, no. 3. May/June 2011.

33. DeVelice, R., and J.R. Martin. 2001. Assessing the extent to which roadless areas complement the conservation of biological diversity. Ecological Applications 11(4): 1008-1018.

34. Edwards, P.J., F. Wood, and R. L. Quinlivan. 2016. Effectiveness of best management practices that have application to forest roads: a literature synthesis. General Technical Report NRS-163. Parsons, WV: U.S. Department of Agriculture, Forest Service, Northern Research Station. 171 p.

35. Edge, W.D., and C.L. Marcum. 1985. Movements of elk in relation to logging disturbances. Journal of Wildlife Management 49(4): 926–930.

36. Endicott, D. 2008. National Level Assessment of Water Quality Impairments Related to Forest Roads and Their Prevention by Best Management Practices. A Report Prepared by the Great Lakes Environmental Center for the Environmental Protection Agency, Office of Water, December 4, 2008. 259 pp.

37. Erkinaro, J., H. Erkinaro, and E. Niemelä. 2017. Road culvert restoration expands the habitat connectivity and production area of juvenile Atlantic salmon in a large subarctic river system. Fisheries Management and Ecology. 24: 73-81.

38. Fahrig, L., and T. Rytwinski. 2009. Effects of roads on animal abundance: an empirical review and synthesis. Ecology and Society 14(1): 21.

39. Foltz, R.B. N.S. Copeland, and W.J. Elliot. 2009. Reopening abandoned forest roads in northern Idaho, USA: Quantification of runoff, sediment concentration, infiltration, and interrill erosion parameters. Journal of Environmental Management 90: 2542–2550.

40. Forman, R. T. T., and A.M. Hersperger. 1996. Road ecology and road density in different landscapes, with international planning and mitigation solutions. Pages 1–22. IN: G. L. Evink, P. Garrett, D. Zeigler, and J. Berry (eds.), Trends in Addressing Transportation Related Wildlife Mortality. No. FLER- 58-96, Florida Department of Transportation, Tallahassee, Florida.

41. Foreman, R.T.T., D. Sperling, J.A. Bissonette et al. 2003. Road Ecology – Science and Solutions. Island Press. Washington, D.C. 504 p.

42. Furniss, M.J.; Staab, B.P.; Hazelhurst, S.; Clifton, C.F.; Roby, K.B.; Ilhardt, B.L.; Larry, E.B.; Todd, A.H.; Reid, L.M.; Hines, S.J.; Bennett, K.A.; Luce, C.H.; Edwards, P.J. 2010. Water, climate change, and forests: watershed stewardship for a changing climate. Gen. Tech. Rep. PNW-812. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 75 p.

43. Furniss, Michael J.; Roby, Ken B.; Cenderelli, Dan; Chatel, John; Clifton, Caty F.;Clingenpeel, Alan; Hays, Polly E.; Higgins, Dale; Hodges, Ken; Howe, Carol; Jungst, Laura; Louie, Joan; Mai, Christine; Martinez, Ralph; Overton, Kerry; Staab, Brian P.; Steinke, Rory; Weinhold, Mark. 2013. Assessing the vulnerability of watersheds to climate change: results of national forest watershed vulnerability pilot assessments. Gen. Tech. Rep. PNW-GTR-884. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 32 p. plus appendix.

44. Gaines, W.L., P. Singleton, and R.C. Ross. 2003. Assessing the cumulative effects of linear recreation routes on wildlife habitats on the Okanogan and Wenatchee National Forests. Gen. Tech. Rep. PNW-GTR-586. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 79 p.

45. Gelbard, J.L., and S. Harrison. 2003. Roadless habitats as refuges for native grasslands: interactions with soil, aspect, and grazing. Ecological Applications 13(2): 404-415.

46. Girvetz, E., and F. Shilling. 2003. Decision Support for Road System Analysis and Modification on the Tahoe National Forest. Environmental Management 32(2): 218–233

47. Grant, A., C.R. Nelson, T.A. Switalski, and S.M. Rinehart. 2011. Restoration of native plant communities after road decommissioning in the Rocky Mountains: effect of seed mix composition & soil properties on vegetative establishment. Restoration Ecology 19: 160-169.

48. Griffin, R.J. 2004. Case closed: public motorized trespass and administrative activity on closed roads in the Upper Swan, Lower Swan, and Noisy Face Geographic Units. 14 p.

49. Gucinski, M., J. Furniss, R. Ziemer, and M.H. Brookes. 2001. Forest Roads: A Synthesis of Scientific Information. Gen. Tech. Rep. PNWGTR-509. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 103 p.
Available at: http://www.fs.fed.us/pnw/pubs/gtr509.pdf.

50. Halofsky, Jessica E.; Peterson, David L, O'Halloran, Kathy A.; Hoffman, Catherine Hawkins, eds. 2011. Adapting to climate change at Olympic National Forest and Olympic National Park. U.S. Department of Agriculture, Forest Service Pacific Northwest Research Station Portland, Oregon General Technical Report, PNW-GTR-844. Available at: https://www.fs.fed.us/pnw/pubs/pnw_gtr844.pdf

51. Halofsky, Jessica E.; Peterson, David L., eds. 2017. Climate change vulnerability and adaptation in the Blue Mountains. Gen. Tech. Rep. PNW-GTR-939. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. p. 53-90. Available at: https://www.fs.fed.us/pnw/pubs/pnw_gtr939.pdf.

52. Halofsky, Jessica E.; Peterson, David L.; Dante-Wood, S. Karen; Hoang, Linh; Ho, Joanne J.; Joyce, Linda A., eds. 2018a. Climate change vulnerability and adaptation in the Northern Rocky Mountains. Gen. Tech. Rep. RMRSGTR-374. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. Part 1. pp. 1–273. Available at: https://www.fs.fed.us/rm/pubs_series/rmrs/gtr/rmrs_gtr374_1.pdf.

53. Halofsky, Jessica E.; Peterson, David L.; Ho, Joanne J.; Little, Natalie, J.; Joyce, Linda A., eds. 2018b. Climate change vulnerability and adaptation in the Intermountain Region. Gen. Tech. Rep. RMRS-GTR-375. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. Part 1. pp. 1–197. Available at: https://www.fs.fed.us/rm/pubs_series/rmrs/gtr/rmrs_gtr375_1.pdf.

54. Halofsky, Jessica E.; Peterson, David L.; Ho, Joanne J. eds. 2019. Climate Change Vulnerability and Adaptation in South-Central Oregon. Gen. Tech. Rep. PNW-GTR-974. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. p. 496. Available at: https://www.fs.fed.us/pnw/pubs/pnw_gtr974.pdf.

55. Hargis, C.D., J.A. Bissonette, and D.T. Turner. 1999. The influence of forest fragmentation and landscape pattern on American martens. Journal of Applied Ecology 36(1): 157–172.

56. Hebblewhite, M., R.H. Munro, E.H Merrill. 2009. Trophic consequences of postfire logging in a wolf-ungulate system. Forest Ecology and Management 257(3): 1053-1062.

57. Hedquist, S.L., L.A. Ellison, and A. Laurenzi. 2014. Public lands and cultural resource protection. Advances in Archaeological Practice 2: 298-310.

58. Hessburg, P.F., and J.K. Agee. 2003. An environmental narrative of Inland Northwest United States forests, 1800-2000. Forest Ecology and Management 178: 23-59

59. Holman, I.P., R.J. Nicholls, P.M. Berry, P.A. Harrison, E. Audsley, S. Shackley, and M.D.A. Rounsevell. 2005. A regional, multi-sectoral and integrated assessment of the impacts of climate and socio-economic change in the UK. Part II. Results. Climatic Change 71: 43-73.

60. Jalkotzy, M.G., P.I. Ross, and M.D. Nasserden. 1997. The effects of linear developments on wildlife: a review of selected scientific literature. Prepared for Canadian Association of Petroleum Producers. Arc Wildlife Services, Ltd., Calgary, AB. 115 p.

61. Jensen W.F., T.K. Fuller, and W.L. Robinson. 1986. Wolf (*Canis lupus*) distribution on the Ontario-Michigan border near Sault Ste. Marie. Canadian Field-Naturalist 100: 363-366.

62. Joslin, G., and H. Youmans, coordinators. 1999. Effects of recreation on Rocky Mountain wildlife: A Review for Montana. Committee on Effects of Recreation on Wildlife, Montana Chapter of The Wildlife Society. 307 p. Available at: http://joomla.wildlife.org/Montana/index

63. Kasworm, W.F., and T.L. Manley. 1990. Road and trail influences on grizzly bears and black bears in northwest Montana. International Conference on Bear Research and Management 8: 79-84.

64. Kerkvliet, J., J. Hicks, and B. Wilmer. 2008. Carbon Sequestered when Unneeded National Forest Roads are Revegetated. The Wilderness Society Briefing Memo.

65. Kolka, R.K., and M.F. Smidt. 2004. Effects of forest road amelioration techniques on soil bulk density, surface runoff, sediment transport, soil moisture, and seedling growth. Forest Ecology and Management 202: 313–323.

66. Lamb, C.T., G. Mowat, A. Reid, L. Smit, M. Proctor, S. Nielson, S. Boutin. 2018. Effects of habitat quality and access management on the density of a recovering grizzly bear population. Journal of Applied Ecology 55: 1406–1417.

67. Lee, D., J. Sedell, B.E. Rieman, R. Thurow, and J. Williams. 1997. Broad-scale assessment of aquatic species and habitats. In: An assessment of ecosystem components in the interior Columbia basin and portions of the Klamath and Great Basins. Edited by T.M. Quigley and S.J. Arbelbide. General Technical ReportPNW-GTR-405. USDA Forest Service, Pacific Northwest Research Station, Portland, OR. Vol III. p. 183–196.

68. Lendrum, P.E., C.R. Anderson, R.A. Long, J.G. Kie, and R.T. Bowyer. 2012. Habitat selection by mule deer during migration: effects of landscape structure and natural-gas development. Ecosphere 3: 82.

69. Lendrum P.E., C.R. Anderson, K.L. Monteith, J.A. Jenks, and R.T. Bowyer. 2013. Migrating Mule Deer: Effects of Anthropogenically Altered Landscapes. PLoS ONE, 8. available online at: http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0064548

70. Lloyd, R., K. Lohse, and T.P.A. Ferre. 2013. Influence of road reclamation techniques on forest ecosystem recovery. Frontiers in Ecology and the Environment 11(2): 75-81.

71. Loucks, C., N. Brown, A. Loucks, and K. 2003. USDA Forest Service roadless areas: potential biodiversity conservation reserves. Conservation Ecology 7(2): 5. Available at: http://www.ecologyandsociety.org/vol7/iss2/art5/

72. Logan, R. 2001. Water Quality BMPs for Montana Forests. Montana Department of Environmental Quality. Missoula, MT. 60p.

73. Lyon, L.J. 1983. Road density models describing habitat effectiveness for elk. Journal of Forestry 81: 592-595.

74. Luce, C.H. 1997. Effectiveness of road ripping in restoring infiltration capacity of forest roads. Restoration Ecology 5(3): 265-270.

75. Mace, R.D., J.S. Waller, T.L. Manley, L.J. Lyon, and H. Zuuring. 1996. Relationships among grizzly bears, roads and habitat in the Swan Mountains, MT. Journal of Applied Ecology. 33: 1395-1404.

76. Madej, M., J. Seney, and P. van Mantgem. 2013. Effects of road decommissioning on carbon stocks, losses, and emissions in north coastal California. Restoration Ecology 21(4): 439–446.

77. Mattson, D.J., S. Herrero, R.G. Wright, and C.M. Pease. 1996. Science and management of Rocky Mountain grizzly bears. Conservation Biology 10(4): 1013-1025.

78. McCaffery M., T.A. Switalski, and L. Eby. 2007. Effects of road decommissioning on stream habitat characteristics in the South Fork Flathead River, Montana. Transactions of the American Fisheries Society 136: 553-561.

79. McGurk, B.J., and D.R. Fong, 1995. Equivalent roaded area as a measure of cumulative effect of logging. Environmental Management 19: 609-621.

80. Mech, L D. 1989. Wolf population survival in an area of high road density. American Midland Naturalist 121: 387-389.

81. Mech, L. D., S.H. Fritts, G.L. Radde, and W.J. Paul. 1988. Wolf distribution and road density in Minnesota. Wildlife Society Bulletin 16: 85-87.

82. Meredith, C. B. Roper, and E. Archer. 2014. Reductions in instream wood n streams near roads in the Interior Columbia River Basin. North American Journal of Fisheries Management 34:493-506.

83. Merrilll, B.R., and E. Cassaday. 2003. Best Management Practices for Road Rehabilitation – Road – Stream Crossing Manual. California State Parks. Eureka, CA. 25p. Available at: http://www.parks.ca.gov/pages/23071/files/streamcrossingremovalbmp5_03.pdf

84. Mladenoff, D.J., T.A. Sickley, R.G. Haight, and A.P. Wydeven. 1995. A regional landscape analysis and prediction of favorable gray wolf habitat in the Northern Great Lakes region. Conservation Biology 9: 279-294.

85. Miller, Stephanie A.; Gordon, Sean N.; Eldred, Peter; Beloin, Ronald M.; Wilcox, Steve; Raggon, Mark; Andersen, Heidi; Muldoon, Ariel. 2017. Northwest Forest Plan—the first 20 years (1994–2013): watershed condition status and trends. Gen. Tech. Rep. PNW-GTR-932. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 74 p.

86. Moomaw William R., Masino Susan A., Faison Edward K. 2019. Intact Forests in the United States: Proforestation Mitigates Climate Change and Serves the Greatest Good. Frontiers in Forests and Global Change, Vol. 2. https://www.frontiersin.org/article/10.3389/ffgc.2019.00027

87. Moore, T. 2007. [unpublished draft]. National Forest System Road Trends, Trends Analysis Submitted to Office of Management and Budget. United States Department of Agriculture, Forest Service, Engineering Staff, Washington Office, Washington, DC.

88. Muñoz, P.T., F.P. Torres, and AG. Megías. 2015. Effects of roads on insects: a review. Biodiversity Conservation 24: 659-682.

89. Nagy, R.C., E. Fusco, B. Bradley, J.T. Abatzoglou, and J. Balch. 2018. Human-related ignitions increase the number of large wildfires across U.S. ecoregions. Fire 1(4): 1-14.

90. Narayanaraj, G., and M.C. Wimberly. 2011. Influences of forest roads on the spatial pattern of wildfire boundaries. International Journal of Wildland Fire 20: 792–803.

91. Narayanaraj, G., and M.C. Wimberly. 2012. Influences of forest roads on the spatial pattern of human- and lightning-caused wildfire ignitions. Applied Geography 32: 878–888.

92. Narayanaraj, G., and M.C. Wimberly. 2013. Influences of forest roads and their edge effects on the spatial pattern of burn severity. International Journal of Applied Earth Observation and Geoinformation 23: 62–70.

93. National Fish, Wildlife and Plants Climate Adaptation Partnership (NFWPCAP). 2012. National Fish, Wildlife and Plants Climate Adaptation Strategy. Association of Fish and Wildlife Agencies, Council on environmental Quality, Great Lakes Indian Fish and Wildlife Commission, National Oceanic and Atmospheric Administration, and U.S. Fish and Wildlife Service. Washington, DC.

94. Neeson, T.M., A.T. Moody, J.R. O'Hanley, M. Diebel, P.J. Doran, M.C. Ferris, T.C. Peter, B. McIntyre. 2018. Aging infrastructure creates opportunities for cost-efficient restoration of aquatic ecosystem connectivity. 28(6): 1494-1502

95. Nelson, N., T. Black, and R. Cissel. 2010. Monitoring road treatments in the Island Park watershed. Boise, ID. 34p.

96. Noss, R.F. 2001. Beyond Kyoto: forest management in a time of rapid climate change. Conservation Biology 15(3): 578-590.

97. Ortega, Y.K., and D.E. Capen. 2002. Roads as edges: effects on birds in forested landscapes. Forest Science 48(2): 381–396.

98. Ouren, D.S., C. Haas, C.P. Melcher, S.C. Stewart, P.D. Ponds, N.R. Sexton, L. Burris, T. Fancher, and Z.H. Bowen. 2007. Environmental effects of off-highway vehicles on Bureau of Land Management lands: A literature synthesis, annotated bibliographies, extensive bibliographies, and internet resources: U.S. Geological Survey, Open-File Report 2007-1353, 225 p.

99. Pacific Watershed Associates. 2005. Erosion Assessment and Erosion Prevention Planning Project for Forest Roads in the Biscuit Fire Area, Southern Oregon. Prepared for Pacific Rivers Council and The Siskiyou Project. Pacific Watershed Associates, Arcata, California.

100. Parmesan, C. 2006. Ecological and evolutionary responses to recent climate change. Annual Review of Ecology, Evolution, and Systematics 37: 637-669.

101. Paton, D.G., S. Ciutu, M.S. Boyce, and M. Quinn. 2017. Hunting exacerbates the response to human disturbance in large herbivores while migrating through a road network. Ecosphere 8(6): 1-18.

102. Proctor, M. F., et al. 2012. Population Fragmentation and Inter-Ecosystem Movements of Grizzly Bears in Western Canada and the Northern United States. Wildlife Monographs 180:1-46; DOI: 10.1002/wmon.6

103. Proctor, M. F., B. N. McLellan, G. B. Stenhouse, G. Mowat, C. T. Lamb, and M. Boyce. 2018. Resource Roads and Grizzly Bears in British Columbia, and Alberta. Canadian Grizzly Bear Management Series, Resource Road Management. Trans-border Grizzly Bear Project. Kaslo, BC. Canada.

104. Prokopenko., C.M., M.S. Boyce, T. Avgar. 2017. Extent-dependent habitat selection in a migratory large herbivore: road avoidance across scales. Landscape Ecology 32(2): 313-325.

105. Quigley, T.M., and S.J. Arbelbide, tech. eds. 1997. An assessment of ecosystem components in the interior Columbia basin and portions of the Klamath and Great Basins: volume 1 and volume 3. Gen. Tech. Rep. PNW-GTR-405. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station.

106. Ramlow, M., C.C. Rhoades, and M.F. Cotrufo. 2018. Promoting revegetation and soil sequestration on decommissioned forest roads in Colorado, USA: A comparative assessment of organic soil amendments. Forest Ecology and Management 427:230-241.

107. Reynolds, K. 1999. Netweaver for EMDS user guide (version1.1); a knowledge base development system. General technical Report PNW-GTR-471. USDA Forest Service, Pacific Northwest Research Station, Portland, OR.

108. Rieman, B., D. Lee, G. Chandler, and D. Myers. 1997. Does wildfire threaten extinction for salmonids? Responses of Redband Trout and Bull Trout Following Recent Large Fires on the Boise National Forest, in Greenlee, J. M., Proceedings: First Conference on Fire Effects on Rare and Endangered Species and Habitats. Coeur d'Alene, Idaho. International Association of Wildland Fire. Fairfield, WA. p. 47-57.

109. Robichaud, P.R., L.H. MacDonald, and R.B. Foltz. 2010. Fuel management and Erosion. In: Cumulative Watershed Effects of Fuels Management in the Western United States. USDA Forest Service RMRS-GTR-231. P. 79-100. Available at: http://www.fs.fed.us/rm/pubs/rmrs_gtr231/rmrs_gtr231_079_100.pdf

110. Robinne, F.N., M.A. Parisien, and M. Flannigan. Anthropogenic influence on wildfire activity in Alberta, Canada. International Journal of Wildland Fire 25: 1131-1143.

111. Robinson, C., P.N. Duinker, and K.F. Beazley. 2010. A conceptual framework for understanding, assessing, and mitigation effects for forest roads. Environmental Review 18: 61-86.

112. Rooney, T.P. 2006. Distribution of ecologically-invasive plants along off-road vehicle trails in the Chequamegon National Forest, Wisconsin. The Michigan Botanist 44:178-182

113. Rowland, M.M., M.J. Wisdom, B.K. Johnson, and M.A. Penninger. 2005. Effects of roads on elk: implications for management in forested ecosystems. Pages 42-52. IN: Wisdom, M.J., technical editor, The Starkey Project: a Synthesis of Long-term Studies of Elk and Mule Deer. Reprinted from the 2004 Transactions of the North American Wildlife and Natural Resources Conference, Alliance Communications Group, Lawrence, KS.

114. Sampson, M.P. 2009. The effects of off-highway vehicles on the cultural resources of Red Rock Canyon State Park, California. Proceedings of the Society for California Archaeology 21: 190-201.

115. Sawyer, H., F. Lindzey, and D. McWhirter. 2005. Mule deer and pronghorn migration in western Wyoming. Wildlife Society Bulletin 33:1266-1273.

116. Sawyer, H., R.M. Nielson, F. Lindzey, and L. McDonald. 2006. Winter Habitat Selection of Mule Deer Before and During Development of a Natural Gas Field. The Journal of Wildlife Management 70: 396-403.

117. Schwartz, H. G., M. Meyer, C. J. Burbank, M. Kuby, C. Oster, J. Posey, E. J. Russo, and A. Rypinski, 2014: Ch. 5: Transportation. Climate Change Impacts in the United States: The Third National Climate Assessment, J. M. Melillo, Terese (T.C.) Richmond, and G. W. Yohe, Eds., U.S. Global Change Research Program, 130-149.

118. Selva, N., A. Switalski, S. Kreft, and P.L. Ibisch. 2015. Why Keep Areas Road-free? The importance of roadless areas. In: Handbook of Road Ecology, First Edition. Edited by R. van der Ree, D. J. Smith and C. Grilo. John Wiley and Sons, Ltd., NJ. Pgs 16-26.

119. Semlitsch, R.D., T.J. Ryan, K. Hamed, M. Chatfield, B. Brehman, N. Pekarek, M. Spath, and A. Watland. 2007. Salamander abundance along road edges and within abandoned logging roads in Appalachian forests. Conservation Biology 21: 159-167.

120. Seney, J., and M.A. Madej. 2015. Soil carbon storage following road removal and timber harvesting in redwood forests. Earth Surface Processes and Landforms 40: 2084-2092.

121. Shilling, F., J. Boggs, and S. Reed. 2012. Recreational System Optimization to Reduce Conflict on Public Lands. Environmental Management 50: 381–395.

122. Simmers, S.M., and S.M. Galatowitsch. 2010. Factors affecting revegetation of oil field access roads in semiarid grassland. Restoration Ecology 18: 27-39.

123. Sosa-Pérez, G., and L.H. MacDonald. 2017. Reductions in road sediment production and road-stream connectivity from two decommissioning treatments. Forest Ecology and Management 398; 116–129.

124. Spangler, J.D., and A. Yentsch. 2008. Final Report: Baseline Site Condition and Vandalism Assessments of Archaeological Sites in Tenmile Canyon, Grand County. Ogden, Utah: Colorado Plateau Archaeological Alliance.

125. Strauch, RL. (2014a) Mt. Baker-Snoqualmie National Forest Sustainable Roads System Strategy. Climate Change Appendix. U.S. Department of Agriculture, Forest Service. Available at: https://cascadiapartnerforum.org/wp-content/uploads/2015/01/RStrauch_MBSNF_SustainableRoadsSystem_ClimateChangeReport_2014.pdf

126. Strauch RL, Raymond CL, Hamlet AF. (2014b) Climate change, hydrology, and access in the North Cascade Range. In: Raymond CL, Peterson DL, and Rochefort RM (eds) Climate change vulnerability and adaptation in the North Cascade Region, Washington. Gen Tech Rep PNW-GTR-892. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station

127. Strauch, RL & C.L. Raymond & R.M. Rochefort & A.F. Hamlet & C. Lauver. (2015). Adapting transportation to climate change on federal lands in Washington State, U.S.A. Dordrecht: Springer Science-Business Media. Available at: https://cascadiapartnerforum.org/wp-content/uploads/2015/03/Strauch-et-al.-2015.pdf

128. Strittholt, J., and D. Dellasala. 2001. Importance of Roadless Area Conservation in Forested Ecosystems: Case Study of the Klamath-Siskiyou Region of the United States. In Conservation Biology 15(6): 1742-1754.

129. Switalski, T.A., J.A. Bissonette, T.H. DeLuca, C.H. Luce, and M.A. Madej. 2004. Benefits and impacts of road removal. Frontiers in Ecology and the Environment. 2(1): 21-28.
Available at: http://www.fs.fed.us/rm/pubs_other/rmrs_2004_switalski_t001.pdf

130. Switalski, T.A., and C.R. Nelson. 2011. Efficacy of road removal for restoring wildlife habitat: black bear in the Northern Rocky Mountains, USA. Biological Conservation 144: 2666-2673.

131. Switalski, T.A., and A. Jones. 2012. Off-road vehicle best management practices for forestlands: A review of scientific literature and guidance for managers. Journal of Conservation Planning 8: 12-24.

132. Switalski, T.A. 2018. Off-highway vehicle recreation in drylands: A literature review and recommendations for best management practices. Journal of Outdoor Recreation and Tourism. 21: 87-96.

133. Syphard, A.D., V.C. Radeloff, J.E. Keeley, T.J. Hawbaker, M.K. Clayton, S.I. Stewart, and R.B. Hammer. 2007. Human influence on California fire regimes. Ecological Applications 17 (5): 1388–1402.

134. Tarvainen, O., Tolvanen, A. Healing the wounds in the landscape—reclaiming gravel roads in conservation areas. Environ Sci Pollut Res 23, 13732–13744 (2016). https://doi.org/10.1007/s11356-015-5341-6

135. Thiel, R.P. 1985. The relationships between road densities and wolf habitat in Wisconsin. American Midland Naturalist 113: 404-407.

136. Trombulak S., and C. Frissell. 2000. Review of Ecological Effects of Roads on Terrestrial and Aquatic Communities. Conservation Biology 14(1): 18-30.

137. USDA Forest Service. (USFS) 1998. National Forest System Roads and Use. Available online at: http://www.fs.fed.us/eng/road_mgt/roadsummary.pdf.

138. USDA Forest Service. 1996. Status of the interior Columbia basin: summary of scientific findings. Gen. Tech. Rep. PNW-GTR-385. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station; U.S. Department of the Interior, Bureau of Land Management. 144 p.

139. USDA Forest Service. 1999. Roads Analysis: Informing Decisions about Managing the National Forest Transportation System. Misc. Rep. FS-643. Washington, D.C.: USDA Forest Service. 222 p. Available at: http://www.fs.fed.us/eng/road_mgt/DOCSroad-analysis.shtml

140. USDA Forest Service 2000. Forest Service Roadless Area Conservation Rule Final Environmental Impact Statement. Washington, D.C. 656 pgs.

141. USDA Forest Service. 2001. Final National Forest System Road Management Strategy Environmental Assessment and Civil Rights Impact Analysis. U.S. Department of Agriculture Forest Service Washington Office, January 2001.

142. USDA Forest Service. 2008. Tongass National Forest Amendment to the Land and Resource Management Plan Record of Decision and Final EIS. Available online at: Available at: https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5367433.pdf

143. USDA Forest Service. 2010. Water, Climate Change, and Forests: Watershed Stewardship for a Changing Climate, PNW-GTR-812, June 2010, 72 p.
Available at: http://www.fs.fed.us/pnw/pubs/pnw_gtr812.pdf.

144. USDA Forest Service. 2011a. Adapting to Climate Change at Olympic National Forest and Olympic National Park. Forest Service Pacific Northwest Research Station General Technical Report, PNW-GTR-844, August 2011.
Available at: http://www.fs.fed.us/pnw/pubs/pnw_gtr844.pdf

145. USDA Forest Service. 2011b. National Roadmap for Responding to Climate Change. US Department of Agriculture. FS-957b. 26 p.
Available at: http://www.fs.fed.us/climatechange/pdf/Roadmap_pub.pdf.

146. USDA Forest Service. 2012. National Best Management Practices for Water Quality Management on National Forest System Lands. Report# FS-990. 177p. Available at: http://www.fs.fed.us/biology/resources/pubs/watershed/FS_National_Core_BMPs_April2012.pdf

147. USDA (US Department of Agriculture). 2014. Strategic plan FY 2014-2018. Washington, D.C. 48p.

148. USDA Forest Service. 2018. U.S. Forest Service Transportation Resiliency Guidebook. Washington, D.C. 94 p. Prepared by: U.S. Department of Transportation John A. Volpe National Transportation Systems Center. Available at: https://www.fs.fed.us/eng/transp/documents/pdf/USFSTransportationResiliencyGuideBook.pdf

149. USDA Forest Service. 2019. Forest Service Geodata Clearinghouse. Accessed 9/18/19. Available at: https://data.fs.usda.gov/geodata/edw/datasets.php

150. USDI Fish and Wildlife Service. 1999. Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for Bull Trout in the Coterminous United States; Final Rule. Federal Register Volume 64, Number 210 (Monday, November 1, 1999). p. 58922.

151. USDI National Park Service. 2010. Climate Change Response Strategy. National Park Service Climate Change Response Program, Fort Collins, Colorado.
Available at: https://www.nps.gov/subjects/climatechange/upload/NPS_CCRS-508compliant.pdf.

152. USFWS, Nevada Fish and Wildlife Office. 2007. 12-Month Finding on a Petition to List the Sand Mountain Blue Butterfly (Euphilotes pallescens ssp. arenamontana) as Threatened or Endangered with Critical Habitat. Federal Register, Vol. 72, No. 84. See pages 24260-61.

153. USDOT John A. Volpe National Transportation Systems Center. 2016. Volpe Travel Analysis Subpart A Review - Summary of Observations DRAFT

154. Van der Ree, R., D.J. Smith, C. Grilo (Eds.). 2015. Handbook of Road Ecology. Wiley-Blackwell, Hoboken, NJ. 552 pgs.

155. Van Dyke, F.G., R.H. Brocke, H.G. Shaw, B.B Ackerman, T.P. Hemker, and F.G. Lindzey. 1986. Reactions of mountain lions to logging and human activity. Journal of Wildlife Management. 50(1): 95–102.

156. Wasser, S.K., K. Bevis, G. King, and E. Hanson. 1997. Noninvasive physiological measures of disturbance in the northern spotted owl. Conservation Biology 11(4): 1019–1022.

157. Wemple, B.C., F.J. Swanson, and J.A. Jones. 2001. Forest Roads and geomorphic process interactions, Cascade Range, Oregon. Earth Surface Process and Landforms 26: 191-204. Available at: http://andrewsforest.oregonstate.edu/pubs/pdf/pub2731.pdf

158. Wisdom, M.J., R.S. Holthausen, B.C. Wales, C.D. Hargis, V.A. Saab, D.C. Lee, W.J. Hann, T.D. Rich, M.M. Rowland, W.J. Murphy, and M.R. Eames. 2000. Source habitats for terrestrial vertebrates of focus in the interior Columbia basin: Broad-scale trends and management implications. Volume 1 – Overview. Gen. Tech. Rep. PNW-GTR-485. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station.

159. Wydeven, A.P, D.J. Mladenoff, T.A. Sickley, B.E. Kohn, R.P. Thiel, and J.L. Hansen. 2001. Road density as a factor in habitat selection by wolves and other carnivores in the Great Lakes Region. Endangered Species Update 18(4): 110-114.

160. Yang, J., H.S. He, S.R. Shifley, and E.J. Gustafson. 2007. Spatial patterns of modern period human-caused fire occurrence in the Missouri Ozark Highlands. Forest Science 53: 1–15.