July 1, 2023

Regional Forester
USDA Forest Service, Southwest Region
333 Broadway Blvd SE
Albuquerque, NM 87102

Submitted via email to: objections-southwestern-regional-office@usda.gov

Submitted with pdf files of cited literature to the Public Comment Form at: https://cara.fs2c.usda.gov/Public//CommentInput?Project=52740.

Submitted as pdf files on flash drive via messenger service to: Reviewing Official, Southwestern Regional Forester, 333 Broadway Blvd. SE, Albuquerque, NM 87102

Re: **OBJECTIONS to Black River Restoration Project Environmental Assessment (Apache-Sitgreaves National Forests), Pursuant to 36 C.F.R. § 218.8**

To the Regional Forester:

The Center for Biological Diversity ("Center") submits these objections to the U.S. Forest Service's Final Environmental Assessment ("EA") and draft Decision Notice for the Black River Restoration Project ("Black River Project" or "Project") on the Apache-Sitgreaves National Forests.

Project Objected To

Pursuant to 36 C.F.R. § 218.8(d)(4), Center for Biological Diversity *et al*. object to the following project:

Project: Black River Restoration Project, Apache-Sitgreaves National Forests, Springerville Ranger District

Responsible Official and Forest/Ranger District: Robert Lever, Forest Supervisor, Apache-Sitgreaves National Forests

Timeliness

Notice of the availability of the Draft Decision notice and Final EA was published in the White Mountain Independent (the newspaper of record) on May 19, 2023, making the deadline to submit comments July 3, 2023. These objections are therefore timely filed.

Lead Objector

Per 36 C.F.R. § 218.8(d)(3), the Objectors designate the "Lead Objector" as follows:

Brian Nowicki, Senior Public Lands Advocate
Center for Biological Diversity

P.O Box 1178, Flagstaff, AZ 86002-1178
(515) 917-5611
bnowicki@biologicaldiversity.org

Interests and Participation of the Objectors

The Center for Biological Diversity is a non-profit environmental organization with more than 1.7 million members and online activists who value wilderness, biodiversity, old growth forests, and the threatened and endangered species which occur on America's spectacular public lands and waters. Center members and supporters use and enjoy the Apache-Sitgreaves National Forests, and the lands of the Black River Project area for, among other things, recreation, photography, wildlife viewing, nature study, and spiritual renewal.

The Center has advocated, since the mid-1990s, for forest restoration that combines appropriate mechanical thinning, a right-scaled restoration industry, prescribed burning, and community protection while maintaining or enhancing large and old trees, key ecological process such as fire, and protecting sensitive and listed species.

The Center believes that the welfare of human beings is deeply linked to nature — to the existence in our world of a vast diversity of wild animals and plants. Because diversity has intrinsic value, and because its loss impoverishes society, we work to secure a future for all species, great and small, hovering on the brink of extinction. We do so through science, law and creative media, with a focus on protecting the lands, forests, waters and climate that species need to survive. The Center has and continues to actively advocate for increased protections for species and their habitats in the forests of the American Southwest.

The Center has been an active stakeholder throughout the project planning process. The Center submitted comments during scoping for the Black River Project on April 25, 2018, and submitted comments on the Environmental Assessment on November 5, 2020. We have visited and toured the project area, most recently in May 2023.

The Center supports many of the changes made to the project after the publication of the Draft EA. In particular, we support the decision to not apply the flexible toolbox approach to Mexican spotted owl PACs, aquatic and watershed areas; to not use thinning treatments in inventoried roadless areas and research natural areas; to not use mechanical thinning treatments in species-specific aquatic management zones and perennial aquatic management zones; and to not use mechanical thinning treatments along eligible wild and scenic rivers. These changes productively address some of the concerns we raised in previous comments and reduce some of the environmental impacts and risks of the project.

We must object to the Project's reliance on a condition-based management and flexible toolbox approach in a way that fails to provide the necessary disclosure and analysis of environmental impacts in the EA; we must object to the Project's broad and vague exemptions from the protections for large trees, including with respect to Mexican spotted owl habitat; and we must object to the failure of the Project and the EA to address the impacts of livestock grazing and those impacts' implications for the Project. The proposed action as designed violates NEPA and is not justified by the existing conditions or the purpose and need specified in the EA.

OBJECTIONS

I. THE BLACK RIVER PROJECT VIOLATES NEPA BY FAILING TO DISCLOSE THE PROJECT'S SITE-SPECIFIC IMPACTS.

A. NEPA Requires Agencies to Take a Hard Look at Site-Specific Impacts.[1]

NEPA is "'our basic national charter for protection of the environment.'"[2] In enacting NEPA, Congress recognized the "profound impact" of human activities, including "resource exploitation," on the environment and declared a national policy "to create and maintain conditions under which man and nature can exist in productive harmony."[3] The statute has two fundamental two goals: "(1) to ensure that the agency will have detailed information on significant environmental impacts when it makes decisions; and (2) to guarantee that this information will be available to a larger audience."[4]

"NEPA promotes its sweeping commitment to 'prevent or eliminate damage to the environment and biosphere' by focusing Government and public attention on the environmental effects of proposed agency action."[5] Stated more directly, NEPA's "'action-forcing' procedures . . . require the [Forest Service] to take a 'hard look' at environmental consequences"[6] *before* the agency approves an action. "By so focusing agency attention, NEPA ensures that the agency will not act on incomplete information, only to regret its decision after it is too late to correct."[7] To ensure

---

[1] This action is governed by the Council on Environmental Quality's 1978 regulations, as amended, and so all references to the CEQ regulations are to those currently in force as of July 14, 2020, unless otherwise noted. Although CEQ issued a final rulemaking in July 2020 fundamentally rewriting those regulations, the new rules apply only "to any NEPA process begun after September 14, 2020," or where the agency has chosen to "apply the regulations in this subchapter to ongoing activities." 40 C.F.R. § 1506.13 (2020). Here, the Forest Service states that it chose to apply the 1978 regulations because the NEPA process began in 2017. Draft Decision Notice at 21, n.2.

[2] *Center for Biological Diversity v. United States Forest Serv*., 349 F.3d 1157, 1166 (9th Cir. 2003) (quoting 40 C.F.R. § 1500.1).

[3] 42 U.S.C. § 4331(a).

[4] *Envtl. Prot. Info. Ctr. v. Blackwell*, 389 F. Supp. 2d 1174, 1184 (N.D. Cal. 2004) (quoting *Neighbors of Cuddy Mt. v. Alexander*, 303 F.3d 1059, 1063 (9th Cir. 2002)); *see also Earth Island v. United States Forest Serv.*, 351 F.3d 1291, 1300 (9th Cir. 2003) ("NEPA requires that a federal agency 'consider every significant aspect of the environmental impact of a proposed action ... [and] inform the public that it has indeed considered environmental concerns in its decision-making process.'").

[5] *Marsh v. Or. Natural Res. Council*, 490 U.S. 360, 371 (1989) (quoting 42 U.S.C. § 4321).

[6] *Metcalf v. Daley*, 214 F.3d 1135, 1141 (9th Cir. 2000) (quoting *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 348 (1989)).

[7] *Marsh*, 490 U.S. at 371 (citation omitted).

that the agency has taken the required "hard look," courts hold that the agency must utilize "public comment and the best available scientific information."[8]

In *Natural Resources Defense Council v. U.S. Forest Service,* for example, the Court faulted the Forest Service for providing empty disclosures that lacked any analysis, explaining the agency "d[id] not disclose the effect" of continued logging on the Tongass National Forest and "d[id] not give detail on whether or how to lessen the cumulative impact" of the logging.[9] The Court explained that "general statements about possible effects and some risk do not constitute a hard look, absent a justification regarding why more definitive information could not be provided."[10] The court reasoned that the Forest Service also must provide the public "'the underlying environmental data' from which the Forest Service develop[ed] its opinions and arrive[d] at its decisions."[11] In the end, "vague and conclusory statements, without any supporting data, do not constitute a 'hard look' at the environmental consequences of the action as required by NEPA."[12] "The agency must explain the conclusions it has drawn from its chosen methodology, and the reasons it considered the underlying evidence to be reliable."[13]

At the project level, as compared to a programmatic decision, the required level of analysis is more stringent.[14] At the "implementation stage," the NEPA review is more tailored and detailed because the Forest Service is confronting "individual site specific projects."[15] Indeed, federal courts have faulted the Forest Service for failing to provide site-specific information in a landscape level analysis:

> This paltry information does not allow the public to determine where the range for moose is located, whether the areas open to snowmobile use will affect that range, or whether the Forest Service considered alternatives that would avoid adverse impacts on moose and other big game wildlife. In other words, the EIS does not provide the information necessary to determine how specific land should be allocated to protect particular habitat important to the moose and other big game

---

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

[9] *Natural Res. Def. Council v. U.S. Forest Serv.,* 421 F.3d 797, 812 (9th Cir. 2005).

[10] *Or. Natural Res. Council Fund v. Brong*, 492 F.3d 1120, 1134 (9th Cir. 2007) (citation omitted); *see also Or. Natural Res. Council Fund v. Goodman*, 505 F.3d 884, 892 (9th Cir. 2007) (holding the Forest Service's failure to discuss the importance of maintaining a biological corridor violated NEPA, explaining that "[m]erely disclosing the existence of a biological corridor is inadequate" and that the agency must "meaningfully substantiate [its] finding").

[11] *WildEarth Guardians v. Mont. Snowmobile Ass'n*, 790 F.3d 920, 925 (9th Cir. 2015).

[12] *Great Basin Mine Watch v. Hankins*, 456 F.3d 955, 973 (9th Cir. 2006).

[13] *N. Plains Res. Council, Inc. v. Surface Transp. Bd.*, 668 F.3d 1067, 1075 (9th Cir. 2011) (citation and internal quotation marks omitted).

[14] *See, e.g., Friends of Yosemite Valley v. Norton*, 348 F.3d 789, 800-01 (9th Cir. 2003).

[15] *Forest Ecology Ctr., Inc. v. U.S. Forest Serv.*, 192 F.3d 922, 923 n.2 (9th Cir. 1999).

> wildlife. Because the Forest Service did not make the relevant information available . . . the public was limited to two-dimensional advocacy—interested persons could argue only for the allocation of more or less land for snowmobile use, but not for the protection of particular areas. As a result, the Forest Service effectively stymied the public's ability to challenge agency action.[16]

When the Forest Service fails to conduct that site-specific analysis, the agency "does not allow the public to 'play a role in both the decision-making process and the implementation of that decision.'"[17] "Although the agency does have discretion to define the scope of its actions, . . . such discretion does not allow the agency to determine the specificity required by NEPA."[18] In *State of Cal. v. Block*, for example, the decision concerned 62 million acres of National Forest land, and the Ninth Circuit still required an analysis of "[t]he site-specific impact of this decisive allocative decision."[19] In short, NEPA's procedural safeguards are designed to guarantee that the public receives accurate *site-specific* information regarding the impacts of an agency's project-level decision *before* the agency approves the decision.

Analyzing and disclosing site-specific impacts is critical because where (and when and how) activities occur on a landscape strongly determines that nature of the impact. As the Tenth Circuit Court of Appeals has explained, the actual "location of development greatly influences the likelihood and extent of habitat preservation. Disturbances on the same total surface area may produce wildly different impacts on plants and wildlife depending on the amount of contiguous habitat between them."[20] The Court used the example of "building a dirt road along the edge of an ecosystem" and "building a four-lane highway straight down the middle" to explain how those activities may have similar types of impacts, but the extent of those impacts – in particular on habitat disturbance – is different.[21] Indeed, "location, not merely total surface disturbance, affects habitat fragmentation,"[22] and therefore location data is critical to the site-specific analysis NEPA requires. Merely disclosing the existence of particular geographic or biological features is inadequate—agencies must discuss their importance and substantiate their findings as to the impacts.[23]

Courts in the Ninth Circuit have taken a similar approach. For example, the U.S. District Court for the District of Alaska in 2019 issued a preliminary injunction in the case *Southeast Alaska Conservation Council v. U.S. Forest Service,* halting implementation of the Tongass National

---

[16] *WildEarth Guardians v. Montana Snowmobile Ass'n*, 790 F.3d 920, 927 (9th Cir. 2015).

[17] *Id*. at 928 (quoting Methow Valley Citizens Council, 490 U.S. at 349).

[18] *City of Tenakee Springs v. Block*, 778 F.2d 1402, 1407 (citing *California v. Block,* 690 F.2d 753, 765 (9th Cir. 1982)).

[19] *California v. Block*, 690 F.2d 753, 763 (9th Cir. 1982).

[20] *New Mexico ex rel. Richardson*, 565 F.3d at 706.

[21] *Id*. at 707.

[22] *Id*.

[23] *Or. Natural Res. Council Fund v. Goodman*, 505 F.3d 884, 892 (9th Cir. 2007).

Forest's Prince of Wales Landscape Level Analysis Project.[24] The court did so because the Forest Service's "condition-based management" approach, which failed to disclose the site-specific impacts of that logging proposal, raised "serious questions" about whether that approach violated the National Environmental Policy Act (NEPA).

The district court explained the approach the Forest Service took in the Prince of Wales EIS:

> each alternative considered in the EIS "describe[d] the conditions being targeted for treatments and what conditions cannot be exceeded in an area, or place[d] limits on the intensity of specific activities such as timber harvest." But the EIS provides that "site-specific locations and methods will be determined during implementation based on defined conditions in the alternative selected in the . . . ROD . . . in conjunction with the . . . Implementation Plan . . . ." The Forest Service has termed this approach "condition-based analysis."[25]

The Prince of Wales EIS made assumptions "in order to consider the 'maximum effects' of the Project."[26] It also identified larger areas within which smaller areas of logging would later be identified, and approved the construction of 164 miles of road, but "did not identify the specific sites where the harvest or road construction would occur."[27]

The Court found the Forest Service's approach contradicted federal appellate court precedent, including *City of Tenakee Springs v. Block*, 778 F.2d 1402 (9th Cir. 1995). In that case, the appellate court set aside the Forest Service's decision to authorize pre-roading in a watershed without specifically evaluating where and when on approximately 750,000 acres it intended to authorize logging to occur. The district court evaluating the Prince of Wales project found the Forest Service's approach was equivalent to the deficient analysis set aside in *City of Tenakee Springs.*

> Plaintiffs argue that the Project EIS is similarly deficient and that by engaging in condition-based analysis, the Forest Service impermissibly limited the specificity of its environmental review. The EIS identified which areas within the roughly 1.8-million-acre project area could potentially be harvested over the Project's 15-year period, but expressly left site-specific determinations for the future. For example, the selected alternative allows 23,269 acres of old-growth harvest, but does not specify where this will be located within the 48,140 acres of old growth identified as suitable for harvest in the project area. Similar to the EIS found inadequate in *City of Tenakee Springs*, the EIS here does not include a determination of when and where the 23,269 acres of old-growth harvest will occur. As a result, the EIS also does not provide specific information about the

[24] *Southeast Alaska Conservation Council v. U.S. Forest Serv.*, 413 F. Supp. 3d 973 (D. Ak. 2019).

[25] *See id.* at 976-77 (citations omitted).

[26] *Id*. at 977.

[27] *Id*.

> amount and location of actual road construction under each alternative, stating instead that "[t]he total road miles needed will be determined by the specific harvest units offered and the needed transportation network."[28]

The district court concluded that plaintiffs in the case raised "serious questions" about whether the Prince of Wales EIS condition-based management approach violated NEPA because "the Project EIS does not identify individual harvest units; by only identifying broad areas within which harvest may occur, it does not fully explain to the public how or where actual timber activities will affect localized habitats."[29]

On March 11, 2020, the Alaska district court issued its merits opinion on the Prince of Wales Project, reaffirming its September 2019 preliminary injunction decision and holding that the Forest Service's condition-based management approach violated NEPA.[30] The court explained that "NEPA requires that environmental analysis be specific enough to ensure informed decision-making and meaningful public participation. The Project EIS's omission of the actual location of proposed timber harvest and road construction within the Project Area falls short of that mandate."[31]

The district court also concluded that the Forest Service's "worst case analysis" was insufficient, explaining: "This approach, coupled with the lack of site-specific information in the Project EIS, detracts from a decisionmaker's or public participant's ability to conduct a meaningful comparison of the probable environmental impacts among the various alternatives."[32] Consequently, the court concluded that

> By authorizing an integrated resource management plan but deferring siting decisions to the future with no additional NEPA review, the Project EIS violates NEPA. The Forest Service has not yet taken the requisite hard look at the environmental impact of site-specific timber sales on Prince of Wales over the next 15 years. The Forest Service's plan for condition-based analysis may very well streamline management of the Tongass ... however, it does not comply with the procedural requirements of NEPA, which are binding on the agency. NEPA favors coherent and comprehensive up-front environmental analysis to ensure ... that the agency will not act on incomplete information, only to regret its decision after it is too late to correct.[33]

---

[28] *Id*. at 982 (citations omitted).

[29] *Id*. at 983, 984.

[30] *Southeast Alaska Conservation Council v. United States Forest Serv*., 443 F. Supp. 3d 995 (D. Ak. 2020).

[31] *Id*. at 1009 (citations omitted).

[32] *Id*. at 1013.

[33] *Id*. at 1014-15 (internal citations and quotations omitted). The Forest Service should not interpret the Alaska District's decision to somehow endorse the use of condition-based analyses for environmental assessments. Where the exercise of site-specific discretion is material to a

B. The Final EA Fails to Disclose the Black River Project's Site-Specific Direct and Indirect Effects.

The Black River Project EA purports to be a project-level analysis. The EA does not contemplate additional NEPA analysis before the project can be implemented, and site-specific ground and vegetation disturbance comments. Thus, any NEPA document prepared for the project must include the detailed information and analysis that NEPA and the CEQ regulations require because there will be no further NEPA analysis for this large, landscape-scale analysis.

Although NEPA requires that analysis disclose specific information about the when, where, and how of any agency action, so that the impacts and alternatives can be described and weighed, the EA fails to contain much of this data or analysis. Instead, the Forest Service postpones site-specific project design and consideration of on-the-ground impacts until *after* the NEPA process is complete. This upends NEPA's central purpose that agencies look *before* they leap, as the Court held in *Southeast Alaska Conservation Council*.

The Forest Service admits that "condition-based management," the very process held illegal in *Southeast Alaska Conservation Council*, is being used for mechanical treatments for the Black River Project.

> To best meet restoration objectives in the purpose and need, a flexible toolbox framework was established for mechanized treatments. The flexible toolbox is essentially a decision matrix with a set of "if…then" determination points, based on current conditions, which would lead to the desired conditions (Figure 14). The flexible toolbox allows managers to adapt the intensity of thinning treatments based on current on-the-ground conditions during implementation if they varied from the original analysis.[34]

The EA does not define, or contain an analysis of, site-specific actions, and that document states that site-specific actions will not be defined until after the public NEPA process is complete. "Field verification begins the process of validating the analysis and currently assigned prescription," [35] *after the NEPA decision is complete*.

> A condition-based management approach would not tie implementers to a single predetermined thinning intensity for each individual stand slated to be mechanically treated in the project area, but defer that decision until we have the most accurate and current on-site stand conditions. [36]
>
> If the analysis was representative of the current conditions, then that prescription is the basis for the on-site silviculture prescription. If the field validation differs from what was

---

project's environmental consequences, NEPA requires consideration of site-specific proposals and alternatives, regardless of whether the effects are "significant." 42 U.S.C. § 4332(2)(C), (E).

[34] Black River Project Final EA, Silviculture Specialist Report, at 115.

[35] Black River Project Final EA, Silviculture Specialist Report, at 115.

[36] Black River Project Final EA, Silviculture Specialist Report, at 119.

> analyzed, the stand is run through the Flexible Toolbox to determine the correct treatment and that then becomes the basis for a new prescription.[37]

The EA reveals that post-NEPA, the Forest Service would evaluate baseline conditions on site-specific locations identified for mechanical logging *after* the agency decides which alternative to approve. The Forest Service does not explain why they cannot undertake stand exams as part of the NEPA process.

Similarly, for Mexican spotted owl recovery habitat, northern goshawk nest stands, northern goshawk post-fledging areas, stands with a preponderance of large young trees, and sensitive soils, the "different site conditions that would lead to different treatments in areas outside of filters" would be determined after the NEPA process is complete and a decision is issued. [38] "Specific treatments in [Mexican spotted owl] protected activity centers would be determined prior to implementation and in consultation with U.S. Fish and Wildlife Service (FWS) personnel." [39]

With the flexibility the CBM approach provides, how can the EA disclose impacts? The Forest Service explains that CBM is used to

> Estimate the number of acres of each type of treatment proposed in each of the action alternatives. Proposed treatments, each with a defined range of openness, are analyzed at the higher end of treatment intensity, in order to analyze the maximum potential effects from these treatments. [40]

But if the agency "allows managers to adapt the intensity of thinning treatments based on current on-the-ground conditions during implementation," [41] the EA cannot disclose the impacts of treatments, and the Forest Service will not know the extent of the impacts until years later as the acres of treatment intensity are tracked and summed. [42]

The EA is particularly vague with respect to the removal of large trees, a topic we discuss in greater detail in the next section. The lack of clarity regarding how many large trees would be removed, what size they are, and where they are located greatly undermines the Large Tree Implementation Plan, adopted for use in the Black River Project for the express purpose of

---

[37] Black River Project Final EA, Silviculture Specialist Report, at 115.

[38] Black River Project Final EA, Silviculture Specialist Report, at 118.

[39] Black River Project Final EA, Silviculture Specialist Report, at 120.

[40] Black River Project Final EA, Silviculture Specialist Report, at 118.

[41] Black River Project Final EA, Silviculture Specialist Report, at 115.

[42] *See, e.g.,* Black River Project Final EA, at 191: "When the condition-based management approach shows a change in intensity (low, medium, high), then total treatment intensity acreage across the project area would to be tracked so overall project limits do not exceed what was analyzed."

protecting and enhancing the large tree component that is deficient in the Black River project area and throughout the ASNF.

The Black River Project would cap the total SPLYT area covered by the Large Tree Implementation Plan.

> Stands (or portions thereof) meeting SPLYT criteria, including those not captured by the data filter, would be treated at the lowest range of intensity within the identified silvicultural prescription **up to 10% of the total Ponderosa Pine PNVT acres**. [43]

The Silviculture Specialist Report reports that there are 11,679 acres of SPLYT stands within the ponderosa pine vegetation type, which is 6,923 acres more than 10% of the total 47,559 acres of ponderosa pine PNVT. [44] Thus, the Black River Project would retain large trees on 4,756 acres while potentially removing large trees from 6,923 acres. The EA does not disclose or analyze which stands will be defined as SPLYT and which will not; the relative locations of those stands where large trees will be retained compared to those where they won't; how many large trees, and of what sizes, will be removed from the 6,923 acres of unprotected SPLYT stands, or the impacts of those removals. The relative locations of the 6,923 acres compared to the 4,756 acres is critical in determining the impacts if the treatments; if the 6,923 acres of large trees that the Project will not define as SPLYT stands are clustered, the Project would result in greatly reducing the large tree component across large areas that are already deficient in large trees.

In addition to a cap on the application of the SPLYT stand definition, the Black River Project applies broad exceptions to the Large Tree Implementation Plan (LTIP) as it applies to: seeps and springs, riparian zones, wet meadows, encroached grasslands, aspen forest and woodland, pine-oak forests, within-stand openings, and heavily stocked SPLYT stands.[45] The EA does not disclose or analyze how many large trees, and of what sizes, and where, will be removed under these exceptions, how many acres will be affected, or the impacts of those removals.

In some cases, the EA identifies certain actions as entirely discretionary, with no threshold or standard that would determine when an action would be taken. For example, in discussing aspen treatments, the Forest Service states: "Aspen restoration treatments *may* include conifer removal from within stands, and barriers to reduce browsing pressure on regeneration."[46] Nowhere in the EA does the Forest Service further explain how the treatment decision will be determined. That is, the Final EA identifies different potential treatment options in aspen stands without determining which treatments would be applied under which conditions, and at which specific sites. The result is an arbitrary application of treatment. Furthermore, the EA fails to provide the baseline information necessary to understand the environmental impacts, because it contains no

[43] Black River Project Final EA, at 183. The bolded words are those that the ASNF added to the SPLYT definition for the Black River Project.

[44] Black River Project, Silviculture Specialist Report, at 28.

[45] Black River Project Final EA, at 168 - 176.

[46] Black River Project Final EA, at 181 (emphasis added).

information about the location of the aspen stands that contain conifers, or the number and size of large trees that might be removed.

Other treatments grant the Forest Service so much discretion that the impacts on the ground could vary widely. For example, one baseline prescription for mechanical treatment in the wildland urban interface (Intermediate Thinning Treatment *IT 25 - WUI*, which applies to 2,157 acres under Alternative 3) includes a range of post-treatment stand densities between 20 and 50 ft^2/acre of basal area. [47] The bottom end of that range, 20 ft^2/acre, is akin to an even-aged management seed tree cut; 50 ft^2/acre is more than twice as dense. Choosing the bottom end of the range or the top would have significant differences in terms of the ultimate impacts on wildlife values, soil, watersheds, and other values. Similarly, Intermediate Thinning Treatment *IT 10 – 25*, the mechanical treatment most widely applied in the EA, includes a range of 50 to 80 ft^2/acre of basal area in ponderosa pine forest and 60 to 100 ft^2/acre of basal area in mixed conifer forest. [48] However, the EA doesn't evaluate these differences or identify where the Forest Service would apply the lower or upper end of the range, or why.

The Forest Service asserts that it can disclose the effects of the proposed action by assuming a sort-of worst case scenario:

> Estimate the number of acres of each type of treatment proposed in each of the action alternatives. Proposed treatments, each with a defined range of openness, are analyzed at the higher end of openness or intensity, in order to analyze the maximum potential effects from these treatments. [49]

That is, effects are assessed as a matter of the number of acres within each post-treatment basal area range.[50]

Disclosing impacts based on only *numbers of acres* across a broad landscape, and assuming that impacts can be disclosed by merely counting the acres impacted by certain treatments, as the Final EA does, ignores that individual acres of land are not interchangeable, even when they have similar numbers and types of trees.[51] Further, the statement that the impacts of logging at

---

[47] Black River Project Final EA, Table 9, at 12.

[48] Black River Project Final EA, Table 9, at 12.

[49] Black River Project Final EA, at 179.

[50] *See* Black River Project Final EA, Table 26, at 51: ("Black River Project density ranges in 2049 under Alternative 3 by acres and basal area compared to the desired conditions ranges for each potential natural vegetation type").

[51] Similarly, capping treatments to a specific total acreage over the course of the Project does not assure that impacts will remain below a certain threshold, particularly because the Forest Service will not identify site-specific treatments until years later. *See, e.g.*, Black River Project Final EA, at 191: "When the condition-based management approach shows a change in intensity (low, medium, high), then total treatment intensity acreage across the project area would to be tracked so overall project limits do not exceed what was analyzed."

unspecified locations at unspecified times "at the higher end of openness or intensity" does not identify what "higher end" means.

Similarly, in assessing logging impacts on Mexican spotted owls, the Final EA modeled impacts based on the total number of acres treated, by treatment type, within protected activity centers and nest cores; and changes in basal area.[52] But the EA fails to disclose or analyze these values by location, so neither the public nor the decision-maker understands *where* these treated acres would be, how they would relate to each other, and to other values, or what the trees per acre greater than 18 inches DBH are in any particular protected activity center. For example, the EA discloses and analyzes the total number of acres of Mexican spotted owl protected activity centers (PAC) that would be subjected to thinning treatment, but not how much treatment would occur in any single PAC, at what intensity, and over what timeframe. [53] Similarly, the EA states only that temporary roads would be constructed within MSO habitat, but provides no information on the length of road within MSO habitat, the expected levels of traffic, or the proximity to PACs. [54]

The environmental analysis and disclosure that Congress directed the agency to perform before making a decision will only occur after the fact here. The Forest Service will only identify "the intensity of thinning treatments based on current on-the-ground conditions *during implementation*." [55] Flow charts and checklists are not a replacement for disclosing location-specific values, and disclosing how those values will be degraded (or improved) by agency action.

In sum, the Forest Service's analysis of the impacts of temporary road construction, and other project actions, using condition-based management violates NEPA because it fails to disclose site-specific impacts before approving the project. We raised these same issues in our comments to the Draft EA.[56]

We note that NEPA provides multiple *legal* mechanisms for addressing broad scale analysis that is then refined later. CEQ regulations and guidance permit agencies to prepare programmatic NEPA documents where the agency has a need to determine impacts at a "broad or high-level."[57]

---

[52] Black River Project Final EA, Terrestrial Wildlife Report, at 30.

[53] *See* Black River Project Final EA, at 91, "Mechanical and hand thinning would occur on 912 acres in Alternative 2 (22 percent) or 558 acres in Alternative 3 (13 percent) of the total acres of PACs in the project area (4,177 acres)."

[54] *See* Black River Project Final EA, at 99, "Temporary logging roads would be constructed within MSO habitat and would temporarily disturb a small amount of habitat during the duration of local operations but would be returned to a natural state at the close of the sale and would have minimal effect to habitat PCEs."

[55] Black River Project Final EA, Silviculture Specialist Report, at 115.

[56] Center for Biological Diversity comments on the Black River Restoration Project Draft EA, November 5, 2020, at 6-15.

[57] *See* Council on Environmental Quality, Effective Use of Programmatic NEPA Reviews (Dec. 18, 2014) at 7, available at

Site specific NEPA can then "tier" to this analysis. And where conditions change on the ground over time, the agency may pivot promptly by preparing supplemental NEPA analysis.[58] However, the invented "condition-based management" approach is sanctioned by neither law nor policy.

Finally, there is no way that the Forest Service can reach a finding of no significant impacts for this project without understanding and disclosing the where, when, and how of the various menu of treatments it proposes.

> ***Suggested Remedies:*** The Forest Service must disclose the impacts of defined, site-specific proposed actions in a subsequently prepared NEPA document. Alternatively, the Forest Service may modify the Black River Project EA to make clear that it is a programmatic analysis that does not approve any activities implementing the project unless and until the Forest Service completes a subsequent, site-specific NEPA analysis informed by additional public comment.

II. THE BLACK RIVER PROJECT ARBITRARILY REMOVES LARGE TREES IN CONTRADICTION TO THE LARGE TREE IMPLEMENTATION PLAN, EXACERBATING THE CURRENT DEFICIT OF LARGE TREES

We support the adoption of the Old Tree Implementation Plan (OTIP) and Large Tree Implementation Plan (LTIP) developed under 4FRI.[59] We also support the adoption of the

---

https://www.energy.gov/sites/default/files/2014/12/f19/effective_use_of_programmatic_nepa_reviews_18dec2014.pdf (last viewed Apr. 15, 2022).

[58] The 1978 NEPA regulations require the preparation of supplemental NEPA documents when, *inter alia*, "[t]here are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts." 40 C.F.R. § 1502.9(c)(1)(ii) (1978). The 2020 NEPA regs contain similar language. *See* 40 C.F.R. § 1502.9(d)(1) (2020). *See also Marsh v. Oregon Natural Resources Council*, 490 U.S. 360, 371 (1989) ("[i]t would be incongruous with [NEPA's] approach to environmental protection, and with the Act's manifest concern with preventing uninformed action, for the blinders to adverse environmental effects, once unequivocally removed, to be restored prior to the completion of agency action simply because the relevant proposal has received initial approval."); *Tri-Valley CAREs v. United States DOE*, 671 F.3d 1113, 1130 (9th Cir. 2012) (applying supplementation requirement to EAs, stating that "NEPA requires supplementation of any NEPA analysis in response to 'significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts.'"); Forest Service Handbook 1909.15, Ch. 18.03 (June 22, 2012) (applying mandate to prepare supplemental NEPA documentation to environmental assessments as well as EISs), available at https://www.fs.fed.us/im/directives/fsh/1909.15/wo_1909.15_10_Environmental%20Analysis.doc (last viewed Apr. 23, 2021).

[59] Black River Project Final EA, at 209. "Alternative 2 has a large tree definition of 20.0 inches dbh per the ASNF LMP. Alternative 3 has a large tree definition of 16.0 inches dbh."

definition of Stands with a Preponderance of Large Young Trees ("SPLYT"), as developed under 4FRI. These provisions are a positive step towards protecting large and old trees and mature forest structure that are at a deficit within the project area and the ASNF more broadly.

As stated in the EA, "There is a lack of a diversity of small and large-to-very large trees present across the Black River Project area. While large and small trees exist within these stands, they tend to be minor components when compared to other size classes," and "Young and mid-aged trees are over-represented, and seedlings, saplings, mature and old trees are at a deficit relative to a diverse uneven-aged and structural condition within general forest foraging areas." [60]

As we described in detail in our previous comments on the draft EA, retention of large ponderosa pine trees is fundamentally important to the fire resistance of stands and the fire resilience of forests; low thinning and prescribed fire to reduce surface fuels and increase canopy base height at strategic locations effectively reduces fire hazard at a landscape scale and meets the purpose and need, whereas the removal of large trees undermines forest dynamics, stand development and wildlife habitat.[61]

Despite acknowledging the value of large trees and mature forest, and their deficit on the landscape, the Black River Project includes broad exceptions that undermine the LTIP and SPLYT provisions as developed under 4FRI and fail to adequately provide for the retention of large trees and SPLYTs. [62] Instead, the Black River Project proposes a blanket limitation and broad exceptions to the Large Tree Implementation Plan, directly contradicting and undermining the LTIP's implementation and the purpose of protecting the rare, large tree component.

A. The Black River Project Arbitrarily Caps the Application of the SPLYT Stand Definition

The Black River Project would cap the total SPLYT area covered by the Large Tree Implementation Plan, stating that:

> Stands (or portions thereof) meeting SPLYT criteria, including those not captured by the data filter, would be treated at the lowest range of intensity within the

[60] Black River Project Final EA, at 3.

[61] We raised these same issues in our comments on the Draft EA, Center for Biological Diversity Comments on the Black River Restoration Project Draft EA, submitted November 5, 2020, at 26-31.

[62] Black River Project Final EA, at 209. "Alternative 2 has a large tree definition of 20.0 inches dbh per the ASNF LMP. Alternative 3 has a large tree definition of 16.0 inches dbh. Trees larger than this may be cut if they fall into one of the LTIP exceptions. See the Final EA, C2.1 Large Tree Exceptions for the expected categories that would allow for trees over the large tree definition to be cut."

> identified silvicultural prescription **up to 10% of the total Ponderosa Pine PNVT acres**. [63]

This is *not* the definition of SPLYT that was developed by stakeholder consensus in 4FRI. The 4FRI definition of SPLYT applies to *all* SPLYT stands within a project area.

The EA asserts that the Black River Project must apply extraordinary limits on the treatment of SPLYT stands because the Black River Project is different from the rest of the 4FRI planning area.

> The Black River Project Alternative 3 does align with collaboratively developed and stakeholder approved 4FRI project elements including SPLYT, OTIP/LTIP and the mechanical flexible toolbox approach similar to 4FRI's Rim Country EIS. As Black River is a very different landscape than the first 4FRI EIS and the Rim Country EIS there are site-specific adjustments, particularly in Alternative 2…The definition of SPLYT for the Black River Project is found in section 1.42. This definition was developed based on few stands on the Coconino NF. The formula for SPLYT does not identify the same conditions on the ASNFs due a very different logging history, stand structures, and growing conditions. [64]

The 4FRI definition of SPLYT was developed not just for a few stands on the Coconino National Forest, but for the application throughout the 4FRI planning area, across four national forests, including the Apache-Sitgreaves National Forests. Whether or not the 4FRI stakeholder group utilized field trips to stands in the Coconino National Forest in order to reach consensus is irrelevant. It is no doubt true that the logging history, forest structures, and growing conditions of any acre in the Black River Project area is different from the logging history, forest structures, and growing conditions of other areas within 4FRI, just as it is undoubtedly true that the specific logging history, forest structures, and growing conditions of any acre in the Black River Project is different from those of any other acre within the Black River Project area.

The EA fails to identify, much less quantify, how the ASNF is different from everywhere else in the 4FRI planning area; the EA fails to identify how the "very different logging history, stand structures, and growing conditions" in the Black River Project area make the 4FRI application of the SPLYT definition impossible in the Black River Project; and the EA fails to identify any standard or criteria that would distinguish SPLYT stands in the Black River Project from SPLYT stands in the 4FRI planning area. In the absence of such a standard or criteria, the decision to limit the application of the SPLYT criteria in the Black River Project is arbitrary and capricious, and inconsistent with the 4FRI application of the SPLYT criteria. This allows for the removal of large trees for reasons other than the achievement of the Project's purpose and need.

The Silviculture Specialist Report reports that there are 11,679 acres of SPLYT stands within the ponderosa pine vegetation type, which is 6,923 acres more than 10% of the total 47,559 acres of

[63] Black River Project Final EA, at 183. The bolded words are those that the ASNF added to the SPLYT definition for the Black River Project.

[64] Black River Project Final EA, at 210 (emphasis added).

ponderosa pine PNVT. [65] Thus, the Black River Project will retain large trees on 4,756 acres while potentially removing large trees from 6,923 acres.

The EA does not disclose or analyze how many large trees, and of what sizes, will be removed from the 6,923 acres of unprotected SPLYT stands. Nor does the EA acknowledge that the order of implementation in this case is critically important, as the large trees in SPLYT stands treated earlier in the implementation will be more likely to be retained than large trees in SPLYT stands treated later, when the 10% threshold has already been reached. Furthermore, the EA includes no effort to prioritize SPLYT stands so that the largest trees or the stands with the greatest numbers of large trees are retained. The result is an arbitrary application of the SPLYT definition, such that large trees—including the largest trees and the stands with the greatest densities of large trees—may be removed for arbitrary reasons.

The Final EA describes the many different circumstances in which the Black River Project would remove large trees. One of the many exceptions to retaining large trees is described as "Heavily-Stocked Stands (with High Basal Area) Generated by a Preponderance of Large, Young Trees."

> In some areas, the increase in post-settlement trees has been so rapid that current stand structure is characterized by high density and high basal area in large, young trees. These stands or groups of stands exhibit continuous canopy cover which promotes uncharacteristically severe fire behavior under severe fire weather conditions. At the fine scale, the management approach would apply on a case-by-case basis. The removal of large trees may be necessary to meet site-specific ecological objectives as listed below. For example, the removal of large trees may be necessary to reduce the potential for uncharacteristic crown fire, especially to limit spread into communities or important habitats that include MSO and/or goshawk nest stands.
>
> In stands where pre-settlement evidence, restoration objectives, community protection, or other ecological restoration objectives indicate much lower tree density and basal area would be desirable, large post-settlement conifers may need to be removed to achieve post-treatment conditions consistent with a desired trajectory towards a more resilient forest density and uneven-aged structure and composition. Where evidence indicates higher tree density and basal area would have occurred pre-settlement, or other ecological restoration or management objectives desired higher forest density, only a few large conifers may need to be removed. Many of these areas currently support crown fire and, therefore, require structural modification to reduce crown fire potential and restore understory vegetation that supports surface fire. [66]

The EA fails to explain, define, or quantify—either in this section or elsewhere—how the hypothetical scenario described above is irreconcilable with the rest of the 4FRI planning area.

---

[65] Black River Project, Silviculture Specialist Report, at 28.

[66] Black River Project Final EA, at 173.

Furthermore, the EA fails to identify a standard or criteria for when the exception is indicated. Instead, the EA provides only this broad generalization that large trees may need to be removed where "*necessary to site-specific ecological objectives*," or where a "*much lower tree density and basal area would be desirable.*" The EA fails to provide specific criteria for determining when this exception is applied, or any direction that basal area targets should be achieved by targeting smaller trees first. The result is an unclear and largely discretionary Large Tree Implementation Policy that allows for the arbitrary removal of large trees in SPLYT stands.

Furthermore, the decision to limit the application of the SPLYT criteria in the Black River Project entirely misses the point that the SPLYT criteria were developed in 4FRI as a means for protecting a class of trees that are deficient across the *region*, based in large part on the shared understanding that the retention of large trees not only doesn't impede the goals of restoration, it actively promotes those goals. The EA fails to explain, let alone demonstrate, how this is not the case for the Black River Project.

Only by focusing narrowly and solely on tree density and basal area at the site (sub-stand) scale can the EA ignore the deficit of large trees at scales of the stand and larger, and the potential crown fire dynamics beyond the local, group scale. In reality, the distribution of large trees in the project area is highly patchy, within a surrounding forest structure with a deficit of large trees and a surplus of opportunities to reduce canopy cover and create openings. Only in the very largest SPLYT stand—the stand about one mile east-northeast of Buffalo Crossing—is there any point within a SPLYT stand that is more than a few hundred feet from the edge of the stand or a riparian area, and that assumes that the entirety of the area is confirmed by field inspection to qualify as a SPLYT stand. The EA fails to consider the location of the SPLYT stands with respect to the surrounding forest structure, and the opportunities to disrupt canopy cover and crown fire behavior at the multi-stand scale, and instead takes the unjustified position that basal area targets must be achieved on every acre, regardless of the need to retain large trees, and regardless of the dearth of large trees across the project area and the forest.

> **Suggested Remedy**: The Forest Service must apply the definition of SPLYT stands to all qualifying stands, as it is adopted under 4FRI.

B. The Broad Exceptions to the Large Tree Implementation Plan Amount to the Arbitrary Removal of Large Trees

In addition to a cap on the application of the SPLYT stand definition, the Black River Project applies broad exceptions to the Large Tree Implementation Plan (LTIP) as it applies to: seeps and springs, riparian, wet meadows, encroached grasslands, aspen forest and woodland, pine-oak forests, within-stand openings, and heavily stocked SPLYT stands.[67]

Seeps and Springs, Riparian Zones, and Wet Meadows

The EA identifies as ecological objectives the conservation and restoration of the "biophysical conditions" in seeps and springs, riparian zones, and wet meadows upon which terrestrial, mesic-

[67] Black River Project Final EA, at 168-176.

adapted, and aquatic native biological diversity depend."[68] The EA acknowledges that the removal of encroaching trees is only part of what is necessary to restore seeps and springs, potentially only a small part of restoration, and also acknowledges that tree thinning is unlikely to restore seeps and springs if the underlying sources of degradation are not addressed.

> Removal of trees that have encroached upon seeps and springs may constitute a relatively small part of an overall seep and spring restoration effort, when compared to fully addressing root causes of overall degradation. Thinning alone, without addressing other sources of degradation, may be unlikely to fully restore seeps and springs (Thompson et al. 2002). However, it is a necessary step leading to the restoration of these ecologically important areas. [69]

The EA includes similar statements specific to riparian zones and wet meadows as well. [70] Nonetheless, the EA fails to analyze the contribution of livestock grazing as a cause of degradation of seeps and springs, riparian zones, and wet meadows, and instead focuses solely on the removal of trees. Nor does the EA analyze the implications of continued livestock grazing on the effectiveness of tree removal as a means for restoring these features. Furthermore, the EA proposes a blanket exception to the LTIP to allow for the removal of large trees encroaching on seeps and springs, riparian zones, and wet meadows, without any analysis of the impact of such tree removal with respect to the large tree component at that site, and the EA does not disclose the number and size of large trees to be removed under this provision.

Furthermore, the EA fails to explain how the project delineates seeps and springs, riparian zones, and wet meadows, or the area in which trees with be considered "encroaching." The EA implies that these delineations may be based on soil type, but currently the relevant soil data is not publicly available. In February of this year, we submitted to the ASNF a FOIA request for this same information with respect to the West Escudilla EA, but we have yet to receive the response to our request. Such delineation must be based on solid and verified underlying data, and must be able to be located with precision in the field as part of the selection criteria. The absence of such data and geographic specificity would further exacerbate the arbitrary nature of large tree removal under these exceptions, and represents a failure to provide baseline data and take a hard look at the impacts of excluding trees and stands from the LTIP, as NEPA and implementing regulations and guidance require.

Encroached Grasslands

---

[68] Black River Project Final EA, at 168-169.

[69] Black River Project Final EA, at 168-170: "Removal of trees constitutes a relatively small part of an overall riparian area restoration effort, when compared to the fundamental causes of overall degradation. Riparian areas are fully restored by using an array of tools that address all sources of degradation." "Removal of large trees constitutes a relatively small part of an overall riparian area restoration effort, when compared to the fundamental causes of overall degradation. Wet meadows are fully restored by using an array of tools that address all sources of degradation."

[70] Black River Project Final EA, at 168.

The EA identifies as ecological objectives that "[grasslands] are enhanced, maintained, and function with potential natural vegetation (as defined by vegetative mapping units)," and that "grasslands function with a natural fire regime." [71]

The EA states that "[conifer] tree removal, restoration of fire, and appropriate livestock numbers are all necessary to restore structure and function of native grasslands." However, the EA fails to analyze the contribution of livestock grazing as a cause of degradation of grasslands, and fails to explain how the ASNF will determine and implement "appropriate livestock numbers." Nor does the EA analyze the implications of continued livestock grazing on the effectiveness of tree removal as a means for restoring grasslands, or the implications of continued livestock grazing on the potential to restore a natural fire regime.

The EA fails to explain how the project delineates grasslands, beyond the mention of mollisol soils.[72] Nor does the EA explain how the project will determine "evidence of pine trees growing prior to European settlement." Furthermore, the EA fails to disclose the number and size of large trees estimated to be removed under this provision. Again, all of these omissions represent a failure to provide baseline data and take a hard look at the impacts of excepted trees and stands from LTIP, as NEPA and implementing regulations and guidance require.

Aspen Forest and Woodland

The EA identifies the ecological objective of conserving and restoring the "appropriate fire regime" of aspen forests and woodlands. [73] The EA acknowledges that the removal of encroaching trees is only part of what is necessary to restore aspen, potentially only a small part of restoration, and also acknowledges that aspen will be restored only if all sources of degradation are addressed.

> "Removal of large trees constitutes a relatively small part of the aspen restoration effort, when compared to the fundamental causes of overall degradation. Aspen forests and woodlands are fully restored by using an array of tools that address all sources of degradation." [74]

[71] Black River Project Final EA, at 170.

[72] Black River Project Final EA at 170: "Encroached grasslands are herbaceous ecosystems that have no evidence of pine trees growing prior to European settlement. A key indicator of grasslands is the presence of mollisol soils."

[73] Black River Project Final EA, at 171.

[74] Black River Project Final EA, at 171.

Nonetheless, the EA fails to analyze the contribution of livestock grazing and other ungulates as a cause of degradation of aspen, despite acknowledging their impact.[75] Nor does the EA analyze the implications of continued livestock grazing on the effectiveness of tree removal as a means for restoring aspen, or the effectiveness of pine tree removal in the absence of exclosures. Instead, the EA focuses solely on the removal of trees and proposes a blanket exception to the LTIP to allow for the removal of large trees in aspen stands, without any analysis of the impact of such tree removal with respect to the large tree component at that site. Nor does the EA disclose the number and size of large trees estimated to be removed under this provision. These omissions, too, represent a failure to provide baseline data and take a hard look at the impacts of excepted trees and stands from LTIP, as NEPA and implementing regulations and guidance require.

Pine-Oak Forest

The EA states that "[conifer] competition with oak has been identified as an issue in slowing oak growth, particularly for older oaks (Onkonburi 1999). Thinning of competing pine trees may promote large oaks with vigorous crowns and enhanced acorn production (Abella 2008a) and may increase oak seedling establishment (Ffolliott and Gottfried 1991)." [76] To address this, the EA proposes a blanket exception to the LTIP to allow for the removal of large pine trees so that "[large post-settlement trees are not restricting oak development." [77] However, the EA fails to state how it will be determined that a large post-settlement tree is restricting oak development. Nor does the EA disclose the number and size of large trees estimated to be removed under this provision. These omissions represent a failure to provide baseline data and take a hard look at the impacts of excepted trees and stands from LTIP, as NEPA and implementing regulations and guidance require.

Within-Stand Openings

The EA acknowledges that within-stand openings and the desired ecological conditions can be achieved without removing large trees.

> Pre-settlement openings can be identified by the lack of stumps, stump holes, or other evidence of pre-settlement tree occupancy (Covington et al. 1997). Current openings include fine-scaled canopy gaps. It is not necessary to have desired within-stand openings and groups located in the same location that they were in before settlement (the site fidelity assumption). Trees might be retained in areas that were openings before settlement, and openings might be established in areas which had previously supported pre-settlement trees." [78]

---

[75] Black River Project Final EA, at 170: "Other factors contributing to gradual aspen decline over the past 140 years include reduced regeneration from browsing ungulates (Pearson 1914, Larson 1959, Jones 1974, Shepperd and Fairweather 1994, Martin 2007)."

[76] Black River Project Final EA, at 171.

[77] Black River Project Final EA, at 172.

[78] Black River Project Final EA, at 172.

> Contemporary within-stand openings or areas dominated by smaller post-settlement trees should be the starting point for restoring more natural within-stand heterogeneity." [79]

Nonetheless, the EA proposes a blanket exception to the LTIP to allow for the removal of large trees to create within-stand openings, without any analysis of the impact of such tree removal with respect to the large tree component at that site. The EA places no limitations on that exception, does not require large trees to be retained if openings can be created through the removal of smaller trees, and does not specify under which conditions large trees need to be removed. Nor does the EA disclose the number and size of large trees estimated to be removed under this provision. All of these omissions represent a failure to provide baseline data and take a hard look at the impacts of excepted trees and stands from LTIP, as NEPA and implementing regulations and guidance require.

Baseline Prescriptions

The EA fails to disclose and analyze the number and size of large trees to be removed, and presents baseline prescriptions in a manner that makes it impossible for the public to understand whether and where the removal of large trees is prescribed.

The EA presents baseline prescriptions in terms of interspace percentages and basal areas, both of which can be applied variably over wide ranges.[80] For example, the Intermediate Thinning treatment IT 10 – 25 (which is proposed for 12,789 acres under alternative 3) can be applied to achieve an interspace of 10 to 40 percent, a basal area of 50 to 80 square feet in ponderosa pine, and a basal area of 60 to 100 square feet in mixed conifer. It would be impossible for the public or decisionmakers to understand whether and where the removal of large trees is necessary to achieve these targets, and it would be impossible for the public to verify after treatment why the removal of large trees was necessary. With such wide target ranges for treatment, it is difficult to imagine a scenario in which the treatment target could not be achieved solely through the removal of small trees. At the same time, given these wide target ranges and the proposed broad exceptions to the Large Tree Implementation Plan, it is very easy to imagine scenarios in which ASNF could remove large trees where it is entirely possible to achieve the treatment targets solely or primarily through the removal of small trees.

In the absence of pre-treatment tree inventories and projected post-treatment results, as required by NEPA's hard look mandate, it is impossible for the agency or the public to understand the impacts of these various exceptions to the and their implications for the effectiveness of the Large Tree Implementation Plan. Indeed, without such inventory and treatment data, it would be impossible for the agency or the public to know whether the Project is implementing the Large Tree Implementation Plan at all.

Suggested Remedies:

[79] Black River Project Final EA, at 173.

[80] *See* Black River Project Final EA at 9, Table 9: Acres of baseline prescription for mechanical treatment by alternative.

- The EA must disclose the number and sizes of large trees that would be removed under the various exceptions to the LTIP, identify the specific locations where such exceptions would be utilized; and analyze the impacts of these large tree removals with respect to the large tree composition of the surrounding stands.

- The EA must analyze the degree to which seeps and springs, riparian zones, wet meadows, grasslands, and aspen can be restored and conserved through the removal of small trees, while retaining the large trees, and identify those areas where large tree removal is critical to the effectiveness of the treatment.

- The EA must analyze the contribution of livestock grazing as a cause of degradation of seeps and springs, riparian zones, wet meadows, grasslands, and aspen; and analyze the implications of continued livestock grazing on the effectiveness of large tree removal as a means for restoring these features.

- The EA must identify the specific criteria to be used to identify seeps and springs, riparian zones, wet meadows, and grasslands; the specific data to which that criteria would be applied; and the criteria used to determine if a tree is encroaching on the feature.

- The EA must specify how "appropriate livestock numbers" will be determined and implemented in encroached grasslands, and how stocking levels will be implemented in coordination with tree thinning treatments.

- The EA must identify the specific criteria for determining evidence of pine trees growing in grasslands prior to European settlement and specify a process for determining if such evidence may be obscured by past fire or clearing.

- The EA must identify the specific criteria for determining whether a large post-settlement tree is restricting oak development, and the specific data to which that criteria would be applied.

- The EA must require that within-stand openings be created through the removal of trees smaller than 18 inches diameter.

- The EA must require that a thinning treatment achieve a basal area within the target range solely through the removal of small trees.

III. THE BLACK RIVER PROJECT FAILS TO ENSURE PROTECTION OF MEXICAN SPOTTED OWL

In the Black River Project are there are 7 designated Mexican Spotted Owl ("MSO) Protected Activity Centers ("PACs") within the Project boundaries; 772 acres of habitat that currently meet

MSO recovery nest/roost habitat thresholds, and 3,166 acres of nest/roost recovery habitat that do not currently meet thresholds.[81]

In our previous comments to the Draft EA, we stated our concern that the EA promotes managing for minimums in MSO Recovery Nesting and Roosting Habitat.[82] This is problematic and contradictory to the MSO Recovery Plan in any case, but it is particularly problematic in the Black River Project, where 80% of the nest/roost habitat does not meet recovery thresholds. In response to our concerns the Final EA stated that MSO stands would be maintained at or above thresholds.

> The 'minimums' as referenced in this concern are actually thresholds. At the landscape level it is the ASNFs desire to manage stands that are not at the threshold towards the thresholds (and beyond) if possible. For stands at, or above, threshold the desired management is to maintain these stands at or above threshold. It is not the intent of BRRP to reduce all stands suitable for nesting/roosting to thresholds. The wildlife and silvicultural reports state that in most cases, the minimums would rarely be used, and describes what those circumstances are.[83]

The Silviculture Specialist Report describes three scenarios in which MSO Recovery Nesting and Roosting Habitat would be managed for the minimum basal area: 1) high basal area stands with active insect and disease outbreaks, 2) high basal area stands dominated by small trees, and 3) stands in the WUI. However, neither the EA nor the Specialist reports disclose the extent or number of nest/roost habitat to which these scenarios apply. Furthermore, the Silviculture Specialist Report identifies the projected stand conditions only as averages across all PACs in the Project area, and fails to indicate the range of potential values for individual PACs.

For its part, the Terrestrial Wildlife Specialist Report states that stands could indeed be reduced to basal area minimums.

> Treatments would reduce basal area of stands but would leave them at or above stand basal area minimums, with basal area recovery to pre-treatment levels and beyond in 10 years. [84]
>
> *Suggested Remedies*:
>
> - To take the hard look NEPA requires (and to comply with the Endangered Species Act), the Forest Service must disclose the number of trees in each size class and the canopy cover in each PAC before and after treatment.

[81] Black River Project Terrestrial Wildlife Specialist Report, at 18.

[82] We raised these same issues in our comments to the Draft EA. Center for Biological Diversity, Comments on the Black River Restoration Project Draft EA, submitted November 5, 2020.

[83] Black River Project Final EA, at 243.

[84] Black River Project Terrestrial Wildlife Specialist Report, at 57.

- The Forest Service must increase the post-treatment basal area and canopy cover for mixed conifer stands to levels that are significantly above the minimums recommended by the Recovery Plan.

- The EA must include a specific monitoring plan that will be implemented for a specific period of time post-treatment.

IV. THE BLACK RIVER PROJECT FAILS TO PROTECT NEW MEXICAN MEADOW JUMPING MOUSE AND ITS HABITAT

The New Mexico meadow jumping mouse is on the precipice of local extinction in the Black River watershed, and remaining populations require immediate conservation management to recover. The USFWS determined the species' overall viability is low in the next ten years and predicted the probability of persistence will decrease over the long term.[85] All remaining populations across the species' range are small and isolated and lack resiliency. However, the USFWS also believes the species has a high potential to recover, as explained in the species' Recovery Outline, stating,

> Although the New Mexico jumping mouse has lower fecundity than most mice species, its high potential for recovery is based on the species' intimate link to the state of its habitat. The dynamic nature of early seral stage riparian vegetation, with protection, can promote rapid development into suitable habitat within several years, with an expected tandem response of increased New Mexico jumping mouse populations. Restoration of dense, herbaceous riparian vegetation will likely involve modifying or limiting actions that currently preclude the growth of suitable habitat. Thus, restoration of New Mexico meadow jumping mouse habitat will play an important role in the future viability and recovery of populations by creating additional suitable habitat to recover the subspecies.[86]

The Black River watershed in ASNF is a known stronghold for the New Mexico meadow jumping mouse, although distribution is still largely unknown. The EA states that

> The ASNFs have the largest known population of NMMJM (USDI 2014). Within the project area, there are 10 identified occupied sites. Yearly surveys have been ongoing on the ASNF since 2015 in coordination with NAU and the AZGFD. West Fork BR, East Fork BR, Beaver creek, Home creek, Horse creek, Hannagan creek, Bear Creek, Snake Creek, Wildcat creek, Boggy Creek, Centerfire Creek, East Draw creek, and Stinky creek have been surveyed. The main stem of the Black River and both the East and West Fork of the Black River are occupied by NMMJM. Tributaries to the Black River have also been found to be occupied,

[85] 79 Fed. Reg. 33120.

[86] USDI Fish and Wildlife Service. 2014. Recovery Outline: New Mexico Meadow Jumping Mouse (*Zapus hudsonius luteus*). June. p. 9.

including portions of Beaver Creek, Boggy Creek, Centerfire Creek, Home Creek, and lower Hannagan Creek. [87]

First, the EA does not identify the full range of ecological conditions required by the NMMJM. New Mexico meadow jumping mice are highly vagile and use different habitats for different aspects of their life history: they selected canal banks and certain early seral herbaceous riparian vegetation types at the landscape and macrohabitat scale; and active jumping mice (i.e., foraging and traveling) selected microhabitat that contained certain wetland plants and was near water, had high soil moisture, high herbaceous cover, and lacked shrubs and trees.[88]

The USFWS' 2014 Species Status Assessment[89] for the jumping mouse identified the following requirements (ecological conditions) necessary for the species' recovery:

- Riparian communities along rivers and streams, springs and wetlands, or canals and ditches that contain:
    - Persistent emergent herbaceous wetlands especially characterized by presence of primarily forbs and sedges (*Carex* spp. or *Schoenoplectus pungens*).
    - Scrub-shrub riparian areas that are composed of willows (*Salix* spp.) or alders (*Alnus* spp.) with an understory of primarily forbs and sedges.
    - Flowing water that provides saturated soils throughout the jumping mouse's active season that supports tall (average stubble height of herbaceous vegetation of at least 61 cm (24 inches)) and dense herbaceous riparian vegetation composed primarily of sedges (*Carex* spp. or *Schoenoplectus pungens*) and forbs, including, but not limited to, one or more of the following associated species: Spikerush (*Eleocharis macrostachya*), beaked sedge (*Carex rostrata*), rushes (*Juncus* spp. and *Scirpus* spp.), and numerous species of grasses such as bluegrass (*Poa* spp.), slender wheatgrass (*Elymus trachycaulus*), brome (*Bromus* spp.), foxtail barley (*Hordeum jubatum*), or Japanese brome (*Bromus japonicas*), and forbs such as water hemlock (*Circuta douglasii*), field mint (*Mentha arvense*), asters (*Aster* spp.), or cutleaf coneflower (*Rudbeckia laciniata*);
- Sufficient areas of 9 to 24 km (5.6 to 15 mi) along a stream, ditch, or canal that contains suitable or restorable habitat to support movements of individual New Mexico meadow jumping mice.
- The minimum length for contiguous suitable habitat should be 15 miles.

---

[87] Black River Project Terrestrial Wildlife Specialist Report, EA at 35.

[88] Wright, G.D. and Frey, J.K., 2015. Habitat selection by the endangered New Mexico meadow jumping mouse on an irrigated floodplain. *Journal of Fish and Wildlife Management* 6(1): 112-129.

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

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

The USFWS considered 330 feet to be an adequate area for adjacent floodplain and upland habitat to be protected. Dr. Frey references Trainor et al. (2012), suggesting that the width may need to be at least twice the 330 feet. Thus, the condition above should be modified to:

- Adjacent floodplain and upland areas extending at a minimum of 200 m (660 ft) outward from the boundary between the active water channel and the floodplain (as defined by the bankfull stage of streams) or from the top edge of the ditch or canal.

Unfortunately, the EA does not demonstrate how the Proposed Action will quantitatively improve these criteria. Instead, it is likely to adversely affect. We raised these issues in our previous comments on the Draft EA.[90]

The Recovery Outline discussed the importance of habitat connectivity:

- [W]e assume that the jumping mouse likely existed historically in metapopulations with occasional exchange of individuals among local populations within stream segments (Morrison 1991, pp. 18–20; Frey 2011, pp. 76, 78; 2012a, p. 6). This ability to have multiple local populations along streams is important to maintaining genetic diversity and providing sources for recolonization when local populations are extirpated. Movement, dispersal, and gene flow require connectivity of suitable habitat along riparian corridors (Vignieri 2005, entire). This habitat connectivity among local populations is important to support resilient populations of the jumping mouse (Mawdsley *et al*. 2009, entire).[91]

Secondly, the EA does not adequately seek to resolve removing one of the primary threats to NMMJM populations and greatest driver of habitat loss for the species- livestock grazing. The USFWS's Species Status Assessment[92] characterized the problem of livestock grazing in NMMJM habitat as "*grazing pressure from livestock*." Livestock grazing in occupied and suitable/storable habitat is not compatible with jumping mouse recovery. Cattle grazing—even at low levels, even when regulated—makes achieving the necessary structural vegetation conditions (vegetation height) and vegetation composition conditions impossible to achieve and has been identified by the USFWS as one of the primary causes of this mouse's habitat destruction. Without this habitat, the New Mexico meadow jumping mouse cannot breed and prepare for its 8-9 month hibernation, the longest known for any mammal. The primary threats to

[90] Center for Biological Diversity Comments on the Black River Restoration Project, submitted November 5, 2020, at 34-74.

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

[92] USDI Fish and Wildlife Service, Listing Review Team. 2014. Species Status Assessment Report: New Mexico Meadow Jumping Mouse (*Zapus hudsonius luteus*). May 27. p. 83.

the NMMJM include cumulative habitat loss and fragmentation, directly attributable to livestock grazing pressure and human water use, among other lesser factors.[93]

The threat of livestock to NMMJM has been demonstrated in numerous peer-reviewed studies.[94] For example, Morrison (1990) concluded that the population in the White Mountains was declining and endangered as a result of habitat degradation due to livestock grazing and recreation.[95] In 2005, Frey[96] observed that jumping mice prefer habitat unaltered by grazing activity, informing her future conclusion that the New Mexico meadow jumping mouse is significantly more likely to occur in a livestock exclosure rather than in habitat grazed by

---

[93] USDI Fish and Wildlife Service. 2014. Final Rule. Determination of Endangered Status for the New Mexico Meadow Jumping Mouse Throughout Its Range. Federal Register, Vol. 79, No. 111. Tuesday, June 10, 2014. Pp. 33119-33137.

[94] Morrison, J.L. 1987. A study of the active season ecology, population dynamics and habitat affinities of a known population of the meadow jumping mouse, *Zapus hudsonius luteus* in northern New Mexico, Unpublished report to New Mexico Department of Game and Fish: 53; Morrison, J.L. 1989. Distribution, population status, life history and habitat affinities of the meadow jumping mouse, *Zapus hudsonius luteus* in the Sacramento Mountains, New Mexico, Unpublished report to New Mexico Department of Game and Fish: 32 + 11pp; map; Morrison, J.L. 1990. The meadow jumping mouse in New Mexico: habitat preferences and management recommendations. Proceedings of the symposium on managing wildlife in the Southwest, Phoenix, Arizona Chapter, The Wildlife Society; Morrison, J.L. 1991. Distribution and status of the meadow jumping mouse, *Zapus hudsonius luteus* on the Apache-Sitgreaves National Forest, Unpublished report to Apache-Sitgreaves National Forest: 26 + 8 pp; Frey, J.K. 2005. Status assessment of montane populations of the New Mexico meadow jumping mouse (*Zapus hudsonius luteus*) in New Mexico. Santa Fe, Final report submitted to New Mexico Department of Game and Fish: 74 + appendices on CD; Frey, J.K. 2006. Status of the New Mexico meadow jumping mouse (*Zapus hudsonius luteus*) in the Sangre de Cristo Mountains, New Mexico, Final Report submitted to New Mexico Department of Game and Fish; Frey, J.K. 2007. Final report: Survey for the New Mexico meadow jumping mouse (*Zapus hudsonius luteus*) at selected locations in the Jemez Ranger District, Santa Fe National Forest, Santa Fe National Forest: Jemez Ranger District; Frey, JK. 2012. Survey for the New Mexico meadow jumping mouse on Carson National Forest, New Mexico. Final Report to Carson National Forest, Taos, NM. 71p; Center for Biological Diversity letter to U.S. Secretary of the Interior, U.S. Fish and Wildlife Service, and U.S. Forest Service, RE: Sixty-Day Notice of Endangered Species Act Violations, Lincoln National Forest, September 13, 2019.

[95] Morrison, J.L., 1990. The meadow jumping mouse in New Mexico: habitat preferences and management recommendations. In *Proceedings of the symposium on managing wildlife in the Southwest. Arizona Chapter, The Wildlife Society, Phoenix* (pp. 136-143).

[96] Frey, J.K. 2005. Status assessment of montane populations of the New Mexico meadow jumping mouse (*Zapus hudsonius luteus*) in New Mexico. Santa Fe, Final report submitted to New Mexico Department of Game and Fish: 74 + appendices on CD.

cattle.[97] In a study in the drainage of the Black River, Frey (2009) only captured NMMJM at sites that had no authorized livestock grazing, and the taxon was more likely to occur at sites where there were no signs of livestock grazing. The author notes that exclusion of livestock from riparian areas in the White Mountains may have contributed to the higher rate of population persistence of the New Mexico meadow jumping mice in the White Mountains compared with the Jemez and Sacramento mountains, New Mexico.

Frey and Malaney (2009) attributed differences in microhabitat at sites where the New Mexico meadow jumping mouse was captured or not captured to livestock grazing; most of their capture sites were in grazing exclosures, whereas most of their noncapture sites had authorized livestock grazing[98]. The authors state "*Decline in distribution was due to loss of this habitat, primarily as a result of livestock grazing. However, drought, development, recreation, forest fire, and loss of the American beaver (Castor canadensis) also contributed. We recommend that conservation of Z. h. luteus will require establishment of refugial areas of suitable habitat through protection from livestock grazing*." Frey and Malaney (2009) reported that presence of a livestock exclosure was a highly significant factor related to presence of potentially suitable riparian vegetation and presence of *Z. h. luteus*. Other studies have also demonstrated a negative response of jumping mice in grazed habitats (e.g., Hanley and Page, 1982; Giuliano and Homyack, 2004; Morrison, 1990; Schulz and Leininger, 1991).

It is impossible to protect and conserve New Mexico Meadow Jumping Mouse without protecting and recovering the riparian habitat on which it relies. And it is impossible to protect and recover riparian habitat within the Black River project area without addressing the impacts of continued cattle grazing and feral horses.

Invasive, feral horses are a significant problem within the Project Area that cause excessive damage to riparian systems. The sole statement in the EA regarding feral horses is:

> Feral horses are common in the Centerfire Creek watershed. Their abundance is increasing, since they have no natural predators, and their distribution depends on the availability of adequate water and forage. Management responsibility lies with the State of Arizona. Effects of these animals are like those for elk or deer but are often more severe. Areas experiencing particularly severe effects from free-roaming horses (e.g. Wildcat Creek, Centerfire Creek, Boggy Creek).[216]

These horses have no brands, no owners, and should be viewed as a highly destructive invasive species. We remain increasingly concerned about the Forest Service's failure to remove feral horses for the second straight season in order to stop the horses' destruction of the upper elevation

---

[97] Frey, J.K., and J.L. Malaney 2008. Decline of a riparian indicator species, the meadow jumping Mouse (*Zapus hudsonius luteus*), in relict montane habitats in the American Southwest. *Southwestern Naturalist*.

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

meadows and streams in the Black River watershed of the White Mountains. Failure of this Project to address this problem is a non-starter. Without removal and provisions to monitor for and to remove any feral horses that subsequently return, this project cannot logically or legally proceed.

The Arizona Department of Agriculture ("AZDA") refutes the Apache-Sitgreaves errant position that "Management responsibility [for the feral Black River horses] lies with the State of Arizona." On October 5, 2020, AZDA told the Center in writing, in regard to AZDA's role in removal of the feral Black River horses, "There is no requirement on the inspectors side…If they [the Forest Service] find one [horse] with a brand we [AZDA] need to verify it does not belong to one of our brand holders. They can move on any documents given to them by the forest service since they are following their own CFR's."

AZDA's referral to "their own CFR's" refers to the fact that Forest Service's own governing regulations do not preclude removal, in fact, Forest Service regulations require removal. Here is a selection of regulations governing the Forest Service's management of these animals:
16 U.S. Code § 1332 "Definitions" states: "wild free-roaming horses and burros" means all unbranded and unclaimed horses and burros on public lands of the United States … 'excess animals' means 'wild free-roaming horses or burros… which must be removed from an area in order to preserve and maintain a thriving natural ecological balance…"

16 U.S. Code § 1333 states: "Where the Secretary determines … (iv) … that an overpopulation exists on a given area of the public lands and that action is necessary to remove excess animals, he shall immediately remove excess animals from the range so as to achieve appropriate management levels. Such action shall be taken, in the following order and priority, until all excess animals have been removed so as to restore a thriving natural ecological balance to the range, and protect the range from the deterioration associated with over population…'"

Forest Service regulations (36 CFR 222.20 Subpart B – Management of Wild Free-Roaming Horses and Burros… Authority and definitions" states: "Wild free-roaming horses and burros mean all unbranded and unclaimed horses and burros and their progeny … does not include any horse or burro introduced onto the National Forest Service System on or after December 15, 1971, by accident, negligence, or willful disregard of private ownership…"

36 CFR § 222.23 Removal of other horses and burros states: "Horses and burros … introduced onto … ranges after December 15, 1971, by accident, negligence, or willful disregard of private ownership, and which do not become intermingled with wild free-roaming horses or burros shall be considered as unauthorized livestock and treated in accordance with provisions in 36 CFR 261.7 and 262.10."

36 CFR § 261.7 states: " Livestock … The following are prohibited: … (a) Placing or allowing unauthorized livestock to enter or be in the National Forest System … (b) Not removing unauthorized livestock from the National Forest System … under Forest Service control when requested by a forest officer …"

36 CFR § 262.10 states: "Impoundment and disposal of unauthorized livestock. … (b) When a Forest officer determines that such livestock use is occurring, but does not have complete

knowledge of the kind of livestock, or if the name of the owner is unknown, such livestock may be impounded any time 15 days after the date a notice of intent to impound livestock is first published in a local newspaper and posted at the county courthouse and in one or more local post offices. The notice will identify the area in which it will be effective."

Because there is no decision allowing for and leading to the removal of feral horses, we are now forced into a position where we cannot stand by without challenging the Black River Project's inability to fulfill its purpose and need for riparian restoration as long as the horses area present and destroying the riparian areas.

In addition to not identifying the full range of ecological conditions required by the NMMJM, as well as not adequately addressing primary stressors to NMMJM populations in the form of non-native domestic stock, the EA states that project activities are expected to have likely adverse effects on NMMJM and their Critical Habitat. In Table 30 on page 83 of the EA, the Black River Restoration Project is determined to likely adversely affect designated Critical Habitat. The EA also states "However, some adverse effects may occur on some species, such as the New Mexico meadow jumping mouse, through the implementation of aquatic restoration activities. These adverse impacts will be short term but provide for long term benefits by helping to recover flood plains and wet meadows." [99]

The EA states that "mortalities and injuries are unlikely to occur through timing of operations during non-critical periods, or through buffers around sensitive areas, such as in the case of … the New Mexico meadow jumping mouse." [100] Here, the use of 'non-critical periods' requires clarification. Just because operations will occur outside of the species' active period, this does not equate to avoiding direct impacts to NMMJM. The 9-month hibernation period, the longest known for any mammal, is just as much a 'critical period' for survival and must be free of any possible human disturbances in the vicinity. Construction disturbances to hibernating NMMJM could reasonably result in unauthorized take. In future NEPA documents, please describe each proposed example of construction activity that requires mechanized equipment within and in the vicinity of critical, occupied, or suitable habitat for MNMJM and analyze an appropriate buffer, while considering noise, ground vibrations, and altered streamflow, to adequately demonstrate that construction activities will not disturb hibernating NMMJM.

An EA that calls for an unidentified number of riparian exclosures of undetermined size must be contested and considered inadequate. Please justify why, in a massive ecosystem restoration project, forest managers propose to allow opportunities for further environmental degradation by not properly addressing domestic grazers in riparian areas. Why are large areas of NMMJM critical habitat remaining open to non-native ungulates? Why not just close it now and begin the restoration process, instead of providing more opportunities for degradation? Please answer these questions in reference to the stated purpose and need of the project, which specifically includes creating landscapes more resilient to disturbances so natural ecological processes may

[99] Black River Project Draft EA, at 79.

[100] Black River Project Draft EA, at 78.

return and restoring habitat quality, distribution and abundance necessary to support the recovery of federally listed species.

The best available science is clear regarding MNMJM. In order to meet the purpose and need of the project all domestic stock, including cattle and horses, must be removed. According to Frey and Malaney (2009), "*livestock exclosures can promote stream flow, which is required by Z. h. luteus (Morrison, 1990), by reducing soil compaction and evaporation. Second, livestock exclosures allow development of tall, dense, herbaceous cover by reducing grazing and trampling (Wyman et al., 2006). This and other studies have concluded that adequate herbaceous cover is required to maintain populations of Z. hudsonius (Whitaker, 1963).*"

Given the unknown status of this endangered and declining species, we must demand that all possible ecosystem stressors, including all non-native domestic stock, be effectively removed from all critical, occupied, and suitable habitat for NMMJM within the Project Area. This would be required in order to support the stated purpose and need of the project. The Black River Project must play an important role in contributing to the NMMJM's recovery. It is essential that the Project provide a framework for restoring or maintaining the ecological conditions necessary for the species and for mitigating threats and stressors to the species' habitat based on a full accounting of the best available scientific information.

Suggested Remedies:

- The Forest Service must designate a Special Management Area that includes occupied and suitable/restorable habitat for the NMMJM.
- The Project must provide sufficient areas of at least 15 miles along a stream, ditch, or canal that contains suitable or restorable habitat to support movements of individual New Mexico meadow jumping mice.
- The Project must include livestock exclosures in NMMJM riparian habitat.

V. THE FINAL EA FAILS TO TAKE A HARD LOOK AT THE IMPACTS OF LIVESTOCK GRAZING.

A. NEPA Requires Agencies to Take a Hard Look at a Project's Direct, Indirect, and Cumulative Effects.

NEPA requires federal agencies to take a "hard look" at the direct, indirect, and cumulative environmental impacts of proposed actions.[101] To do so, federal agencies must prepare an environmental impact statement (EIS) for all "major Federal actions significantly affecting the quality of the human environment."[102] An EIS must "provide [a] full and fair discussion of significant environmental impacts" associated with a federal decision and "inform

[101] *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 350 (1989).

[102] 42 U.S.C. § 4332(2)(C); *see also* 40 C.F.R. § 1501.4.

decisionmakers and the public of the reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment."[103] Taking the required "hard look" requires agencies to " urther[e] … the best available scientific information."[104]

NEPA's review obligations are more stringent and detailed at the project level, or "implementation stage," given the nature of "individual site specific projects."[105] "[G]eneral statements about possible effects and some risk do not constitute a hard look, absent a justification regarding why more definitive information could not be provided."[106]

Analyzing and disclosing site-specific impacts is critical because where (and when and how) activities occur on a landscape strongly determines that nature of the impact. As the Tenth Circuit Court of Appeals has explained, the actual "location of development greatly influences the likelihood and extent of habitat preservation. Disturbances on the same total surface area may produce wildly different impacts on plants and wildlife depending on the amount of contiguous habitat between them."[107] The Court used the example of "building a dirt road along the edge of an ecosystem" and "building a four-lane highway straight down the middle" to explain how those activities may have similar types of impacts, but the extent of those impacts – in particular on habitat disturbance – is different.[108] Indeed, "location, not merely total surface disturbance, affects habitat fragmentation,"[109] and therefore location data is critical to the site-specific analysis NEPA requires.

NEPA further mandates that the agency provide the public "'the underlying environmental data' from which the Forest Service develop[ed] its opinions and arrive[d] at its decisions."[110] "The

---

[103] 40 C.F.R. § 1502.1 (1978).

[104] *Colo. Envtl. Coal. v. Dombeck*, 185 F.3d 1162, 1171 (10th Cir. 1999).

[105] *Ecology Ctr., Inc. v. United States Forest Serv.*, 192 F.3d 922, 923 n.2 (9th Cir. 1999); *see also Friends of Yosemite Valley v. Norton*, 348 F.3d 789, 800-01 (9th Cir. 2003); *New Mexico ex rel Richardson v. Bureau of Land Management*, 565 F.3d 683, 718-19 (10th Cir. 2009) (requiring site-specific NEPA analysis when no future NEPA process would occur); *Colo. Envtl. Coal. v. Ofc. of Legacy Mgmt*., 819 F. Supp. 2d 1193, 1209-10 (D. Colo. 2011) (requiring site-specific NEPA analysis even when future NEPA would occur because "environmental impacts were reasonably foreseeable").

[106] *Or. Natural Res. Council Fund v. Brong*, 492 F.3d 1120, 1134 (9th Cir. 2007) (citation omitted); *see also Or. Natural Res. Council Fund v. Goodman*, 505 F.3d 884, 892 (9th Cir. 2007) (holding the Forest Service's failure to discuss the importance of maintaining a biological corridor violated NEPA, explaining that "[m]erely disclosing the existence of a biological corridor is inadequate" and that the agency must "meaningfully substantiate [its] finding").

[107] *New Mexico ex rel Richardson*, 565 F.3d at 706.

[108] *Id*. at 707.

[109] *Id*.

[110] *WildEarth Guardians v. Mont. Snowmobile Ass'n*, 790 F.3d 920, 925 (9th Cir. 2015).

agency must explain the conclusions it has drawn from its chosen methodology, and the reasons it considered the underlying evidence to be reliable."[111] In the end, "vague and conclusory statements, without any supporting data, do not constitute a 'hard look' at the environmental consequences of the action as required by NEPA."[112]

Agencies must disclose impacts that are "cumulative," which regulations define as:

> the impact on the environment which results 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. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.[113]

The Forest Service NEPA Handbook further explains:

> Groups of actions may have collective or cumulative impacts that are significant. Cumulative effects must be considered and analyzed without regard to land ownership boundaries or who proposes the actions. Consideration must be given to the incremental effects of the action when added to the past, present, and reasonably foreseeable related future actions of the Forest Service, as well as those of other agencies and individuals, that may have a measurable and meaningful impact on particular resources.[114]

Further, "In analyzing the affected environment, NEPA requires the agency to set forth the baseline conditions."[115] Specifically, NEPA requires agencies to "succinctly describe the environment of the area(s) to be affected or created by the alternatives under consideration."[116] The Council on Environmental Quality, the agency charged with interpreting NEPA, has explained that "[t]he concept of a baseline against which to compare predictions of the effects of the proposed action and reasonable alternatives is critical to the NEPA process."[117] Federal courts hold that "[w]ithout establishing … baseline conditions ... there is simply no way to

---

[111] *N. Plains Res. Council, Inc. v. Surface Transp. Bd.*, 668 F.3d 1067, 1075 (9th Cir. 2011) (citation omitted).

[112] *Great Basin Mine Watch v. Hankins*, 456 F.3d 955, 973 (9th Cir. 2006).

[113] 40 C.F.R. § 1508.7.

[114] Forest Service Handbook 1909.15, Ch. 15.1.

[115] *Western Watersheds Project v. BLM*, 552 F. Supp. 2d 1113, 1126 (D. Nev. 2008).

[116] 40 C.F.R. § 1502.15 (1978).

[117] Council on Environmental Quality, Considering Cumulative Effects Under the National Environmental Policy Act 41 (1997), https://ceq.doe.gov/publications/cumulative_effects.html (last visited July 5, 2019).

determine what effect [an action] will have on the environment and, consequently, no way to comply with NEPA."[118]

B. Decades of Science Demonstrate that Livestock Grazing Threatens Healthy Ecosystems in the American Southwest.

Livestock grazing has been the most widespread management practice on federal lands, and livestock grazing allotments are extensive in the Black River project area.[119] A careful evaluation of livestock grazing's impacts as it relates to the proposed action is necessary because status quo grazing will likely undermine the project's restoration goals.

Livestock grazing damages ecosystems in a variety of ways.

More than a century of livestock grazing in ecosystems in the Western U.S. has led to a decline in insect, fish, reptile, amphibian, bird, mammals, ground cover, biomass, and native vegetation,[120] making grazing the most destructive, widespread activity wrought on Western rivers and watersheds since the arrival of European settlers. Decades of scientific research comparing grazed and ungrazed areas have documented that livestock grazing in the arid West degrades water quality and quantity, stream channel morphology, hydrologic function, soil stability, streambank vegetation, aquatic and riparian wildlife, and upland soil and forage conditions, proving that livestock grazing is an ecological catastrophe.[121] A literature review on livestock grazing impacts on arid land ecosystems reported that 69% of 132 studies demonstrated significant detrimental effects across those ecosystems.[122]

Livestock grazing poses a particular threat to riparian ecosystems.

---

[118] *Half Moon Bay Fishermans' Mktg. Ass'n v. Carlucci*, 857 F.2d 505, 510 (9th Cir. 1988); *see also N. Plains Res. Council, Inc. v. Surface Transp. Bd.*, 668 F.3d 1067, 1084–85 (9th Cir. 2011) (holding that agency did not take a sufficiently "hard look" at environmental impacts because it did not collect baseline data).

[119] Fleischner, T.L. 1994. Ecological costs of livestock grazing in western North America. Conservation Biology. 8: 629-644.

[120] Krueper, D.J. 1996. Effects of livestock management on Southwestern riparian ecosystems. Pp 281-301 in Shaw, D.W., and D.M. Finch. 1996. Desired future conditions for Southwestern riparian ecosystems: bringing interests and concerns together. Gen. Tech. Rep. RMRS-GTR-272. USDA Forest Service, Fort Collins, CO. 359 p.

[121] Belsky, A.J., A. Matzke, and S. Uselman. 1999. Survey of Livestock Influences on Stream and Riparian Ecosystems in the Western United States. *Journal of Soil and Water Conservation* 54: 419-431. *See also* Fleischner, T. 1994. The Ecological Costs of Livestock Grazing in Western North America. Conservation Biology. Vol. 8, No. 3. Pp. 629-644. Attached as Ex. 19.

[122] Jones, A., 2000. Effects of cattle grazing on North American arid ecosystems: a quantitative review. Western North American Naturalist. 155-164.

Natural riparian and spring habitats make up <1% of the landscape, yet those habitats directly support a disproportionate level of species richness across a variety of taxonomic groups and commonly 2-3 orders of magnitude greater productivity than the surrounding arid uplands.[123, 124] Despite being keystone ecosystems, riparian zones are considered one of the most endangered ecosystems in the Southwest.[125]

Because riparian zones provide water, shade, and succulent vegetation, livestock grazing is a primary cause of stream and riparian habitat degradation in the western United States and continues to exert pervasive adverse influences on springs and other riparian habitats.[126] A report prepared by Forest Service's Rocky Mountain Research Station entitled "Threats to western United States riparian ecosystems" provides a comprehensive review and bibliography of threats to riparian areas.[127] The Forest Service authors reviewed "453 journal articles, reports, books, and book chapters addressing threats to riparian ecosystems in western North America were analyzed to identify, quantify, and qualify the major threats to these ecosystems as represented in the existing literature."[128] Poff and colleagues write that "most of the publications in this

---

[123] Stevens, L.E., A. Jones, P. Stacey, D. Duff, C. Gourley, and J.C. Catlin. 2002. Riparian ecosystem evaluation: a review and test of BLM's proper functioning condition assessment guidelines. Technical Report submitted to the National Riparian Service Team. U.S. Department of the Interior.

[124] Soykan, C.U., L.A. Brand, and J.L. Sabo. 2009. Causes and consequences of mammal species richness. Ecology and Conservation of the Upper San Pedro Riparian Ecosystem. University of Arizona Press. Tucson, AZ. pp. 107-126.

[125] Noss, R.F., and J.M. Scott. 1995. Endangered ecosystems of the United States: a preliminary assessment of loss and degradation. https://www.researchgate.net/profile/Reed-Noss/publication/246063035_Endangered_eco-systems_of_the_United_States_A_preliminary_assessment_of_loss_and_degradation/links/0deec5389ecd1092a8000000/Endangered-eco-systems-of-the-United-States-A-preliminary-assessment-of-loss-and-degradation.pdf.

[126] Fleischner, T.L. 1994. Ecological costs of livestock grazing in western North America. Conservation Biology. 8: 629-644. *See also* Fleischner, T.L., 2010. Livestock grazing and wildlife conservation in the American West: historical, policy and conservation biology perspectives. Wild Rangelands: Conserving Wildlife While Maintain Livestock in Semi-Arid Ecosystems, 1st edition. J.T. du Toit, R. Kocki and J.C. Deutsch (eds.) Blackwell Publishing. pp. 235-265

[127] Poff, B., K.A. Koestner, D.G Neary, and D. Merritt. 2012. Threats to western United States riparian ecosystems: A bibliography. Gen. Tech. Rep. RMRS-GTR-269. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 78 p. https://www.fs.fed.us/rm/pubs/rmrs_gtr269.pdf.

[128] Poff, B., K.A. Koestner, D.G. Neary, and V. Henderson, 2011. Threats to Riparian Ecosystems in Western North America: An Analysis of Existing Literature. Journal of the American Water Resources Association (JAWRA) 1-14. DOI: 10.1111/j.1752-1688.2011.00571.x. https://www.fs.fed.us/rm/pubs_other/rmrs_2011_poff_b001.pdf.

bibliography that address a single threat discuss grazing" and that "the two topics with the most individual references are grazing and invasive species."[129]

These impacts are widely documented in several decades of scientific literature, and summarized well in Fleischner (1994),[130] Gifford and Hawkins (1978),[131] Krueper (1995),[132] and Kauffman and Krueger (1984).[133] The negative impacts of livestock grazing in riparian areas have been well documented. Extensive scientific literature reveals that livestock grazing negatively affects water quality and water seasonal quantity, stream channel morphology, hydrology, riparian zone soils, instream and streambank vegetation, and aquatic and riparian wildlife.[134]

Presence of livestock in riparian areas can negatively affect ecosystem integrity including reducing vegetation complexity and plant biomass, bank stability, soil quality, litter cover and water quality. Selective consumption of palatable vegetation by cattle can alter ecosystem structure, function and species composition.[135] Cattle graze cottonwood seedlings preventing tree growth and recruitment.[136] Grazing can severely reduce riparian vegetative cover which

---

[129] Poff et al. (2012), RMRS-GTR-269, at 8, 11.

[130] Fleischner, T.L. 1994. Ecological costs of livestock grazing in western North America. *Conservation Biology* 8(3): 629-644.

[131] Gifford G.F., R.H. Hawkins. 1978. Hydrologic Impact of Grazing on Infiltration: A Critical Review. *Water Resources Research* 14(2): 305-313.

[132] Krueper, D.J. 1996. Effects of livestock management on Southwestern riparian ecosystems. In Shaw, D.W. and D.M. Finch, tech coords. 1996. Desired future conditions for Southwestern riparian ecosystems: Bringing interests and concerns together. 1995 Sept. 18-22, 1995; Albuquerque, NM. General Technical Report RM-GTR-272. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station. 359 p.

[133] Kauffman, J.B., and W.C. Krueger. 1984. Livestock impacts on riparian ecosystems and streamside management implications…a review. *Journal of Range Management* 37(5): 430-438. *See also* Poff, B., K.A. Koestner, D.G. Neary and V. Henderson 2011. Threats to riparian ecosystems in Western North America: an analysis of existing literature. Journal of the American Water Resources Association. 47(6): 1241-1254

[134] *Id*. *See also* Fleischner, T.L., 2010. *See also* Belsky, A.J., A. Matzke, and S. Uselman. 1999. Survey of livestock influences on stream and riparian ecosystems in the western United States. Journal of Soil and Water Conservation. 54(1): 419-431. *See also* Ohmart, R.D. 1996. Ecological condition of the East Fork of the Gila River and selected tributaries: Gila National Forest, New Mexico. General Technical Report RM., 272, p. 312. *See also* Elmore, W., and B. Kauffman. 1994. Riparian and watershed systems: degradation and restoration. Ecological implications of livestock herbivory in the West. M. Vavra, W.A. Laycock, and R.D. Pieper (eds.) Society of Range Management, Denver, CO. p. 212-231. *See also* Stevens et al. 2002.

[135] Kauffman and Krueger 1984; Poff et al. 2011

[136] Poff et al. 2011.

increases air and water temperatures and influences invertebrate and native wildlife distribution and diversity.[137] In addition to herbivory and alteration of vegetation, hoof action through concentrated trampling directly degrades streambanks through bank sheering.[138] This leads to excessive erosion and nutrient runoff.[139] Loss of riparian vegetation compounds degradation of streambanks, precipitating permanent channel incisions.[140] Eventually, channels lose their riffle areas, streams migrate laterally, pools shallow out, water tables lower, and riparian vegetation composition shifts from hydric to more mesic species.[141]

Over thirty years ago, overall estimates of riparian habitat loss ranged from 40-90% among the Southwestern states.[142] This trend has only steadily continued and there may be as little as 2% of the original forested riparian habitat remaining in the West.[143]

Grazing impacts on riparian areas fall into four categories: impacts on streamside vegetation, stream channel morphology, water quality/quantity, and streambanks.[144] Collectively, these impacts to vegetation, soils, and water lead to losses of wildlife habitat, reduced stream flow, increased pollution, and eradication of plant and animal species.[145] Grazing on riparian plants reduces vegetative cover and exposes soil to erosion, which in combination with streambank trampling leads to increased erosion and turbidity.[146] Grazing animals congregating in riparian areas feed on native tree and shrub regeneration, disrupting their reproductive cycle and leading to destabilized streambanks,[147] increased water temperatures, loss of hiding and breeding cover,

---

[137] Fleischner, T.L., 2010.

[138] Neary and Medina 1996.

[139] Tufekcioglu, M., R.C. Schultz, G.N. Zaimes, T.M. Isenhart, and A. Tufekcioglu. 2013. Riparian grazing impacts on streambank erosion and phosphorus loss via surface runoff. Journal of the American Water Resources Association. 49(1): 103-113.

[140] Poff et al. 2011.

[141] Poff et al. 2011.

[142] Dahl, T.E., 1990. Wetlands losses in the United States, 1780's to 1980's. United States Department of the Interior, Fish and Wildlife Service.

[143] Jones, K.B., E.T. Slonecker, M.S. Nash, A.C. Neale, T.G. Wade, and S. Hamann. 2010. Riparian habitat changes across the continental United States (1972–2003) and potential implications for sustaining ecosystem services. Landscape Ecology. 25(8): 1261-1275.

[144] Kauffman, J.B., and W.C. Krueger. 1984. Livestock impacts on riparian plant communities and streamside management implications-a review. *Journal of Range Management* 37(5): 430-438.

[145] Armour, C.L., D.A. Duff, and W. Elmore. 1991. The effects of livestock grazing on riparian and stream ecosystems. *Fisheries* 16(1): 7-11.

[146] Trimble, S.W., and A.C. Mendel. 1995. The cow as a geomorphic agent - a critical review. *Geomorphology* 13 (1995): 233-253.

[147] Patten, D.T. 1998. Riparian ecosystems of Semi-Arid North America: Diversity and Human Impacts. *Wetlands* 18(4): 498-512.

and defecation and urination directly in the water. Reduced rainfall infiltration into soil[148] and increased sediment loads combine to exacerbate riparian ecosystem decline and increase stream down-cutting.[149]

Studies show that riparian meadows face particular threats from livestock grazing. In a review of the endangered Arizona willow, the U.S. Fish and Wildlife Service stated:

> Historic and current livestock grazing in the high elevation riparian meadows on the [Apache-Sitgreaves National] Forest has contributed to habitat degradation. Livestock have had less of a recent effect on Reservation riparian areas because no livestock grazing has occurred there for a number of years. Livestock overuse of riparian meadows affects the habitat through hydrologic changes, soil compaction, erosion, bank instability, and siltation. Repeated habitat overuse by cattle results in reduced plant vigor and reproductive success, shifts in relative abundance of plant species, and localized loss of plant species. The adverse effects of livestock on the habitat are believed to be the most important factor affecting the populations on the Forest.[150]

Environmental degradation through grazing is not restricted to historical practices. To this day, it is a chronic and ongoing issue. For example:

> One of the most significant adverse impacts within western riparian systems has been the perpetuation of improper grazing practices (Hastings and Turner 1965, Ames 1977, Glinski 1977, Marlow and Pogacnik 1985). Chaney et al. (1990) noted that initial deterioration of western riparian systems began with severe overgrazing in the late nineteenth century. For the last 75 years, the Forest Service has acknowledged the continued damage cattle have done to riparian areas, upland tributaries, and ranges. The effects of both past and ongoing grazing activities on the forest have had a profound effect on riparian habitat and there has been little improvement western watersheds under modern range management. (GAO 1988, Alford 1993). By not allowing riparian vegetation to develop, there is no rehabilitation of stream banks or prevention of erosion. As a result, the conditions of these streams are in a perpetual state of decay.[151]

---

[148] Gifford, G.F., and R.H. Hawkins. 1978. Hydrologic Impact of Grazing on Infiltration: A Critical Review. *Water Resources Research* 14(2): 305-313.

[149] Obedzinski, R.A., C.G. Shaw, and D.G. Neary. 2001. Declining woody vegetation in riparian ecosystems of the Western United States. *Journal of Applied Forestry*. 16(4): 169-181.

[150] 57 Fed. Reg. 57 FR 54747 (Nov. 20, 1992); Proposed Endangered Status for the Plant "*Salix arizonica*" (Arizona willow), with Critical Habitat.

[151] U.S. Fish & Wildlife Service, Biological Opinion, On-going and Long-term Grazing on the Tonto National Forest (Feb. 28, 2002) (02-21-99-F-300), p. 19.

Studies also show that current levels of livestock grazing are degrading the stream and riparian components and not allowing for recovery of degraded stream banks.[152]

Damage from livestock to riparian areas is only likely to worsen as climate-induced drought grips the Southwest. An American Fisheries Society editorial (Hughes 2014) stated "Livestock grazing exacerbates climate change effects on stream, riparian, and upland natural resources. Greatly reducing public land livestock grazing would greatly reduce this spatially extensive pressure and thereby reduce the susceptibility of those resources to climate change. It could also free up over $144 million for more fish- and wildlife-friendly landscape rehabilitation."[153]

Forest Service ecologists have established that livestock grazing has exacerbated riparian ecosystem decline and stream down-cutting associated with multiple concurrent factors.[154] Likewise, New Mexico Department of Game and Fish has recognized that the effects of livestock grazing are compounded by extended drought and altered hydrological function.[155] Additionally, the Forest Service has written on this issue in a climate assessment of the middle Rio Grande in New Mexico, stating that

> For many species, reducing non climate-related threats during restoration is important. For example, herbicides pose high risks to amphibians (USACE 2001). Grazing may exacerbate disturbance related to restoration treatments. Warming conditions and increased variability to river flow will reduce the capacity of the riparian habitats and individual species to recover from disturbances. Decisions on land use and conversion should consider the overall effect of human activities plus potential consequences of climate change for habitat loss.[156]

---

[152] Knapp, R.A., V.T. Vredenburg, and K.R. Matthews. 1998. Effects of stream channel morphology on Golden Trout spawning habitat and recruitment. Ecological Applications. 8: 1104-1117. *See also* Nussle, S.C., K.R. Matthews, and S.M. Carlson. 2017. Patterns and dynamics of vegetation recovery following grazing cessation in the California golden trout habitat. Ecosphere. 8(7): e01880. 10.1002/ecs2.1880. *See also* Nussle, S.C., K.R. Matthews, and S.M. Carlson. 2015. Mediating water temperature increases due to livestock and global change in high elevation meadow streams of the Golden Trout Wilderness. PLOS ONE. 10(11): 1-22.

[153] B. Hughes. Livestock Grazing in the West: Sacred Cows at the Public Trough Revisited. Aug. 2014. *Fisheries*. Am. Fisheries Soc'y. Vol. 39 No. 8. At page 339.

[154] Obedzinski, R.A.; Shaw, C.G.; Neary, D.G. 2001. Declining woody vegetation in riparian ecosystems of the Western United States. Journal of Applied Forestry. 16(4): 169-181.

[155] New Mexico Department of Game and Fish. 2006. Comprehensive Wildlife Conservation Strategy for New Mexico. New Mexico Department of Game and Fish. Santa Fe, New Mexico. 526 pp + appendices.

[156] M. Friggens et al. Vulnerability of species to climate change in the Southwest: terrestrial species of the Middle Rio Grande. 2013. Gen. Tech. Rep. RMRS-GTR-306. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 191 p. At page 58.

As Smith and Keinath wrote regarding the northern leopard frog, synergistic effects of climate change and drought are exacerbated by grazing, as depleted water sources cause grazers to congregate on remaining water sources, "especially by introduced grazers like cattle."[157] Likewise, regarding Arizona Willow, Decker wrote that "[a]n important consideration in the evaluation and management of grazing impacts is the additive effect of herbivory from a variety of sources. Although *S. arizonica* certainly evolved with native herbivores, the effect of domestic livestock in combination with increasing pressure from wildlife means that the plants may frequently be exposed to levels of herbivory beyond their presumed tolerance."[158]

Given this litany of damage to riparian areas caused by livestock, it is not surprising that riparian areas in the Southwest are in dire need of restoration and protection. Over three decades ago, an assessment by the U.S. General Accounting Office found that that most (~90%) of the lands managed by the Forest Service were in need of restoration. A few years later, Elmore and Kaufman (1994) reaffirmed this point, stating, "Current Forest Service policy calls for undertaking a national riparian strategy designed to improve markedly riparian conditions along lakes and streams by the year 2000." This has still not occurred and the West's riparian systems have been in a chronic state of degradation. This is particularly true in Arizona and New Mexico (Region 3).[159]

The only bright spot in this otherwise grim picture is that riparian areas, protected from livestock, can recover. Although Southwestern stream ecosystems have been greatly altered, these systems are ecologically resilient and are likely to respond positively to improved management and restoration practices, the simplest being to curb poorly managed gazing practices.[160] Livestock exclusion has shown to be the most practical approach for initiating rapid

---

[157] B. Smith and D. Keinath. Northern Leopard Frog (Rana pipiens): A Technical Conservation Assessment. Prepared for the USDA Forest Service, Rocky Mountain Region, Species Conservation Project. 2007. At page 3.

[158] K. Decker. Salix arizonica Dorn (Arizona willow): A Technical Conservation Assessment. Prepared for the USDA Forest Service, Rocky Mountain Region, Species Conservation Project. 2006. At page 29.

[159] Trudeau, J. 2020. Ravaged River: Cattle Damage to Endangered Species Habitat in Arizona's Verde River Watershed. Report. Center for Biological Diversity. 39 pp.

[160] Hayward, B., E.J. Heske, and C.W. Painter. 1997. Effects of livestock grazing on small mammals at a desert cienaga. The Journal of Wildlife Management. 123-129. *See also* Phillips, F., 1998. The'Ahakhav Tribal Preserve: Colorado River Indian Tribes initiate a major riparian restoration program. Restoration and Management Notes. 16(2): 140-148. *See also* Giuliano, W.M., and J.D. Homyack. 2004. Short-term grazing exclusion effects on riparian small mammal communities. Rangeland Ecology and Management. 57(4): 346-350. *See also* Hough-Snee, N., B.B. Roper, J.M. Wheaton, P. and R.L. Lokteff. 2013. Riparian vegetation communities change rapidly following passive restoration at a northern Utah stream. Ecological Engineering. 58: 371-377. *See also* Strong, T.R., and C.E. Bock. 1990. Bird species distribution patterns in riparian habitats in southeastern Arizona. The Condor. 92(4): 866-885. *See also* Krueper, D., J. Bart, and T.D. Rich. 2003. Response of vegetation and breeding birds to the removal of cattle on the San Pedro River,

riparian recovery or improving highly sensitive areas, and it works.[161] Cessation of livestock grazing in riparian areas can increase the abundance of small mammals that require dense vegetation.[162] The substantial increase of plant cover that followed the removal of livestock from Southwestern riparian areas quickly increases abundance and diversity of invertebrates, herpetofauna, birds, and small mammals.[163] When maintained, grazing exclosure fencing protects riparian areas and leads to rapid recovery of vigorous native vegetation[164] which is critical to maintain streambank stability and provide habitat to riparian and aquatic wildlife.[165] The Forest Service's own Watershed Conservation Practices Handbook (FSH 2509.25) directs the agency to "[e]xclude livestock from riparian areas and wetlands that are not meeting or moving towards desired condition objectives where monitoring information shows continued livestock grazing would prevent attainment of those objectives."[166]

Because of their biological importance, increasingly threatened status, and potential for offering resilience to protect biodiversity, protection and restoration of riparian ecosystems should become a high priority for federal agencies.[167] Furthermore, removal of livestock from sensitive

---

Arizona (USA). Conservation Biology. 17(2): 607-615. *See also* Wyman, S., D. Bailey, M. Borman, S. Cote, J. Eisner, W. Elmore, B. Leinard, S. Leonard, F. Reed, S. Swanson, L. Van Riper, T. Westfall, R. Wiley, and A. Winward. 2006. Riparian area management: Grazing management processes and strategies for riparian-wetland areas. Technical Reference 1737-20. BLM/ST/ST-06/002+1737. U.S. Department of the Interior, Bureau of Land Management, National Science and Technology Center. Denver, CO. 105 pp.

[161] Grudzinski, B., K. Fritz, and W. Dodds. 2020. Does riparian fencing protect stream water quality in cattle-grazed lands? Environmental Management. 66(1): 121-135.

[162] Soykan, C.U., L.A. Brand, and J.L. Sabo. 2009. Causes and consequences of mammal species richness. Ecology and Conservation of the Upper San Pedro Riparian Ecosystem. University of Arizona Press. Tucson, AZ. pp. 107-126.

[163] Duncan, D.K., 1988. Small mammal inventory of the upper San Pedro River Valley, Cochise County, Arizona: Progress report. San Pedro Project Office, San Simon Resource Area, Safford District, Bureau of Land Management. *See also* Fleischner, T.L. 1994. Ecological costs of livestock grazing in western North America. Conservation Biology. 8: 629-644. *See also* Soykan et al. (2009) and Grudzinski et al. (2020).

[164] Schulz, T.T., and W.C. Leininger. 1990. Differences in riparian vegetation structure between grazed areas and exclosures. *Journal of Range Management* 43(4): 295-299.

[165] Sarr, D.A. 2002. Riparian Livestock Exclosure Research in the Western United States: A Critique and Some Recommendations. *Environmental Management* 30(4): 516-526.

[166] *Ibid, 12.1.1(f)* at 9.

[167] Belsky, A.J., A. Matzke, and S. Uselman. 1999. Survey of livestock influences on stream and riparian ecosystems in the western United States. Journal of Soil and Water Conservation. 54(1): 419-431. *See also* Roper, B.B., J.M. Capurso, Y. Paroz, and M.K. Young. 2018. Conservation of aquatic biodiversity in the context of multiple-use management on National Forest System lands. Fisheries. 43(9): 396-405.

ecosystems such as arid-lands riparian areas is a critical component of adapting to climate change.[168]

Livestock grazing threatens wildlife.

Grazing of the most nutritious plants by livestock results in a loss of forage for native species and can alter habitat or insect prey base.[169] A decrease in prey base inevitably leads to a decrease in carnivores in the area, which are also eliminated by the government at the request of the livestock community. "The productivity, diversity, and species richness of native grasslands are threatened by competition from noxious and invasive weeds/grasses. Productivity is threatened by other factors including drought, soil erosion, fire suppression, and improper livestock management practices."[170] Grazing also has negative effects on songbirds, reptiles and other mammals especially if their habitat is close to the ground.[171] Rosenstock and Van Riper reported that: "Livestock grazing and fire suppression commonly are cited as causes of woodland expansion."[172]

A 2005 Forest Service review and assessment of grazing impacts on terrestrial wildlife in Region 3, GTR-142, found that grazing has multiple negative effects on native species.[173] This incredibly useful and regionally specific document, assessed the ecological interactions among Southwest native wildlife species and grazing and range management practices, and was designed to inform the region's land managers and biologists.

---

[168] Beschta, R.L., D.L. Donahue, D.A. DellaSala, J.J. Rhodes, J.R. Karr, M.H. O'Brien, T.L. Fleischner, and C.D. Williams. 2013. Adapting to climate change on western public lands: addressing the ecological effects of domestic, wild, and feral ungulates. *Environmental Management* 51: 474-491.

[169] Donahue, D. 1999. The Western Range Revisited: Removing Livestock from Public Lands to Conserve Native Biodiversity. Norman, OK: University of Oklahoma Press. 338 pages. See also Kie, John G., Charles J. Evans, Eric R. Loft, and John W. Menke. 1991. Foraging behavior by mule deer: the influence of cattle grazing. *The Journal of Wildlife Management* 55(4):665-674.

[170] Central Arizona Grasslands Conservation Strategy, page 21.

[171] Finch, D.M., and W. Block, technical editors. 1997. Songbird ecology in southwestern ponderosa pine forests: a literature review. Gen. Tech. Rep. RM-GTR-292. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station. 152 p.

[172] Rosenstock, S. S. and Van Riper III, C. (2001) Breeding Bird Responses to Juniper Woodland Expansion. *Journal of Range Management*, 54:226-232.

[173] Zwartjes, P.W., J.E. Cartron, P.L.L. Stoleson, W.C. Haussamen, and T.E. Crane. 2005. Assessment of Native Species and Ungulate Grazing in the Southwest: Terrestrial Wildlife. Gen. Tech. Rep. RMRS-GTR-142. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 74 p. plus CD. https://www.fs.fed.us/rm/pubs/rmrs_gtr142.pdf.

A database developed to complement the GTR-142 assessment (provided on a companion CD) contains accounts for 305 terrestrial species and subspecies (not including fish) believed to be potentially vulnerable to both short-term and long-term effects of native and domestic ungulate grazing. The assessment exhaustively details the effects of livestock grazing on wildlife, including finding that:

- Livestock use has "a consistently negative impact and therefore to be generally incompatible with habitat maintenance" for wetland/marsh habitats;[174]

- For mammals of riparian and wet meadow habitats, "such wetlands are generally incompatible with livestock use."[175]

Livestock grazing effects have contributed to the listing of many threatened and endangered species, including the yellow-billed cuckoo,[176] spikedace and loach minnow,[177] Northern Mexican and narrow-headed gartersnakes,[178] and others southwestern species found in the project area, such as Apache trout and roundtail chub.[179]

Ample science demonstrates the damaging impacts of livestock grazing on fish. Livestock grazing directly affects three general components of stream and riparian ecosystems that are important to maintaining viable fish and amphibian populations: streamside vegetation; stream channel morphology, including the shape of the water column and streambank structure; and water quality including water temperature.[180] These impacts can ultimately alter the population

---

[174] *Id*. at 29.

[175] *Id*. at 34.

[176] 60 Fed. Reg. 10,694, 10,707 (Feb. 27, 1995) ("Overuse by livestock has been a major factor in the degradation and modification of riparian habitats in the United States … Livestock grazing in riparian habitats typically results in reduction of plant species diversity and density, especially of palatable plants like willow and cottonwood saplings.").

[177] 77 Fed. Reg. 10,810, 10,818 (Feb 23, 2012) ("Impacts associated with roads and bridges, changes in water quality, improper livestock grazing, and recreation have altered or destroyed many of the rivers, streams, and watershed functions in the ranges of the spikedace and loach minnow.").

[178] 79 Fed. Reg. 38,678, 38718 (July 8, 2014) ("We found numerous effects of livestock grazing that have resulted in the historical degradation of riparian and aquatic communities that have likely affected northern Mexican and narrow-headed gartersnakes.").

[179] Black River Project, Aquatics Specialist Report, at 16, 22, 25, 30.

[180] Kauffman, J.B. and W.C. Krueger. 1984. Livestock impacts on riparian ecosystems and streamside management implications... a review. Rangeland Ecology and Management/Journal of Range Management Archives. 37(5): 430-438. *See also* Nussle, S.C., K.R. Matthews, and S.M. Carlson. 2017. Patterns and dynamics of vegetation recovery following grazing cessation in the California golden trout habitat. Ecosphere. 8(7): e01880. 10.1002/ecs2.1880. *See also* Nussle, S.C., K.R. Matthews, and S.M. Carlson. 2015. Mediating water temperature increases due to livestock and global change

structure of resident fish, particularly salmonids.[181] One review reported that 15 of 19 studies showed that stream fish were diminished in the presence of livestock grazing.[182]

Scientists have concluded that livestock grazing has been a major factor in eliminating native fishes from portions of their historic ranges.[183] Researchers realized decades ago that habitat loss driven by livestock grazing is primary threat to native fish in nearby northern New Mexico. As much as fifty years ago, Behnke and Zarn,[184] and Behnke[185] concluded that livestock grazing on National Forests and other lands was harming Rio Grande cutthroat trout populations. Researchers working on behalf of New Mexico Game and Fish Department concluded that:

> Livestock grazing in riparian areas has contributed to the decline in quality of many aquatic habitats and in some instances has been a major factor in eliminating native fishes from portions of their historic ranges. Livestock trample and consume vegetation that maintains stream bank integrity, hoof action destroys undercut banks and accelerates erosion, and feces elevate nutrients unnaturally, particularly in spring habitats… Livestock grazing has contributed to increased erosion in many watersheds and thus elevated sediment loads in virtually all river systems.[186]

As with damage to riparian areas, fish habitat can be restored by eliminating livestock. Prominent fish scientists have concluded that "habitat degradation as a result of excessive grazing pressure can most easily be reversed by excluding livestock from the riparian area."[187] Rinne and LaFayette (1991) found that ungrazed streams on the Tonto and Santa Fe National

---

in high elevation meadow streams of the Golden Trout Wilderness. PLOS ONE. 10(11): 1-22.

[181] Platts, W.S. 1991.

[182] Platts, W.S. 1991.

[183] Propst, D.L. 1999. Threatened and endangered fishes of New Mexico. Tech. Rpt. No. 1. New Mexico Department of Game and Fish, Santa Fe, NM at page 15.

[184] Behnke, R.J. and M. Zarn. 1976. Biology and management of threatened and endangered western trouts. Gen. Tech. Rep. USDA Forest Service, RM-28: 1-45. Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO.

[185] Behnke, R.J. 1992. Native Trout of Western North America. American Fisheries Society, Monograph No. 6.

[186] Propst, D.L. 1999. Threatened and endangered fishes of New Mexico. Tech. Rpt. No. 1. New Mexico Department of Game and Fish, Santa Fe, NM at page 15.

[187] Pritchard, V.L. and D.E. Crowley. 2006. Rio Grande Cutthroat Trout (*Oncorhynchus clarkii virginalis*): A Technical Conservation Assessment. Prepared for the USDA Forest Service, Rocky Mountain Region, Species Conservation Project. Department of Fishery and Wildlife Sciences, New Mexico State University, Las Cruces, NM. At page 50.

Forests had twice as many trout, trout populations, and trout biomass than grazed streams.[188] Propst and McInnis (1975) found that Santa Fe National Forest streams with little riparian habitat and erosion problems, such as degraded banks or sign of rapid run-off, sustained few or no cutthroat trout.[189] Platts (1991) reviewed 21 studies, finding only one that did not concluded that cattle degrade trout populations and habitat.[190] Chaney et al. (1990) reported: 1) that degraded cutthroat spawning habitat in Mahogany Creek, ID recovered when cattle were removed from the riparian area; 2) that populations of cutthroat trout in Huff Creek, Wyoming increased from 36 per mile to 444 per mile when cattle were excluded from the stream area, as a result of better in-stream cover lower water temperature, and decreased sedimentation; and 3) that cattle exclusion from the riparian zone of Bear Creek in Oregon converted an ephemeral reach of the stream into a permanent flow supporting a wild trout population.[191] Similarly, twenty years of cattle exclosures on Camp Creek in central Oregon turned an ephemeral wash into permanent stream capable of supporting redband trout.[192]

Species that rely on grasslands and uplands degraded by livestock grazing also likely will benefit from eliminating or reducing livestock numbers.

Upland ecosystems can recover if livestock numbers are limited or eliminated. For example:

- Removing of cattle from rangelands for 35 years led to the disappearance of rabbitbrush from previously shrub-dominated communities, and native grasses regained dominance.[193]

[188] Rinne, J.N. and R.A. Lafayette 1991. Southwestern Riparian-Stream Ecosystems: Research Design, Complexity, and Opportunity. USDA Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO. 9pp.

[189] Propst, D.L. and M.A. McInnis 1975. An analysis of streams containing native Rio Grande cutthroat in the Santa Fe National Forest. WICHE Report for the Santa Fe National Forest, Region 3, Albuquerque, NM.

[190] Platts, W.S. 1991. Livestock grazing. Pp. 389- 423 In: W.R. Meehan, editor. Influences of Forest and Rangeland Management on Salmonids Fishes and their Habitats. Amer. Fish. Soc. Spec. Pub. 19: 389-423. Bethesda, MD. 751 pp.

[191] Chaney, E., W. Elmore, and W.S. Platts 1990. Livestock Grazing on Western Riparian Areas. EPA report. 14-7, 26-7.

[192] Hunter, C.J. 1991. Better Trout Habitat. Island Press, Washington, D.C.

[193] Austin, D.D., and P.J. Urness. 1998. Vegetal change on a northern Utah foothill range in the absence of livestock grazing between 1948 and 1982. *Great Basin Naturalist* 58(2): 188-191.

- Forest Service scientists at the Intermountain Forest and Range Experiment Station found that protection of an Idaho range from grazing increased grass and forb production by 30% and decreased shrub production by 20%.[194]

- University of Idaho range scientists documented a 20-fold increase in perennial grass cover after 25 years of grazing exclusion while shrub cover only increased by 1.5-fold, attributing the grass response to "the availability of seeds as formerly depleted populations increase in size." [195]

- A southeastern Arizona rangeland excluded from cattle grazing for 14 years, and grass cover increased by 45%, the grass community was more heterogeneous, herb cover was higher, and rodent and bird numbers were higher than grazed comparison areas.[196]

- USDA research has found that excluding cattle from a landscape for five growing seasons "significantly increased: (1) total vegetative cover, (2) native perennial forb cover, (3) grass stature, (4) grass flowering stem density, and (5) the cover of some shrub species and functional groups."[197]

C. The Final EA Fails to Take a Hard Look at the Impacts of Continued Livestock Grazing on the Effectiveness of the Project.

We raised these issues in our previous comments on the Draft EA.[198]

The Final EA states that the Black River Project is needed to, among other things:

- Increase forest resilience and promote natural ecological processes,
- Restore fire to a more natural function,
- Improve terrestrial and aquatic species habitat, and

[194] Laycock, W.A. 1967. How heavy grazing and protection affect sagebrush-grass ranges. *Journal of Range Management* 20: 206-213.

[195] Anderson, J.E., and K.E. Holte. 1981. Vegetation development over 25 years without grazing on sagebrush-dominated rangeland in southeastern Idaho. *Journal of Range Management* 34:25-29.

[196] Bock, C.E., J.H. Bock, W.R. Kenney, and V.M. Hawthorne. 1984. Responses of birds, rodents, and vegetation to livestock exclosure in a semidesert grassland site. *Journal of Range Management* 37(3): 239-242.

[197] Kerns, B. K., M. Buonopane, W.G. Thies, and C. Niwa. 2011. Reintroducing fire into a ponderosa pine forest with and without cattle grazing: understory vegetation response. *Ecosphere* 2(5):1-23.

[198] Center for Biological Diversity, Comments on the Black River Restoration Project EA, submitted November 5, 2020, at 56-74.

- Improve the condition and function of streams, springs, and other aquatic and hydrological resources.[199]

Achieving each of these goals will be made more difficult by the continuation of livestock grazing; each goal could be achieved in part by reducing livestock grazing numbers and distribution. It is thus critical that the Forest Service consider both the synergistic and cumulative impacts of continued livestock grazing together with the tree removal and prescribed fire the project proposes, as NEPA requires that the agency disclose direct, indirect, and cumulative effects of the proposed action, and continued livestock grazing within the project area is reasonably foreseeable. The Forest Service must also consider alternatives that limit grazing, an action that can contribute significantly to meeting the Project's purpose and need. Further, continued livestock grazing will interfere with, or undercut the efficacy of, restoration projects, and reducing livestock grazing numbers and distribution could make other mitigation measures less necessary or more effective. In fact, the EA acknowledges that addressing the key sources of degradation is necessary for treatment effectiveness.

> Thinning alone, without addressing other sources of degradation, may be unlikely to fully restore seeps and springs (Thompson et al. 2002). However, it is a necessary step leading to the restoration of these ecologically important areas. [200]

The EA includes similar statements specific to riparian zones and wet meadows as well. [201] Nonetheless, the EA fails to analyze the contribution of livestock grazing as a cause of degradation of seeps and springs, riparian zones, and wet meadows, and instead focuses solely on the removal of trees. Nor does the EA analyze the implications of continued livestock grazing on the effectiveness of tree removal as a means for restoring these features.

The EA also contains multiple references to the impacts of livestock grazing on riparian function in the project area.

> Effects are mostly due to roads (authorized and unauthorized), past grazing, past timber harvest and past catastrophic wildfire. Lesser effects may be due to current grazing. [202]

---

[199] Black River Project Final EA, at 3 - 8.

[200] Black River Project Final EA, at 168 - 170. "Removal of trees constitutes a relatively small part of an overall riparian area restoration effort, when compared to the fundamental causes of overall degradation. Riparian areas are fully restored by using an array of tools that address all sources of degradation." "Removal of large trees constitutes a relatively small part of an overall riparian area restoration effort, when compared to the fundamental causes of overall degradation. Wet meadows are fully restored by using an array of tools that address all sources of degradation."

[201] Black River Project Final EA, at 168.

[202] Black River Project, Aquatics Specialist Report, at 34.

> Ongoing authorized grazing activities could potentially contribute sediment to streams and reduce bank stability.[203]
>
> Subwatersheds in 'poor condition' for aquatic habitat largely reflect past land uses (i.e., grazing, logging), including fragmentation by roads, lack of large wood in channels, and altered channel morphology. Many of these conditions continue to persist. [204]
>
> Most of the riparian area along West Fork Black River consists of willow and alder except between FSR 68 and FSR 25 which is mostly devoid of woody riparian species due to grazing and channelization.[205]
>
> The subwatershed has been primarily impacted by livestock grazing, loss of the ecological role of fire from fire suppression and vegetation alterations, timber harvest and roads.[206]

Even though the EA acknowledges that, in general, riparian areas and springs are in degraded condition and that the project is needed to restore these areas, the EA refuses to address the ongoing and cumulative impacts of livestock grazing in the Black River Project, and how those impacts will interfere with achieving the project's purposes.

> Grazing is not a part of the purpose and need for this project and is therefore, outside the scope of this project. This may be addressed through future projects. [207]

Continued livestock grazing also threatens the success of efforts to restore diverse wildlife habitats and improve watershed conditions, and will undermine efforts to achieve the Black River Project's purpose and need. rim In a section discussing mammals of riparian and wet meadow habitats, including the masked and water shrews and the New Mexico meadow jumping mouse, GTR-142 states (page 34) that *"… such wetlands are generally incompatible with livestock use.*" [208]

---

[203] Black River Project, Aquatics Specialist Report, at 54.

[204] Black River Project, Aquatics Specialist Report, at 11.

[205] Black River Project, Aquatics Specialist Report, at 16.

[206] Black River Project, Aquatics Specialist Report, at 22.

[207] Black River Project Final EA, at 234.

[208] Zwartjes, P.W., J.E. Cartron, P.L.L. Stoleson, W.C. Haussamen, and T.E. Crane. 2005. Assessment of Native Species and Ungulate Grazing in the Southwest: Terrestrial Wildlife. Gen. Tech. Rep. RMRS-GTR-142. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 74 p. plus CD. https://www.fs.fed.us/rm/pubs/rmrs_gtr142.pdf

Logging, livestock grazing, and fire exclusion created the conditions that now require ecological restoration.[209] The Final EA fails to adequately describe livestock grazing as a significant cause of impaired ecological function or departed structure in seeps and springs, wet meadows, riparian areas, grasslands and savannas, thus failing to take the hard look NEPA requires, failing to address mitigation measures (including resting or fencing livestock out of areas) to ameliorate theproject's impacts, and preventing the agency from exploring alternative methods for achieving the project's purpose and need.

Continued livestock grazing is highly problematic for the project's efforts to use prescribed fire and restore a fire regime in the project area. The EA states that "Fire Regimes are currently departed from reference conditions due to historic management practices around fire suppression."[210] This statement, and any similar to it, must include livestock grazing as contributing to this condition.

Scientists have long recognized the role livestock grazing and logging have had in leading to contemporary forest conditions. "Domestic livestock grazing, especially overgrazing by cattle and sheep in the late 1880s, greatly reduced herbaceous fuels, and through trampling, further reduced fuel structure and continuity,"[211] described as one tactic used by early foresters to reduce the occurrence of natural fire.

Livestock grazing is a primary driver of fire regime disruption. Livestock grazing decreases understory biomass and density, reducing competition with conifer seedlings and reducing the ability of the understory to carry low-intensity fire, contributing to dense forests with altered species composition.[212]

The EA briefly acknowledges these chronic and ongoing problems. "Grazing is a continued action that reduces the amount of fine fuels such as native grasses that would tend to carry wildfires throughout the forested areas"[213] and "Past grazing was also likely a contributing factor by reducing grass that used to carry wildfires." [214] This is a substantial practical problem in achieving management goals such as the Desired Conditions for Fire Regime Condition Class 1: "Fire burns primarily on the forest floor…"[215] However, the EA fails to address the issue of

---

[209] Covington, W.W., and M.M. Moore. 1994. Southwestern ponderosa forest structure: Changes since Euro- American settlement. *Journal of Forestry* 92: 39-47.

[210] Black River Project Final EA, at 12.

[211] Covington, W.W. and S.S. Sackett. 1984. The Effect of a Prescribed Burn in Southwestern Ponderosa Pine on Organic Matter and Nutrients in Woody Debris and Forest Floor. *Forest Science* 30(1): 183-192.

[212] Belsky A.J. and D.M. Blumenthal. 1997. Effects of livestock grazing on stand dynamics and soils in upland forests of the Interior West. *Conservation Biology* 11:316-27.

[213] Black River Project Final EA, at 43.

[214] Black River Project Final EA, at 50.

[215] Apache-Sitgreaves National Forests Land and Resource Management Plan, at 37-47, 105-110.

utilizing prescribed fire and reintroducing fire as an ecosystem function and management tool if the surface fine fuels (such as dried grasses) are insufficient to carry low-intensity fire.

In short, the EA violates NEPA by turning a blind eye to both livestock grazing's cumulative and synergistic impacts when taken together with the proposed action, and by failing to address how limiting livestock grazing represents an alternative means of achieving at least some of the project's purpose and need.

Proposed Remedies:

- To comply with NEPA's hard look mandate, the EA must disclose and analyze the role of livestock grazing in perpetuating ecosystem degradation in the Black River project area.
- The EA must analyze and compare the effects of restoration treatments with and without the exclusion of livestock grazing.
- The EA must disclose the role of livestock grazing in reducing surface fuels in the Black River project area and analyze the impacts of continued grazing on the reintroduction of low-severity fire.
- The EA must include the exclusion of livestock at locations where livestock grazing contradicts the project goals or the effectiveness of treatments.

CONCLUSION

The Center for Biological Diversity appreciates your consideration of the information and concerns raised in our comments and highlighted in this objection.

We request a meeting to discuss potential resolution of issues raised in this objection, pursuant to 36 C.F.R. § 218.11(a). We hope that the Forest Service will use the objection process and such a meeting as opportunities to engage with stakeholders, including the objectors here, to develop a project that is legally and ecologically sound.

Sincerely,

Edward B. Zukoski, Senior Attorney
Center for Biological Diversity
1536 Wynkoop Street, Suite 421
Denver, CO 80202
(303) 641-3149
tzukoski@biologicaldiversity.org

Brian Nowicki, Senior Public Lands Advocate
Center for Biological Diversity
P.O Box 1178, Flagstaff, AZ 86002-1178
(515) 917-5611
bnowicki@biologicaldiversity.org

Literature Cited and Submitted

We provide these documents for the project record and to inform the Forest Service's analysis of the proposed action and cumulative effects of the proposed action and other federal and non-federal projects and programs. We request that these papers are read and that the NEPA analysis address the issues we have identified and justified with this best available science.

The following documents were cited in the above comments:

Anderson, J.E., and K.E. Holte. 1981. Vegetation development over 25 years without grazing on sagebrush-dominated rangeland in southeastern Idaho. *Journal of Range Management* 34:25-29.

Armour, C.L., D.A. Duff, and W. Elmore. 1991. The effects of livestock grazing on riparian and stream ecosystems. *Fisheries* 16(1): 7-11.

Austin, D.D., and P.J. Urness. 1998. Vegetal change on a northern Utah foothill range in the absence of livestock grazing between 1948 and 1982. *Great Basin Naturalist* 58(2): 188-191.

Behnke, R.J. and M. Zarn. 1976. Biology and management of threatened and endangered western trouts. Gen. Tech. Rep. USDA Forest Service, RM-28: 1-45. Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO.

Behnke, R.J. 1992. Native Trout of Western North America. American Fisheries Society, Monograph No. 6.

Belsky, A.J., A. Matzke, and S. Uselman. 1999. Survey of Livestock Influences on Stream and Riparian Ecosystems in the Western United States. *Journal of Soil and Water Conservation* 54: 419-431.

Belsky A.J. and D.M. Blumenthal. 1997. Effects of livestock grazing on stand dynamics and soils in upland forests of the Interior West. *Conservation Biology* 11:316-27.

Beschta, R.L., D.L. Donahue, D.A. DellaSala, J.J. Rhodes, J.R. Karr, M.H. O'Brien, T.L. Fleischner, and C.D. Williams. 2013. Adapting to climate change on western public lands: addressing the ecological effects of domestic, wild, and feral ungulates. *Environmental Management* 51: 474-491.

Bock, C.E., J.H. Bock, W.R. Kenney, and V.M. Hawthorne. 1984. Responses of birds, rodents, and vegetation to livestock exclosure in a semidesert grassland site. *Journal of Range Management* 37(3): 239-242.

Chaney, E., W. Elmore, and W.S. Platts 1990. Livestock Grazing on Western Riparian Areas. EPA report. 14-7, 26-7.

Covington, W.W., and M.M. Moore. 1994. Southwestern ponderosa forest structure: Changes since Euro- American settlement. *Journal of Forestry* 92: 39-47.

Covington, W.W. and S.S. Sackett. 1984. The Effect of a Prescribed Burn in Southwestern Ponderosa Pine on Organic Matter and Nutrients in Woody Debris and Forest Floor. *Forest Science* 30(1): 183-192.

Dahl, T.E., 1990. Wetlands losses in the United States, 1780's to 1980's. United States Department of the Interior, Fish and Wildlife Service.

Decker, K. Salix arizonica Dorn (Arizona willow): A Technical Conservation Assessment. Prepared for the USDA Forest Service, Rocky Mountain Region, Species Conservation Project. 2006. At page 29.

Duncan, D.K., 1988. Small mammal inventory of the upper San Pedro River Valley, Cochise County, Arizona: Progress report. San Pedro Project Office, San Simon Resource Area, Safford District, Bureau of Land Management.

Elmore, W., and B. Kauffman. 1994. Riparian and watershed systems: degradation and restoration. Ecological implications of livestock herbivory in the West. M. Vavra, W.A. Laycock, and R.D. Pieper (eds.) Society of Range Management, Denver, CO. p. 212-231. *See also* Stevens et al. 2002.

Finch, D.M., and W. Block, technical editors. 1997. Songbird ecology in southwestern ponderosa pine forests: a literature review. Gen. Tech. Rep. RM-GTR-292. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station. 152 p.

Fleischner, T.L. 1994. Ecological costs of livestock grazing in western North America. Conservation Biology. 8: 629-644.

Fleischner, T.L., 2010. Livestock grazing and wildlife conservation in the American West: historical, policy and conservation biology perspectives. Wild Rangelands: Conserving Wildlife While Maintain Livestock in Semi-Arid Ecosystems, 1st edition. J.T. du Toit, R. Kocki and J.C. Deutsch (eds.) Blackwell Publishing. pp. 235-265

Frey, J.K. 2007. Final report: Survey for the New Mexico meadow jumping mouse (*Zapus hudsonius luteus*) at selected locations in the Jemez Ranger District, Santa Fe National Forest, Santa Fe National Forest: Jemez Ranger District.

Frey, JK. 2012. Survey for the New Mexico meadow jumping mouse on Carson National Forest, New Mexico. Final Report to Carson National Forest, Taos, NM. 71p.

Frey, J.K. 2005. Status assessment of montane populations of the New Mexico meadow jumping mouse (*Zapus hudsonius luteus*) in New Mexico. Santa Fe, Final report submitted to New Mexico Department of Game and Fish: 74 + appendices on CD.

Frey, J.K., and J.L. Malaney 2008. Decline of a riparian indicator species, the meadow jumping Mouse (*Zapus hudsonius luteus*), in relict montane habitats in the American Southwest. *Southwestern Naturalist*.

Frey, J.K. and Malaney, J.L., 2009. Decline of the meadow jumping mouse (*Zapus hudsonius luteus*) in two mountain ranges in New Mexico. *The Southwestern Naturalist*, *54*(1), pp.31-44.

Friggens, M., et al. Vulnerability of species to climate change in the Southwest: terrestrial species of the Middle Rio Grande. 2013. Gen. Tech. Rep. RMRS-GTR-306. Fort Collins,

CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 191 p. At page 58.

Gifford G.F., R.H. Hawkins. 1978. Hydrologic Impact of Grazing on Infiltration: A Critical Review. *Water Resources Research* 14(2): 305-313.

Giuliano, W.M., and J.D. Homyack. 2004. Short-term grazing exclusion effects on riparian small mammal communities. Rangeland Ecology and Management. 57(4): 346-350.

Grudzinski, B., K. Fritz, and W. Dodds. 2020. Does riparian fencing protect stream water quality in cattle-grazed lands? Environmental Management. 66(1): 121-135.

Hayward, B., E.J. Heske, and C.W. Painter. 1997. Effects of livestock grazing on small mammals at a desert cienega. The Journal of Wildlife Management. 123-129.

Hough-Snee, N., B.B. Roper, J.M. Wheaton, P. and R.L. Lokteff. 2013. Riparian vegetation communities change rapidly following passive restoration at a northern Utah stream. Ecological Engineering. 58: 371-377.

Hughes, B. 2014. Livestock Grazing in the West: Sacred Cows at the Public Trough Revisited. Aug. 2014. *Fisheries*. Am. Fisheries Soc'y. Vol. 39 No. 8. At page 339.

Jones, K.B., E.T. Slonecker, M.S. Nash, A.C. Neale, T.G. Wade, and S. Hamann. 2010. Riparian habitat changes across the continental United States (1972–2003) and potential implications for sustaining ecosystem services. Landscape Ecology. 25(8): 1261-1275.

Jones, A., 2000. Effects of cattle grazing on North American arid ecosystems: a quantitative review. Western North American Naturalist. 155-164.

Kauffman, J.B., and W.C. Krueger. 1984. Livestock impacts on riparian ecosystems and streamside management implications…a review. *Journal of Range Management* 37(5): 430-438.

Kerns, B. K., M. Buonopane, W.G. Thies, and C. Niwa. 2011. Reintroducing fire into a ponderosa pine forest with and without cattle grazing: understory vegetation response. *Ecosphere* 2(5):1-23.

Kie, John G., Charles J. Evans, Eric R. Loft, and John W. Menke. 1991. Foraging behavior by mule deer: the influence of cattle grazing. *The Journal of Wildlife Management* 55(4):665-674.

Knapp, R.A., V.T. Vredenburg, and K.R. Matthews. 1998. Effects of stream channel morphology on Golden Trout spawning habitat and recruitment. Ecological Applications. 8: 1104-1117.

Krueper, D.J. 1996. Effects of livestock management on Southwestern riparian ecosystems. Pp 281-301 in Shaw, D.W., and D.M. Finch. 1996. Desired future conditions for Southwestern riparian ecosystems: bringing interests and concerns together. Gen. Tech. Rep. RMRS-GTR-272. USDA Forest Service, Fort Collins, CO. 359 p.

Krueper, D., J. Bart, and T.D. Rich. 2003. Response of vegetation and breeding birds to the removal of cattle on the San Pedro River, Arizona (USA). Conservation Biology. 17(2): 607-615.

Laycock, W.A. 1967. How heavy grazing and protection affect sagebrush-grass ranges. *Journal of Range Management* 20: 206-213.

Morrison, J.L., 1990. The meadow jumping mouse in New Mexico: habitat preferences and management recommendations. In *Proceedings of the symposium on managing wildlife in the Southwest. Arizona Chapter, The Wildlife Society, Phoenix* (pp. 136-143).

Neary and Medina 1996. Desired future conditions for Southwestern riparian ecosystems: Bringing interests and concerns together. 1995 Sept. 18-22, 1995; Albuquerque, NM. General Technical Report RM-GTR-272. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station. 359 p.

New Mexico Department of Game and Fish. 2006. Comprehensive Wildlife Conservation Strategy for New Mexico. New Mexico Department of Game and Fish. Santa Fe, New Mexico. 526 pp + appendices.

Noss, R.F., and J.M. Scott. 1995. Endangered ecosystems of the United States: a preliminary assessment of loss and degradation. https://www.researchgate.net/profile/Reed-Noss/publication/246063035_Endangered_eco-systems_of_the_United_States_A_preliminary_assessment_of_loss_and_degradation/links/0deec5389ecd1092a8000000/Endangered-eco-systems-of-the-United-States-A-preliminary-assessment-of-loss-and-degradation.pdf.

Nussle, S.C., K.R. Matthews, and S.M. Carlson. 2017. Patterns and dynamics of vegetation recovery following grazing cessation in the California golden trout habitat. Ecosphere. 8(7): e01880. 10.1002/ecs2.1880.

Nussle, S.C., K.R. Matthews, and S.M. Carlson. 2015. Mediating water temperature increases due to livestock and global change in high elevation meadow streams of the Golden Trout Wilderness. PLOS ONE. 10(11): 1-22.

Obedzinski, R.A., C.G. Shaw, and D.G. Neary. 2001. Declining woody vegetation in riparian ecosystems of the Western United States. *Journal of Applied Forestry*. 16(4): 169-181.

Ohmart, R.D. 1996. Ecological condition of the East Fork of the Gila River and selected tributaries: Gila National Forest, New Mexico. General Technical Report RM., 272, p. 312.

Patten, D.T. 1998. Riparian ecosystems of Semi-Arid North America: Diversity and Human Impacts. *Wetlands* 18(4): 498-512.

Phillips, F., 1998. The'Ahakhav Tribal Preserve: Colorado River Indian Tribes initiate a major riparian restoration program. Restoration and Management Notes. 16(2): 140-148.

Platts, W.S. 1991. Livestock grazing. Pp. 389- 423 In: W.R. Meehan, editor. Influences of Forest and Rangeland Management on Salmonids Fishes and their Habitats. Amer. Fish. Soc. Spec. Pub. 19: 389-423. Bethesda, MD. 751 pp.

Poff, B., K.A. Koestner, D.G Neary, and D. Merritt. 2012. Threats to western United States riparian ecosystems: A bibliography. Gen. Tech. Rep. RMRS-GTR-269. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 78 p. https://www.fs.fed.us/rm/pubs/rmrs_gtr269.pdf.

Poff, B., K.A. Koestner, D.G. Neary, and V. Henderson, 2011. Threats to Riparian Ecosystems in Western North America: An Analysis of Existing Literature. Journal of the American Water Resources Association (JAWRA) 1-14. DOI: 10.1111/j.1752-1688.2011.00571.x. https://www.fs.fed.us/rm/pubs_other/rmrs_2011_poff_b001.pdf.

Pritchard, V.L. and D.E. Crowley. 2006. Rio Grande Cutthroat Trout (*Oncorhynchus clarkii virginalis*): A Technical Conservation Assessment. Prepared for the USDA Forest Service, Rocky Mountain Region, Species Conservation Project. Department of Fishery and Wildlife Sciences, New Mexico State University, Las Cruces, NM. At page 50.

Propst, D.L. and M.A. McInnis 1975. An analysis of streams containing native Rio Grande cutthroat in the Santa Fe National Forest. WICHE Report for the Santa Fe National Forest, Region 3, Albuquerque, NM.

Propst, D.L. 1999. Threatened and endangered fishes of New Mexico. Tech. Rpt. No. 1. New Mexico Department of Game and Fish, Santa Fe, NM at page 15.

Rinne, J.N. and R.A. Lafayette 1991. Southwestern Riparian-Stream Ecosystems: Research Design, Complexity, and Opportunity. USDA Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO. 9pp.

Roper, B.B., J.M. Capurso, Y. Paroz, and M.K. Young. 2018. Conservation of aquatic biodiversity in the context of multiple-use management on National Forest System lands. Fisheries. 43(9): 396-405.

Rosenstock, S. S. and Van Riper III, C. (2001) Breeding Bird Responses to Juniper Woodland Expansion. *Journal of Range Management*, 54:226-232.

Sarr, D.A. 2002. Riparian Livestock Exclosure Research in the Western United States: A Critique and Some Recommendations. *Environmental Management* 30(4): 516-526.

Schulz, T.T., and W.C. Leininger. 1990. Differences in riparian vegetation structure between grazed areas and exclosures. *Journal of Range Management* 43(4): 295-299.

Smith, B, and D. Keinath. Northern Leopard Frog (Rana pipiens): A Technical Conservation Assessment. Prepared for the USDA Forest Service, Rocky Mountain Region, Species Conservation Project. 2007. At page 3.

Soykan, C.U., L.A. Brand, and J.L. Sabo. 2009. Causes and consequences of mammal species richness. Ecology and Conservation of the Upper San Pedro Riparian Ecosystem. University of Arizona Press. Tucson, AZ. pp. 107-126.

Stevens, L.E., A. Jones, P. Stacey, D. Duff, C. Gourley, and J.C. Catlin. 2002. Riparian ecosystem evaluation: a review and test of BLM's proper functioning condition assessment guidelines. Technical Report submitted to the National Riparian Service Team. U.S. Department of the Interior.

Strong, T.R., and C.E. Bock. 1990. Bird species distribution patterns in riparian habitats in southeastern Arizona. The Condor. 92(4): 866-885.

Trimble, S.W., and A.C. Mendel. 1995. The cow as a geomorphic agent - a critical review. *Geomorphology* 13 (1995): 233-253.

Trudeau, J. 2020. Ravaged River: Cattle Damage to Endangered Species Habitat in Arizona's Verde River Watershed. Report. Center for Biological Diversity. 39 pp.

Tufekcioglu, M., R.C. Schultz, G.N. Zaimes, T.M. Isenhart, and A. Tufekcioglu. 2013. Riparian grazing impacts on streambank erosion and phosphorus loss via surface runoff. Journal of the American Water Resources Association. 49(1): 103-113.

U.S. Fish & Wildlife Service, Biological Opinion, On-going and Long-term Grazing on the Tonto National Forest (Feb. 28, 2002) (02-21-99-F-300), p. 19.

U.S. Fish and Wildlife Service. 2014. Recovery Outline: New Mexico Meadow Jumping Mouse (*Zapus hudsonius luteus*). June. p. 9.

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

U.S. Fish and Wildlife Service. 2014. Recovery Outline: New Mexico Meadow Jumping Mouse (*Zapus hudsonius luteus*). June. p. 10.

US Fish and Wildlife Service, Listing Review Team. 2014. Species Status Assessment Report: New Mexico Meadow Jumping Mouse (*Zapus hudsonius luteus*). May 27. p. 83.

US Fish and Wildlife Service. 2014. Final Rule. Determination of Endangered Status for the New Mexico Meadow Jumping Mouse Throughout Its Range. Federal Register, Vol. 79, No. 111. Tuesday, June 10, 2014. Pp. 33119-33137.

Wright, G.D. and Frey, J.K., 2015. Habitat selection by the endangered New Mexico meadow jumping mouse on an irrigated floodplain. *Journal of Fish and Wildlife Management* 6(1): 112-129.

Wyman, S., D. Bailey, M. Borman, S. Cote, J. Eisner, W. Elmore, B. Leinard, S. Leonard, F. Reed, S. Swanson, L. Van Riper, T. Westfall, R. Wiley, and A. Winward. 2006. Riparian area management: Grazing management processes and strategies for riparian-wetland areas. Technical Reference 1737-20. BLM/ST/ST-06/002+1737. U.S. Department of the Interior, Bureau of Land Management, National Science and Technology Center. Denver, CO. 105 pp.

Zwartjes, P.W., J.E. Cartron, P.L.L. Stoleson, W.C. Haussamen, and T.E. Crane. 2005. Assessment of Native Species and Ungulate Grazing in the Southwest: Terrestrial Wildlife. Gen. Tech. Rep. RMRS-GTR-142. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 74 p. plus CD. https://www.fs.fed.us/rm/pubs/rmrs_gtr142.pdf.

The following documents were submitted along with the above comments letter, all as pdf files. These are submitted via the Public Comment Website and on a flash drive delivered by delivery service to the address listed in the legal notice: Reviewing Official, Southwestern Regional Forester, 333 Broadway Blvd. SE, Albuquerque, NM 87102.

Continued on next page.

Page 2 of 3 of the list of documents submitted as pdf files.

- Jones et al 2010 Riparian habitat changes..pdf
- Jones, 2000 - Grazing effects on North American arid ecosystems [Western North American Naturali
- Kauffman & Krueger 1984 - Riparian livestock impacts review [JRM].pdf
- Kerns 2011 - reintroducing fire pnw_2011_kerns001.pdf
- Kerns et al 2011 - Reintroducing fire to PIPO with and without grazing- veg response.pdf
- Kie et al. 1991 - cattle effects on mule deer foraging behavior.pdf
- Knapp et al 1998 Effects of stream channel on golden trout.pdf
- Kreuper et al 2003 - Cattle removal bird effects San Pedro [Cons Bio].pdf
- Krueper 1996 - Livestock effects on southwestern riparians [GTR-272].pdf
- Laycock, 1967 - How heavy grazing protection affect sagebrush-grass ranges [JRM].pdf
- Lit cited list.docx
- Morrison 1990 meadow jumping mouse in NM.pdf
- Neary & Medina 1995 - ungulate effects on montane geomorphology ASNF [GTR-272].pdf
- NM Game and Fish 2006 - comprehensive wildlife strategy.pdf
- Noss et al 1995 Endangered ecosystems.pdf
- Nussle et al 2015 - water temperature increases due to livestock.pdf
- Nussle et al 2017 - recovery following grazing cessation.pdf
- Obedzinski et al 2001 - Declining Riparian Woody Veg in the Western US [WJAF].pdf
- Ohmart, R. D. 1996. Historical and present impacts of livestock grazing.pdf
- Patten 1998 - Human impacts on semi-arid riparian ecosystems [Wetlands].pdf
- Poff et al 2011 - Threats to western riparian systems lit review [JAWRA].pdf
- Poff et al 2012 - Threats to western US riparian ecosystems [GTR-269].pdf
- Pritchard & Crowley 2006 - RGCT Conservation Assessment [USFS].pdf
- Propst 1999 - T&E Fish of New Mexico [NMDGF].pdf
- Rinne et al 1991 Southwestern_riparian-stream_ecosystems.pdf
- Roper et al 2018 Conservation of Aquatic Biodiversity.pdf
- Rosenstock et al 2001 - breeding_bird_responses.pdf
- Sarr 2002 - Riparian exclosure research recommendations [Env Mgmt].pdf
- Schulz & Leininger 1990 - Riparian vegetation structure in grazed areas and exclosures.pdf

Continued on the next page.

Page 3 of 3 of the list of documents submitted as pdf files.

- Schulz & Leininger 1990 - Riparian vegetation structure in grazed areas and exclosures.pdf
- Smith & Keinath 2007 - Northern leopard frog conservation assessment [USFS R2].pdf
- Soykan_etal_2009_SanPedro.pdf
- Stevens et al 2002 Riparian ecosystems.pdf
- Strong et al 1990 - bird species riparian habitats.pdf
- Trimble & Mendel 1995 - The cow as a geomorphic agent [Geomorphology].pdf
- Trudeau 2020 - Ravaged-River-Verde-Cattle-Impact-Survey.pdf
- Tufekcioglu et al 2013 Riparian grazing impacts.pdf
- USDI 2014 - Recovery Outline NM Meadow Jumping Mouse R2 ES.pdf
- USDI 2014 SSA_NewMexicoMeadowJumpingMouse_201405.pdf
- USFWS 2002 BO Grazing on the Tonto NF.pdf
- Wright et al 2015 Habita selcetion NM meadow jumping mouse 062014-jfwm-044.pdf
- Wyman et al 2006 - Riparian management TR_1737-20_0.pdf
- Zwartjes et al 2005 - Assessment of grazing on wildlife [GTR-142].pdf