From: Hall, Joshua D -FS on behalf of FS-Northern NM Riparian and Aquatic Watershed Restoration
Sent: 7 Nov 2019 16:54:28 +0000
To: Meredith Zaccherio
Subject: FW: Northern New Mexico Riparian, Aquatic and Wetland Restoration Project
Attachments: CBD_Comment_NNMRAWR_Scoping_11.04.2019.pdf

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Caring for the land and serving people

From: Joe Trudeau [mailto:JTrudeau@biologicaldiversity.org]
Sent: Monday, November 4, 2019 10:22 AM
To: FS-Northern NM Riparian and Aquatic Watershed Restoration <SM.FS.NNMRAWR@usda.gov>
Subject: Northern New Mexico Riparian, Aquatic and Wetland Restoration Project

Mr. Hall,

Please accept the attached comment letter from the Center for Biological Diversity, specific to the Northern New Mexico Riparian, Aquatic and Wetland Restoration Project.

This email will be followed by a series of other emails containing literature we cited in our comments. Please add these to the project record.

Thank you, and have a good day,

Joe Trudeau, *Southwest Advocate*
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(cell) 603-562-6226

November 4, 2019

Northern New Mexico Riparian, Aquatic and Wetland Restoration Project
11 Forest Lane, Santa Fe, NM 87508
Attn: Josh Hall
Delivered via email to: SM.FS.NNMRAWR@usda.gov

RE: Northern New Mexico Riparian, Aquatic and Wetland Restoration Project

Dear Mr. Hall,

In New Mexico, livestock grazing is associated with negative effects on riparian vegetation composition and structure, increased siltation, effects to stream hydrology and water quality, reduced soil permeability, increased soil compaction, and diminished wildlife habitat quality.[1] Indeed, the Forest Service admits that livestock grazing "can adversely affect hydrologic processes and water quality (e.g., compaction, erosion, sedimentation, stream shade, nutrient enrichment, and waterborne pathogens), especially where animals are concentrated within riparian areas."[2] These impacts are widely documented in several decades of scientific literature, and summarized well in Fleischner (1994[3]), Gifford and Hawkins (1978[4]), Krueper (1995[5]), and Kauffman and Krueger (1984[6]).

If livestock grazing is not permanently excluded from riparian areas, wetlands, and aquatic ecosystems in the three subject New Mexico National Forests, the Northern New Mexico Riparian, Aquatic and Wetland Restoration Project is unlikely to achieve a level of restoration of habitat, hydrology, and ecological integrity that is needed of our public lands if they are to endure the coming increasingly stressful conditions driven by climate change.

Please accept these comments on behalf of the 1.6 million members and supporters of the Center for Biological Diversity whose interest is in managing our public lands and waters for ecological health and wildlife viability, and not for the profit of a tiny fraction of our population who sell beef.

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[1] 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.

[2] Santa Fe National Forest, Forest Plan Revision, Draft EIS Vol. 1 at 181.

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

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

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

[6] 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.

Livestock grazing degrades water quality in several ways, including by widening channels due to bank damage from trampling and sedimentation, leading to elevated water temperature via the loss and suppression of riparian vegetation that provides stream shade.[7] Trampling impacts are often substantial even in the absence of shade loss,[8] and lead to long term decreases in retention of water, sediment, and nutrients in stream systems.[9] This is a serious impact because elevated water temperature and nutrient deficiencies adversely affects numerous aquatic species, including many of the species which reside in the streams and wetlands of northern New Mexico.

In a Forest Service climate vulnerability assessment of the middle Rio Grande ecosystem, Friggens and colleagues provided a much needed context for the degraded baseline condition that riparian systems are currently in. They argued "[e]xtensive and irreversible degradation of western riparian zones occurred in the late 19th and early 20th century due to severe overgrazing… [and] affected riparian zones in the Southwest have never recovered from this intense period of use."[10] The ecological baseline for the NNMRAWR is in a chronic state of impairment due to centuries of abuse by the livestock industry. We are optimistic that the NNMRAWR will meaningfully address the root cause of this impairment and degradation, and not ignore the chronic problem that is posed by ongoing livestock abuse subsidized and encouraged by complicit federal land managers.

The National Environmental Policy Act (NEPA) requires that agencies "*succinctly describe the environment of the area(s) to be affected or created by the alternative under consideration*."[11] NEPA also requires the action agency to set an appropriate baseline detailing the nature and extent of the resources in the area: "*The 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*."[12] "*Without establishing ... baseline conditions ... there is simply no way to determine what effect* [an action] *will have on the environment and, consequently, no way to comply with NEPA*."[13]

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[7] 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: 474-91.

[8] Rhodes, J.J., D.A. McCullough, and F.A Espinosa, Jr. 1994. A coarse screening process of the effects of land management on salmon spawning and rearing habitat in ESA consultations. Technical Report 94-4. Columbia River Inter-Tribal Fish Commission. Portland, Oregon. Report prepared for National Marine Fisheries Service.

[9] Sewards, M.A., and H.M. Valett. 1995. Effects of livestock grazing on nutrient retention in a headwater stream of the Rio Puerto Basin. 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.

[10] Friggens, M.M, D.M. Finch, K.E. Bagne, S.J. Coe, and D.L. Hawksworth. 2013. Vulnerability of species to climate change in the Southwest: terrestrial species of the Middle Rio Grande. Gen. Tech. Rep. RMRS-GTR-306. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 191 p. at 59. https://www.fs.fed.us/rm/pubs/rmrs_gtr306.pdf

[11] 40 C.F.R. § 1502.15.

[12] *See* Council on Environmental Quality, *Considering Cumulative Effects under the National Environmental Policy Act* 41 (January 1997).

[13] *Half Moon Bay Fishermans' Mktg. Ass'n v. Carlucci*, 857 F.2d 505, 510 (9th Cir. 1988).

Without baseline data, neither the public nor the agency can understand the effects of the proposed action or craft and analyze alternatives and mitigation measures to protect these values. As such, the Forest Service must identify the environmental baseline and affected environment, as well as the scope of impacts and where those impacts are most likely to be felt. We are concerned with the broad brush stroke of the proposed action, allowing a wide range of potential projects across a huge area, without the benefit of identification of the problems in a spatial record. Where are the culverts that need replacing? How many are there? Which wetlands are degraded, and which are functioning? Which allotments are mismanaged, and which are not a threat to riparian systems?

Many questions arise when considering a project of such immense scope but lacking in site-specific detail. Certainly, we support the protection and recovery of the ecosystems that are subject of the proposal, and we understand the need to increase the pace of restoration activities in the subject ecosystems, but that doesn't mean we throw the requirements of NEPA out the door. It seems clear that the NNMRAWR proposal utilizes the conditions-based management paradigm which the Forest Service is increasingly adopting, possibly prematurely.

On September 23, the U.S. District Court for the District of Alaska issued a preliminary injunction halting implementation of the Prince of Wales Landscape Level Analysis Project. The court did so because the Forest Service's failure to disclose the site-specific impacts of that logging proposal raised "serious questions" about whether that approach violated the National Environmental Policy Act (NEPA).

Because the NNMRAWR seems to takes a similarly vague approach to NEPA compliance, the project risks violating NEPA and could be enjoined. We therefore urge the Forest Service to modify its approach for the NNMRAWR and ensure that it discloses site-specific details about current (baseline) conditions, problematic road crossings, locations of proposed thinning activities, and locations of other proposed riparian, wetland, aquatic, watershed, and landscape restoration activities. To do otherwise risks violating the law and squandering significant agency resources.

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 Activity Cards . . . and Implementation Plan . . . ." The Forest Service has termed this approach "condition-based analysis."[14]

The Prince of Wales EIS made assumptions "in order to consider the 'maximum effects' of the Project."[15] It also identified larger areas within which smaller areas of logging would later be

[14] *See Se. Alaska Conservation Council v. U.S. Forest Serv.*, No. 1:19-cv-00006-SLG, 2019 U.S. Dist. LEXIS 161639 (D. Ak. Sep. 23, 2019) at *4 (citations omitted), attached as Ex. 1.

[15] *Id.* at *5.

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."[16]

The Court found the Forest Service's approach contradicted Ninth Circuit precedent, *City of Tenakee Springs v. Block*, 778 F.2d 1402 (9th 1995), concerning logging on the Tongass National Forest. There, the appellate court set aside the Forest Service's decision to authorize pre-roading in the Kadashan Watershed, without specifically evaluating where and when on approximately 750,000 acres of land on Baranof and Chichagof Islands it intended to authorize logging to occur. The district court evaluating the Prince of Wales project found the Forest Service's condition-based analysis there was equivalent to the deficient analysis found unlawful by the Ninth Circuit nearly a quarter-century ago 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 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."[17]

The Court concluded that plaintiffs in *SEACC* case raised "serious questions" about whether the Prince of Wales EIS violates 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."[18] After finding the plaintiffs also met the other factors for preliminary injunction, the court enjoined all logging until a decision on the merits.[19] The court expects to issue a final decision on the merits by March 31, 2020.

This decision demonstrates that the Forest Service's condition-based management approach conflicts with NEPA's "hard look" mandate, and that where the Forest Service employs it, the agency risks projects being set aside and subject to further, compliant NEPA review. It appears that the Forest Service is in just that precarious position with respect to the NNMRAWR project. While the NNMRAWR written record available to the public does not use the term "condition-based

[16] *Id.* at *6

[17] *Id.* at *13-*14 (citations omitted).

[18] *Id.* at *16, *18.

[19] *Id.* at *19-*23.

management," it employs a similar approach to avoid disclosing site-specific impacts, an approach the federal court found likely to violate NEPA and sufficient to halt the Prince of Wales project.

We urge the Forest Service in any subsequently prepared NEPA document to include baseline, site-specific information about the project area so that the public can better understand and appreciate the values at issue and how the proposed action and alternatives may impact those values, especially the riparian, aquatic and wetland conditions that are degraded by domestic livestock grazing. Some possible metrics to report baseline conditions could be soil compaction, erosion, sedimentation, stream shade, nutrient enrichment, vegetation diversity, exotic species presence, bank stability, or presence of waterborne pathogens, but we are eager to discuss other metrics for reporting and monitoring.

Essential Forest Service Science Documenting Grazing Impacts

A Forest Service review and assessment of grazing impacts on terrestrial wildlife in Region 3[20] found that grazing has multiple negative effects on native species. This incredibly useful and regionally specific document (GTR-142), assessed the ecological interactions among native wildlife species of the Southwest and grazing and range management practices, and was designed to provide an informational tool for the region's land managers and biologists.

A database developed to compliment the GTR-142 assessment (provided on a companion CD) contains accounts for 305 terrestrial species and subspecies (note, the assessment did not address 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, and includes statements like the two below:

In a section discussing birds of wetland/marsh habitats, GTR-142 states (page 29) that livestock use has "a consistently negative impact and therefore to be generally incompatible with habitat maintenance."

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."

In addition to GTR-142, we also request that the NNMRAWR interdisciplinary team review Poff et al (2012) - GTR-269 - "Threats to western United States riparian ecosystems.[21]" In this comprehensive review and bibliography of threats to riparian areas, 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

[20] 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

[21] 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

threats to these ecosystems as represented in the existing literature.[22]" Poff and colleagues write (page 8) that "most of the publications in this bibliography that address a single threat discuss grazing" and on page 11 "the two topics with the most individual references are grazing and invasive species."

Without incorporating these relevant documents into the NNMRAWR the Forest Service will fail to incorporate the best available science into the analysis. We have included these as attachments to this comment submission, and ask that they are reviewed and incorporated into any subsequent NEPA analysis. Furthermore, we ask that the bibliography provided in GTR-269 is reviewed and the research contained therein is also addressed and incorporated into any subsequent Forest Planning NEPA document.

Review of Grazing Impacts to Four Example Species

In this section we will provide four examples of how livestock grazing is a fundamental threat to riparian at-risk species that occur in some of all of the NNMRAWR Forests. We profile an amphibian (northern leopard frog), a plant (Arizona willow), a fish (Rio Grande cutthroat trout, and a mammal (New Mexico meadow jumping mouse), but the impacts are often broadly relevant to all aquatic and riparian species that would be affected by NNMRAWR activities. One purpose of providing these examples is to highlight how the NNMRAWR will not be addressing the key threats to wildlife and habitats if it fails to exclude livestock from riparian and aquatic systems.

Northern leopard frog

Livestock grazing is currently a threat to northern leopard frogs in the NNMRAWR area. While the interactions haven't been studied in detail, ample evidence from neighboring regions points to consistent negative effects of livestock on leopard frogs. A western Canadian management plan for the northern leopard frog stated

"Of particular concern is the concentration of grazing in riparian areas where livestock may trample and reduce moist upland vegetation cover, reduce shoreline emergent vegetation cover, disturb egg masses and affect water quality from stream bank erosion resulting in increased nutrients into the water bodies. Habitat in the form of dugouts, stock ponds, natural permanent wetland basins and river and streams can also be affected."[23]

A Forest Service conservation assessment of northern leopard frogs in the Black Hills of South Dakota[24] listed cattle grazing a "risk factor" to survival of these frogs. The author of this report stated on page 49 of his assessment that

[22] 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

[23] Environment Canada. 2013. Management Plan for the Northern Leopard Frog (*Lithobates pipiens*), Western Boreal/Prairie Populations, in Canada. Species at Risk Act Management Plan Series. Environment Canada, Ottawa. iii + 28 pp. https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/management-plans/northern-leopard-frog-2013.html#_Toc311462887

[24] Smith, B.E. 2003. Conservation Assessment for the Northern Leopard Frog in the Black Hills National Forest South Dakota and Wyoming. United States Department of Agriculture Forest Service, Rocky Mountain Region, Black Hills

"Cattle can easily affect [northern leopard frog] eggs, tadpoles, metamorphic, subadult, and adult frogs. Cattle can affect breeding ponds through erosion of pond margins, by direct effects such as trampling, or by water quality issues such as alteration of temperature, water chemistry, increased nitrate load, or by causing fecal coliform contamination. Siltation can affect the eggs by covering them with silt. Like fish eggs, frog eggs respire through their surface and anything that covers the surface impedes oxygen flow. Cattle can affect tadpoles in breeding ponds through the toxic effects of nitrogen buildup in ponds to which cattle have access."

He further remarked that the legacy effects of grazing, including road building to access range infrastructure, have fragmented habitats which has likely disrupted normal migratory and dispersal routes. Similarly, a Forest Service vulnerability analysis of terrestrial species to climate change in the Middle Rio Grande[25] concluded that the northern leopard frog in this area is vulnerable to changes to breeding and non-breeding habitat and obstructions to their ability to disperse. Researchers have observed that water quality, amphibian diversity and tadpole abundance were lower in wetlands used by cattle compared to wetlands excluded to cattle.[26]

In another Forest Service conservation assessment, this one for Colorado, Smith and Keinath (2007)[27] stated bluntly on page 3 that habitat for northern leopard frog is degraded "through the impacts of cattle grazing." These authors, who are professors at Black Hills State University and the University of Wyoming, identified twelve main factors that contribute to poor water quality in wetland habitats frequented by northern leopard frogs. Most of the factors are related to chemical threats, and include pesticides, fertilizers, mining residues/toxins, pH/acidification, lumberyard-sourced toxins, Rotenone, PCBs, and unknown toxins that contribute to limb malformations. Another two threats were roads and sedimentation, and the last threat was cattle grazing. In describing the threat to water quality posed by cattle grazing, they cited impacts that include waste runoff into breeding ponds (nitrates and fecal coliform), water quality, water chemistry, water temperature, increased erosion, and trampling leading to direct mortality. The authors concluded that cattle grazing had adverse effects on creeks and riparian dispersal corridors, and recommended that livestock are fenced out and excluded from breeding ponds, semi-permanent ponds with emergent vegetation, upstream drainages, and the surrounding upland habitat.

Any subsequent NEPA document prepared for the NNMRAWR project must include the best available science cited here (at a minimum) that documents the impacts of livestock grazing on the northern leopard frog, the ecological integrity of its habitat, and how the frog will benefit from NNMRAWR activities.

National Forest, Custer, South Dakota. 82p.
https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fsm9_012268.pdf

[25] Friggens et al. 2013.

[26] Schmutzer, A.C., Gray, M.J., Burton, E.C., and Miller, D.L. 2008. Impacts of cattle on amphibian larvae and the aquatic environment. Freshwater Biology 53:2613-2625.
http://fwf.ag.utk.edu/mgray/Publications/Schmutzeretal2008_FWBEarlyView.pdf

[27] Smith, B.E. and D.A. Keinath. 2007. Northern Leopard Frog (*Rana pipiens*): a technical conservation assessment. USDA Forest Service, Rocky Mountain Region.
http://www.fs.fed.us/r2/projects/scp/assessments/northernleopardfrog.pdf

Arizona willow

Domestic livestock have been shown to impair willow establishment and growth.[28] Livestock grazing is one of the most important threats to Arizona willow. In 1992, when the US Fish and Wildlife Service proposed to list the species as endangered, the agency stated that

"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."[29]

The proposed listing under ESA led to the development of a conservation agreement in the state of Arizona, but at that time the plant was not known to occur in New Mexico, so the populations in northern New Mexico were not included in the agreement. The interagency agreement in 1996 stated that

"Threats identified in the proposed rule include livestock and wildlife impacts, water impoundments and diversions, roads, recreational use, development and maintenance of ski resort facilities, disease, alteration of natural hydrologic regimes, and changes in the riparian community species composition and structure, including invasion of normative vegetation, especially Kentucky bluegrass (*Poa pratensis*), brought about by historic and current livestock use."[30]

Those same threats are recognized today in New Mexico. The University of New Mexico and the New Mexico Rare Plant Technical Council states that New Mexico populations of Arizona willow are

"…impacted by livestock and wildlife browsing, water impoundments and diversions, roads, recreation, development and maintenance of ski resort facilities, disease, alteration of natural hydrologic regimes, changes in the riparian community species composition and structure, and invasion of non-native vegetation brought about by historic and current livestock grazing."[31]

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[28] Shawl, N.L., and W.P. Clary. 1995. Willow establishment in relation to cattle grazing on an eastern Oregon stream. 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.

[29] Federal Register Vol. 57 No. 225, November 20, 1992, Endangered and Threateneed Wildlife and Plants; Proposed Endangered Status for the Plant "*Salix arizonica*" (Arizona willow), with Critical Habitat.

[30] Prendusi, T., D. Atwood, B. Palmer and R. Rodriguez. 1996. Interagency conservation biology program for Arizona willow (*Salix arizonica* Dorn). Pp. 224-230 In: Maschinski, J., H.D. Hammond and L. Holter, technical editors. Southwestern rare and endangered plants: Proceedings of the second conference. General Technical Report RM-GTR-283. USDA-Forest Service, Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colorado.

[31] http://nmrareplants.unm.edu/rarelist_single.php?SpeciesID=160

The Colorado Natural Heritage Program and The Nature Conservancy have identified that incompatible grazing is considered to be the primary threat to Arizona willow in the area where it occurs in southern Colorado.[32] The conditions in northern New Mexico are certainly comparable.

The US Fish and Wildlife Service's Red Book for rare plants in the southwest lists reasons for Arizona willows decline and vulnerability that include "degradation and loss of high elevation riparian habitat and direct loss of plants due to many factors, including; historic and present livestock grazing, water impoundments, recreation, road construction, elk grazing, timber harvesting in upper watersheds, fungal infection and establishment of exotic plant species."[33]

In a technical conservation assessment of Arizona willow prepared for the Forest Service[34], Karin Decker cites a New Mexico Natural Heritage Program Report which found that occurrences of Arizona willow in New Mexico "are reported to be noticeably impacted by grazing and altered hydrology." The author listed domestic grazing as the number one threat to the plants persistence in the Rocky Mountain region, specifically citing domestic grazing impacts including the removal and reduction of vegetation, soil compaction, increased erosion, changes in riparian community species composition, reductions in plant vigor and reproductive success, destruction of individual plants, trampling, altered hydrology, and competition with exotic species. Decker further elaborated (page 27) that

"Any management activity or natural disturbance that disrupts the hydrologic dynamics of its habitat is likely to have an effect on habitat quality for *S. arizonica*. In general, management activities or natural disturbances that affect habitats are likely to have similar or parallel effects on individuals or subpopulations. In particular, hydrological modification resulting from livestock grazing, timber harvest, road building, or recreation is likely to directly impact individuals and populations of *S. arizonica*. Plants may be killed or damaged as a result of these activities, and population remnants may be unable to recolonize disturbed areas. Surface disturbance may also affect the survival and reproductive success of individuals by altering local patterns of erosion and drainage and by eliminating safe sites for germination."

Any subsequent NEPA document prepared for the NNMRAWR project must include the best available science cited here (at a minimum) that documents the impacts of livestock grazing on the northern Arizona willow and other wetland obligate plants, the ecological integrity of their habitats, and how the willow and other wetland obligate plants will benefit from NNMRAWR activities.

New Mexico meadow jumping mouse

The New Mexico meadow jumping mouse is the prime example of how livestock grazing destroys wildlife habitat and causes populations to plummet. The NNMRAWR should prioritize 100% livestock exclosure from any occupied, potential, and formerly occupied jumping mouse habitat.

[32] Rondeau, R., K. Decker, J. Handwerk, J. Siemers, L. Grunau, and C. Pague. 2011. The state of Colorado's biodiversity. Prepared for The Nature Conservancy by the Colorado Natural Heritage Program, Colorado State University, Fort Collins, Colorado. http://www.cnhp.colostate.edu/download/documents/2011/Scorecard_march1_2012_final.pdf

[33] https://www.fws.gov/southwest/es/arizona/Documents/Redbook/Arizona%20Willow%20RB.pdf

[34] Decker, K. 2006. *Salix arizonica* Dorn (Arizona willow): a technical conservation assessment. USDA Forest Service, Rocky Mountain Region. http://www.fs.fed.us/r2/projects/scp/assessments/salixarizonica.pdf

The mouse has been extirpated from the vast majority of its range due to the destruction and degradation of its streamside habitat. In all historical locations surveyed, New Mexico meadow jumping mouse populations have undergone large declines and in most cases may have completely disappeared due to grazing of domestic livestock.[35] The New Mexico meadow jumping mouse requires pristine streamside and wet meadow habitat where particular vegetation grows to at least 24 inches in height for its food and sheltering needs. Cattle grazing - even when regulated - makes this growth impossible and has been identified by the US Fish and Wildlife Service 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 the NMMJM include cumulative habitat loss and fragmentation, directly attributable to livestock grazing pressure and human water use, among other lesser factors.[36] The decline and vulnerability of this species to extinction are the direct result of cattle growers' overutilization and abuse of a public trust resource and the failure of the Forest Service to restrict grazing in occupied or potential habitat areas.

In 1987, jumping mouse expert Joan Morrison cited cattle grazing as one of the greatest threats to persistence of the New Mexico meadow jumping mouse.[37] Morrison[38] later reiterated this point stating, "[g]razing probably has the highest potential for impact on streamside riparian and wet meadow habitats"[39] and "grazing is the single activity that has the greatest potential for impacting the [New Mexico meadow jumping mouse." [40] In 2005, jumping mouse expert Jennifer Frey concluded that the primary reason for the decline in distribution and abundance of the New Mexico meadow jumping mouse was loss of tall, dense herbaceous riparian vegetation and that absence of livestock grazing was the best predictor of the species presence.[41]

Data from extensive historical and recent surveys indicate that cattle grazing causes habitat destruction and the resulting extirpation of isolated populations of the New Mexico meadow

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

[36] 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.

[37] 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.

[38] 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.

[39] Morrison 1990: page 142

[40] 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.

[41] 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.

jumping mouse. Extant montane populations of the mouse in the Sangre de Cristo, Jemez, and Sacramento mountains are almost exclusively limited to areas that receive protection from livestock grazing.[42] The only instance where the mouse has been found in an area that was grazed was on the Lower Rio Cebolla in the Jemez Mountains.[43] At this location, mice were captured in an extensive wetland created through beaver activity, which excluded cattle grazing due to the reluctance of cattle to enter the deep mud. Beaver buffer the negative effects of grazing in riparian areas and can provide suitable habitat for the New Mexico meadow jumping mouse in areas where grazing is not intense. We are pleased to see beaver habitat restoration listed as a potential project category, but request that reintroduction or relocation be added to the project categories. We support widespread reintroduction of beaver, and request that any subsequent NEPA document provide a map showing and tables describing suitable beaver restoration areas.

Most observations show that vegetation in New Mexico meadow jumping mouse habitat is extremely sensitive to cattle activity. The impacts occur even with low numbers of cows. For example, at Fenton Lake in the Jemez Mountains, a few trespassing cows trampled the marsh area and severely trampled vegetation, damaging one of the few known areas inhabited by the New Mexico meadow jumping mouse and resulting in a researcher recording that "even moderate grazing in a marshy area such as Fenton Lake could seriously affect populations of jumping mice.[44]" A study in the changes of the Jemez Mountains landscape indicated that impacts caused by grazing included loss of vegetative cover, alteration of vegetative communities through selective removal of plant species, soil compaction, and general destruction from trampling.[45]

In Morrison's 1991 surveys for New Mexico meadow jumping mice on the Apache-Sitgreaves National Forest, Arizona, livestock were permitted in 17 of the 24 study sites, with no information available in another 6 sites, leaving only 1 known site without grazing. In 3 of the 17 grazed sites, grazing was heavy and cover was either fair to poor. In the 13 sites where grazing was moderate, cover was very good in only 3 areas, with cover considered good to fair in the other 10 sites. The New Mexico meadow jumping mouse was found at the single area that was not grazed, where the cover was considered very good.[46] Three other sites where the mouse was found had moderate grazing but good to very good cover. Finally, the mouse was also found in one heavily grazed area that had fair cover. However, this site (Three Forks) was adjacent to a moderately grazed area with good cover that is known to have high densities of New Mexico meadow jumping mice (Pers. Comm. Underwood AZGFD 2007). In surveys during the summer of 2019, the Center for

[42] 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.

[43] 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.

[44] 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.

[45] Allen, C.D. 1989. Changes in the landscape of the Jemez Mountains, New Mexico. Berkley, University of California. Ph.D: 346.

[46] 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.

Biological Diversity documented unauthorized livestock grazing in purportedly protected grazing exclosures in the Agua Chiquita, Penasco, Wills Canyon, and other critical habitat sites on the Lincoln National Forest. Documentation submitted to Region 3 Forest Service in a Notice of Intent to Sue[47] clearly shows the immense impact that grazing of just a few cows has on jumping mouse habitat (this NOI is included in the literature we have provided for the project record).

In 2005, Frey[48] 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 cattle.[49] Presence of a livestock exclosure has numerous effects on riparian habitat and the small mammal community. Analysis has shown that habitat within livestock exclosures have significantly higher soil moisture, vertical cover, stubble height, sedge/rush ground cover, litter ground cover and litter depth, but significantly less gravel ground cover and bare ground. [50] On the Carson National Forest, surveyors concluded that the only extensive area that met all the habitat needs for the New Mexico meadow jumping mouse was an area that had not been grazed for more than 20 years.[51]

In designating Critical Habitat for NMMJM, U.S. Fish and Wildlife Service stated

"We found five of the eight geographic management areas would have sufficient populations to support species viability if the current jumping mouse areas were expanded to provide for resilient populations. The three exceptions where the historic distribution is not adequately represented by recently located populations were in the Jemez Mountains, the Sacramento Mountains, and the Rio Grande geographic management areas. We found that the conservation of the subspecies requires increasing the number and distribution of populations of the jumping mouse to allow for the restoration of new populations and expansion of current populations into areas that were historically occupied within the Jemez Mountains, Sacramento Mountains, and the middle Rio Grande."[52]

Clearly, the US Fish and Wildlife Service has determined that livestock grazing in critical riparian areas and adjacent uplands reduces the mouse's habitat, threatening the viability of the species, and

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[47] 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.

[48] 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.

[49] 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.

[50] Frey, J.K. 2006. Field surveys for the New Mexico meadow jumping mouse (*Zapus hudsonius luteus*) at historical localities in the Sangre de Cristo Mountains, New Mexico.

[51] 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.

[52] Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the New Mexico Meadow Jumping Mouse; Final Rule; Federal Register, Volume 81, Number 51, March 16, 2016, page 14296.

that potential habitats must be protected and restored if the species is to recover, including adjacent uplands. The species Recovery Outline states that

"Individual jumping mice need intact upland areas that are up gradient and beyond the floodplain of rivers and streams and adjacent to riparian wetland areas because this is where they build nests or use burrows to give birth to young in the summer and to hibernate over the winter."[53]

Further, the Recovery Outline explains that "resilient populations of jumping mice need suitable habitat in the range of at least about 27.5 to 73.2 ha (68 to 181 ac) along 9 to 24 km (5.6 to 15 mi) of flowing streams."[54] Exclosure fencing should protect the full habitat requirements of the New Mexico meadow jumping mouse, extending outward into the "adjacent floodplain and upland areas extending approximately 100 meters (330 feet) outward from the boundary between the active water channel and the floodplain."[55]

The jumping mouse's habitat needs, consisting of luxuriant riparian and adjacent upland terrestrial vegetation, are common of many riparian obligate species. The 2012 planning rule recognizes this phenomenon in the definition of riparian areas: "Three-dimensional ecotones of interaction that include terrestrial and aquatic ecosystems that extend down into the groundwater, up above the canopy, outward across the floodplain, up the near-slopes that drain to the water, laterally into the terrestrial ecosystem, and along the water course at variable widths."[56]

Any subsequent NEPA document prepared for the NNMRAWR project must include the best available science cited here (at a minimum) that documents the impacts of livestock grazing on the New Mexico meadow jumping mouse and other meadow-dwelling small mammals and the ecological integrity of their riparian and adjacent upland habitats, and explain how the objectives stated in the record of Section 7 consultation, the Recovery Outline, and other documentation will be met by the proposed action.

Rio Grande cutthroat trout

Native fish are severely negatively impacted by domestic livestock grazing. The tremendous negative effect of cattle on trout and trout habitat has been documented in dozens of scientific studies, and summarized here. The New Mexico Department of Game and Fish has stated 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,

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

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

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

[56] 36 CFR § 219.19.

particularly in spring habitats… Livestock grazing has contributed to increased erosion in many watersheds and thus elevated sediment loads in virtually all river systems."[57]

New Mexico Game and Fish issued a report entitled "Status and Future of the Rio Grande cutthroat trout" which concluded that

"Since Spanish days, the range and numbers of this trout have probably been declining in New Mexico, as degradation of habitat (e.g. through overgrazing) and use and misuse of water and later the introduction of exotics...streams with limited riparian growth and erosional problems (e.g. degraded banks, rapid run-off from watershed or streambed) tend to lack proper shade (and thereby have higher temperatures), sufficient feeding and shelter areas, and a suitable diversity of invertebrate life. Such streams harbor few or no native trout, whereas streams without these did sustain fish."[58]

Similarly, Sublette et al. (1990) concluded that

"Most streams occupied by Rio Grande cutthroat trout have been impacted by overgrazing and livestock. Limited vegetation in the watershed, especially in riparian areas, has led to altered stream nutrient and sediment loads, and has modified flow regimes along with the morphology of the stream course. Trampling of streambanks by livestock has further accelerated habitat destruction. Trout survival in many of these streams is impaired because of the lack of productive riffle areas, suitable spawning sites, undercut banks (to escape predation), pools (for resting, feeding and overwintering), and shade (in proper proportions which reserves cold water temperatures yet allows adequate solar gain essential for primary production)."[59]

Researchers realized decades ago that habitat loss driven by livestock grazing is primary threat to native fish in northern New Mexico. As much as fifty years ago, Behnke and Zarn,[60] Sublette et al., and Behnke[61] concluded that livestock grazing on National Forests and other lands was harming Rio Grande cutthroat trout populations.

More recently, grazing has been demonstrated to be the most common cause of reduction of Rio Grande cutthroat trout habitat quality and it is considered a primary threat and a "major problem" to this fish.[62] During the last century, the geographic range and population of Rio Grande cutthroat

[57] 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.

[58] Hubbard, J.P. 1976. Status and Future of the Rio Grande Cutthroat Trout. New Mexico Department of Game and Fish, Endangered Species Program Report.

[59] Sublette, J.E., M.D. Hatch and M. Sublette 1990. The Fishes of New Mexico. University of New Mexico Press, Albuquerque, NM.

[60] 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.

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

[62] 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.

trout (or "Trout") – the southernmost subspecies of cutthroat trout native to the Rocky Mountains – has declined precipitously. The Trout no longer occurs in almost 90 percent of its range within Colorado and New Mexico and, as habitat conditions continue to deteriorate, remaining populations continue to shrink in their numbers and distribution. Most populations are now restricted to small, high-elevation streams and fish cannot migrate between populations because their habitat at lower elevations lack the conditions needed for the Trout's survival. Remaining Trout populations face continuing threats from livestock grazing and recent studies show that climate change is compounding these problems.

In fact, the Santa Fe Forest Plan Draft EIS (Volume 2, at 288) states that Rio Grande cutthroat trout are

"…threatened by degraded stream and riparian habitat, as well as water quality and quantity as a result of inadequately maintained roads and trails, water diversions, livestock grazing, and recreational use."

We anticipate that the NNMRAWR will address these threats in a manner proportionate with the extent and severity of the disturbances attributed to each, and not just pick the low hanging fruit (i.e., restricting recreational use but doing nothing about livestock).

Not only has the Trout's range contracted, but the habitat that remains is not sufficient to sustain the Trout's remaining populations. Most problematic to the species' survival is that the lower elevation rivers that previously connected populations and provided refuges from drought, fire and extreme cold are currently uninhabitable. Remaining Trout populations are now restricted to short, shallow, and narrow segments of headwater streams, mostly above 8,000 feet in elevation within the Rio Grande, Pecos, and Canadian River watersheds in Colorado and New Mexico. This habitat loss means that remnant populations are isolated from one another. Remaining populations are small in size. Numerous factors have destroyed and continue to threaten the trout's habitat, including water diversions, livestock grazing, logging, mining, roadbuilding, wildfires and drought. Whirling disease and non-native fish have resulted in significant population reductions as well. Recent evidence shows that climate change is exacerbating these existing threats to the Trout.

A US Fish and Wildlife review[63] of threats to conservation populations of Rio Grande cutthroat trout found that the vast majority of the populations (97%) were subject to the ongoing threats, including 90 percent by recreation activities; 87 percent by grazing; 58 percent by roads; 19 percent by logging; 17 percent by dewatering; and 3 percent by mining.[64] The US Fish and found that climate change will cause existing threats - such as grazing - to accelerate in their effect. For example, climate change will exacerbate the harms resulting from increased water temperature, decreased water supply, a changed hydrograph (earlier spring run-off), and extreme events, such as floods, drought, and fire, which will occur more frequently and with greater intensity.[65] FWS concluded that while the degree of harm from climate change is uncertain, "even a minimal increase in temperature

[63] Federal Register Vol. 73, No. 94, Wednesday, May 14, 2008 at 27,907.

[64] Federal Register Vol. 73, No. 94, Wednesday, May 14, 2008 at 27,921.

[65] Federal Register Vol. 73, No. 94, Wednesday, May 14, 2008 27,913-19.

will lead to increased habitat unsuitability and will exacerbate most other known threats to the subspecies."[66]

Prominent trout 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."[67] Parson and Wilson (1991) determined that Apache trout were ten times more abundant on ungrazed streams on the Apache- Sitgreaves National Forest and other areas in the White Mountains, AZ than on grazed streams. Rinne and LaFayette (1991) found that ungrazed streams on the Tonto and Santa Fe National Forests had twice as many trout, trout populations, and trout biomass than grazed streams.[68] 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.[69] Platts (1991) reviewed 21 studies, finding only one that did not concluded that cattle degrade trout populations and habitat.[70] 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.[71] Similarly, twenty years of cattle exclosure on Camp Creek in central Oregon turned an ephemeral wash into permanent stream capable of supporting redband trout.[72]

Forest Service biologists have concluded that western trout streams cannot be recovered or even stabilized unless livestock impacts are greatly reduced.[73] If the NNMRAWR project is to successfully protect the Rio Grande Cutthroat trout, or any native fish, domestic livestock grazing must be entirely prohibited from riparian areas and streamside management zones. One of the most commonly employed methods of protecting the trout's habitat in New Mexico is riparian exclosure fencing,[74] and this practice should be dramatically extended to encompass all riparian areas included

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[66] Federal Register Vol. 73, No. 94, Wednesday, May 14, 2008 at 27,919.

[67] Pritchard and Crowley 2006 at 50.

[68] 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.

[69] 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.

[70] 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.

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

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

[73] Behnke and Zarn. 1976.

[74] RGCT Conservation Team. 2013. Rio Grande cutthroat trout (*Oncorhynchus clarkii virginalis*) Conservation Strategy. Colorado Parks and Wildlife, Denver, CO.

in the NNMRAWR project. Construction of grazing exclosures to prevent livestock from entering Rio Grande cutthroat trout streams is an immediate funding need, supported by the best available science.[75] In an evaluation of climate change effects on Rio Grande cutthroat trout, Zeigler and colleagues attributed population and habitat reductions to anthropogenic activities such as grazing, and they called for the "the systematic reduction of nonclimatic exacerbating stressors (e.g., grazing and water diversions)."[76]

To again 'pick on' the Santa Fe Draft Forest Plan, the only mention of exclosure fencing is in regards to elk exclosure (Draft LMP at 122). Similarly, every mention of exclosure fencing in the Santa Fe Draft EIS is specific to elk exclosure. Sadly, in every way imaginable, the Draft EIS and Draft LMP cater to the livestock industry at the expense of native wildlife. Any subsequent NEPA document prepared for the NNMRAWR project should be more explicit that exclosure fencing is meant to protect riparian areas from domestic livestock grazing, not just elk.

The issues and threats selected to assess at-risk species consider all of those threats except for livestock grazing, which as we've described at length

As we have described for Rio Grande cutthroat trout, New Mexico meadow jumping mouse, Arizona willow, and northern leopard frog, domestic livestock grazing is a primary driver of degraded stream and riparian habitat. Other at-risk, sensitive, or species of greatest conservation need are similarly negatively directly and indirectly impacted by livestock grazing, especially where multiple at-risk species co-occur simultaneously,[77] and all species must be evaluated in any subsequent NNMRAWR NEPA document under an approach similar to what we have completed here for the four species used as examples.

Synergistic Effects of Grazing Coupled with Other Stressors Exacerbates Riparian Degradation

It's crucial that any subsequent NNMRAWR NEPA document recognize the additive effects of livestock grazing impacts coupled with drought, climate change, elk herbivory, recreation, roads, habitat fragmentation, uncharacteristic wildfire, and other stressors. Forest Service ecologists have established that livestock grazing has exacerbated riparian ecosystem decline and stream down-cutting associated with multiple concurrent factors.[78] Likewise, New Mexico Department of Game

[75] Colorado Parks and Wildlife, New Mexico Dept. of Game and Fish, U.S. Forest Service, U.S. Fish and Wildlife Service, National Park Service, U.S. Bureau of Land Management, Jicarilla Apache Nation, Mescalero Apache Nation, Taos Pueblo, 15 CO County Coalition, and Trout Unlimited. 2016. Western Native Trout Status Report: Rio Grande Cutthroat Trout (*Oncorhynchus clarkii virginalis*).

[76] Zeigler, M.P., A.S. Todd, and C.A. Caldwell. 2012. Evidence of Recent Climate Change within the Historic Range of Rio Grande Cutthroat Trout: Implications for Management and Future Persistence. *Transactions of the American Fisheries Society* 141: 1045-1059.

[77] Calamusso, B., and J.N. Rinne. 1995. Distribution of Rio Grande Cutthroat Trout and its co-occurrence with the Rio Grande Sucker and Rio Grande Chub on the Carson and Santa Fe National Forests. 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.

[78] 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.

and Fish has recognized that the effects of livestock grazing are compounded by extended drought and altered hydrological function.[79] 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"[80]

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."[81] 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."[82]

Forest Service ecologists have cautioned against analyses that ignore synergistic and additive effects. Poff and colleagues concluded, in GTR 269, that "[i]n most cases, it is difficult to deal with isolated threats as most occur in combination with other threats. Land managers need to be aware of the multiple threats and their interactions in order to successfully manage riparian ecosystems in the western United States."[83]

Any subsequent NEPA document prepared for the NNMRAWR project must address the manner by which livestock grazing exacerbates other stressors, and describe how project success can be achieved by restricting livestock access to wetland, riparian, and aquatic habitats.

NNMRAWR Should Analyze the Effects of Livestock-Related Groundwater Withdrawal on Project Success

Forest Service Manual FSM 2560 Groundwater Resource Management instructs the Forest Service as follows:

"Prior to implementation or approval, assess the potential for proposed Forest Service projects, approvals, and authorizations to affect the groundwater resources of NFS lands. If there is a high probability for substantial impact to NFS groundwater resources, including its quality, quantity, and

[79] 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.

[80] Friggens et al. 2013 at 58.

[81] Smith and Keinath 2007 at 3.

[82] Decker 2006 at 29.

[83] Poff et al. 2012 at 11.

timing, evaluate those potential impacts in a manner appropriate to the scope and scale of the proposal and consistent with this chapter."

The Forest Service Manual also states that the Forest Service shall "Manage surface water and groundwater resources as hydraulically interconnected, and consider them interconnected in all planning and evaluation activities, unless it can be demonstrated otherwise using site-specific information."[84]

To affirm the agreement on the interconnectedness of water systems, current Forest Plan revisions establish a clear link between groundwater and surface water-dependent communities in a number of ways, but notably the glossaries provides definitions for three terms which establish the inseparable relationship. Consider these three definitions, borrowed from the Santa Fe Draft Forest Plan:

"Groundwater-dependent ecosystem. Community of plants, animals, and other organisms whose extent and life processes depend on groundwater. Examples include many wetlands, groundwater-fed lakes and streams, cave and karst systems, aquifer systems, springs, and seeps."

"Riparian areas. Three-dimensional ecotones (the transition zone between two adjoining communities) of interaction that include terrestrial and aquatic ecosystems that extend down into the groundwater, up above the canopy, outward across the floodplain, up the near-slopes that drain to the water, laterally into the terrestrial ecosystem, and along the water course at variable widths (36 CFR 219.19)."

"Wetlands. A specific subtype within the wetland riparian group of vegetation communities. In wetlands, saturation with water is the dominant factor determining the nature of soil development and plant and animal communities. "For regulatory purposes under the Clean Water Act, the term wetlands means 'those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas.' [taken from the EPA Regulations listed at 40 CFR 230.3(t)]."

Recognizing the relationship between groundwater and surface water, we request that any subsequent NEPA document prepared for the NNMRAWR project disclose the baseline effects of groundwater withdrawals on riparian, aquatic, and wetland conditions. We expect that there is substantial impact of wells used for livestock or mineral production on groundwater resources. These impairments must be quantified as baseline documentation.

Forest Service Must Consider Livestock Grazing Disturbance and Disturbance Regime

Again, to use the Santa Fe as an example, the Forest Plan Draft EIS emphasizes repeatedly the threats to ecosystems posed by seral state departure and uncharacteristic wildfire, but ignores the much more widespread and chronic stress and disturbance that is caused by the non-native introduced domestic livestock grazing. For example, in reviewing the risk posed to water shrew and masked shrew, the Draft EIS lists a number of issues and threats, though none of them are explicitly listed as livestock grazing.

[84] FSM 2560.03.

Recent research in habitat similar to that where these shrews and New Mexico meadow jumping mouse occur found that "livestock grazing had a greater effect than wildfire on the small-mammal community by altering vegetation or other habitat elements and thus decreasing population sizes.[85]" In a related meta-analysis of fifty-four studies, Jones (2000) observed that areas grazed by livestock had significantly lower rodent species diversity and richness, largely due to impacts to soils, litter cover, and litter biomass.[86] In this example, as it relates to the Forest Plan revision process, the omission of livestock grazing disturbances as a direct threat to small mammals that rely on meadows with high grass and forb cover is inconsistent with the 2012 planning rule requirement to consider the impacts of "disturbance regimes"[87] on ecosystem integrity. Turning to the NNMRAWR, we anticipate that subsequent NEPA documents will exhaustively review the impacts of livestock grazing on current conditions and the ability for restoration activities to meet activity objectives.

Livestock grazing is a disturbance that the watersheds of the NNMRAWR area did not evolve with. The 2012 planning rule defines a disturbance as "[a]ny relatively discrete event in time that disrupts ecosystem, watershed, community, or species population structure and/or function and changes resources, substrate availability, or the physical environment," and defines a disturbance regime as "[a] description of the characteristic types of disturbance on a given landscape; the frequency, severity, and size distribution of these characteristic disturbance types; and their interactions."[88] A domestic ungulate grazing on the land is a discrete event that disrupts ecosystems, watersheds, communities, species population structure, species population function, substrate availability, and the physical environment in general. The Forest Service is obligated to consider disturbances, and can easily describe the livestock disturbance regime by analyzing stocking rates, rotations, season of use, and other metrics that are currently catalogued under existing range management programs. Any subsequent NEPA document prepared for the NNMRAWR project should exhaustively review the disturbances caused by domestic livestock grazing.

Is the purpose of the NNMRAWR to increase cattle forage?

We are concerned that the recovery of wetland, riparian and wetland conditions that is likely to follow NNMRAWR activities would allow the increase of livestock use in these rare and sensitive habitats. For example, in the current Santa Fe Forest Plan Revision process there seems to be a bias towards increased livestock grazing which is reiterated throughout the Draft EIS and Draft Forest Plan. A section on "Management Approaches for Sustainable Rangelands and Livestock Grazing" (Draft Forest Plan, at 123) displays an unbelievable degree of submission to the powerful livestock industry, for example. And the Draft EIS (Vol. 1 at 197) states:

"Where forage is increased (as expected by alternative 2) stocking rates would likely be increased, and similarly, where forage is decreased (over the long term; as expected by alternatives 3 and 4), stocking rates should decrease."

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[85] Horncastle, V.J., C.L. Chambers, and B.G. Dickson. 2019. Grazing and Wildfire Effects on Small Mammals Inhabiting Montane Meadows. Journal of Wildlife Management 83(3): 534-543. https://doi.org/10.1002/jwmg.21635

[86] Jones, A. 2000. Effects of cattle grazing on North American arid ecosystems: a quantitative review. *Western North American Naturalist* 60(2):155-164. https://scholarsarchive.byu.edu/cgi/viewcontent.cgi?article=1152&context=wnan

[87] 36 CFR § 219.8(a)(1)(iv).

[88] 36 CFR § 219.19

This statement clearly displays a bias towards expanding grazing, as it says "would likely" when referring to increasing stocking, and "should" when decreasing stocking. Furthermore, that section continues by stating:

"As long as stocking is in pace with forage availability, and riparian areas are adequately protected, adverse impacts to surface water resources (see Wa24 through Wa34) are expected to be neutral when compared with the current condition (alternative 1)."

This sentence admits that the preferred alternative will not improve water resources, but rather maintain adverse impacts at the current level. It also makes two significant assumptions, that stocking will be in pace with forage and that riparian areas are adequately protected. Again, the Santa Fe Draft EIS (Vol. 2, p. 39) also admits that

"Objectives for vegetation treatments (mechanical and fire) in alternative 2 of the draft proposed plan would increase herbaceous understory growth, resulting in increased forage cover. These plan components would increase opportunities to graze livestock, benefitting area ranchers, ranching related industries"

We propose a simple solution, that the NNMRAWR decision clearly state that no increases in livestock stocking rates can result from NNMRAWR activities. Any subsequent NEPA document prepared during the NNMRAWR process must include the best available science that we have provided here that documents the impacts of livestock grazing on ecological integrity, and clarify that the project is not intended to increase livestock forage, even though the Santa Fe has already admitted that in their Forest Plan Draft EIS.

The Forest Service Must Analyze a Range of Reasonable Alternatives

CEQ regulations which apply to all NEPA documents, and not just EISs, require that agencies "to the fullest extent possible . . . [i]mplement procedures . . . to emphasize real environmental issues and alternatives" and to "use the NEPA process to identify and assess the reasonable alternatives to proposed actions that will avoid or minimize adverse effects of these actions upon the quality of the human environment."[89]

For decades, the Ninth Circuit and district courts therein have explicitly held that the alternatives requirement applies equally to EAs and EISes. "Any proposed federal action involving . . . the proper use of resources triggers NEPA's consideration of alternatives requirement, whether or not an EIS is also required."[90] Other courts agree.[91]

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[89] 40 C.F.R. § 1500.2(b), (e).

[90] *Bob Marshall Alliance v. Hodel*, 852 F.2d 1223, 1229 (9th Cir. 1988), cert denied, 489 U.S. 1066 (1988). *See also W. Watersheds Project v. Abbey*, 719 F.3d 1035, 1050 (9th Cir. 2013) (in preparing EA, "an agency must still give full and meaningful consideration to *all* reasonable alternatives" (emphasis added) (internal quotation and citation omitted)); *Te-Moak Tribe v. Interior*, 608 F.3d 592, 601-602 (9th Cir. 2010) ("Agencies are required to consider alternatives in both EISs and EAs and must give full and meaningful consideration to all reasonable alternatives."); *Native Ecosystems Council v. U.S. Forest Service,* 428 F.3d 1233, 1245 (9th Cir. 2005) ("alternatives provision" of 42 U.S.C. § 4332(2)(E) applies whether an agency is preparing an EIS or an EA and requires the agency to give full and meaningful consideration to all reasonable alternatives); *Gifford Pinchot Task Force v. Perez*, 2014 U.S. Dist. Lexis 90631, No. 03:13-cv-00810-HZ (D. Or. July 3, 2014) (finding agency failed to consider range of reasonable alternatives in an EA); *Envtl. Prot. Info. Ctr. v. Blackwell*, 389 F. Supp. 2d 1174, 1199 (N.D. Cal. 2004) (stating that "an EA must consider a reasonable range of alternatives"); *Or.*

NEPA requires that federal agencies consider alternatives to recommended actions whenever those actions "involve[] unresolved conflicts concerning alternative uses of available resources."[92] "NEPA's requirement that alternatives be studied, developed, and described both guides the substance of the environmental decisionmaking and provides evidence that the mandated decisionmaking process has actually taken place."[93]

In taking the "hard look" at impacts that NEPA requires, an EA must "study, develop, and describe" reasonable alternatives to the proposed action.[94] CEQ regulations explicitly mandate that an EA "[s]hall include brief discussions . . . of alternatives."[95]

The purpose of the multiple alternative analysis requirement is to insist that no major federal project be undertaken without intense consideration of other more ecologically sound courses of action, including shelving the entire project, or of accomplishing the same result by entirely different means.[96]

Reasonable alternatives must be analyzed for an EA even where a FONSI is issued because "nonsignificant impact does not equal no impact. Thus, if an even less harmful alternative is feasible, it ought to be considered." When an agency considers reasonable alternatives, it "ensures that it has considered all [97]possible approaches to, and potential environmental impacts of, a particular project; as a result, NEPA ensures that the most intelligent, optimally beneficial decision will ultimately be made."[98]

In determining whether an alternative is "reasonable," and thus requires detailed analysis, courts look to two guideposts: "First, when considering agency actions taken pursuant to a statute, an

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Natural Desert Ass'n v. Singleton, 47 F. Supp. 2d 1182, (D. Or. 1998) ("The requirement of considering a reasonable range of alternatives applies to an EA as well as an EIS" (citing 40 C.F.R. § 1508.9(b)).

[91] *See Davis v. Mineta*, 302 F.3d 1104, 1120 (10th Cir. 2002) (granting injunction where EA failed to consider reasonable alternatives); *Diné Citizens Against Ruining Our Env't v. Klein*, 747 F. Supp. 2d 1234, 1254 (D. Colo. 2010) (alternatives analysis "is at the heart of the NEPA process, and is 'operative even if the agency finds no significant environmental impact.'" (quoting *Greater Yellowstone Coal. v. Flowers*, 359 F.3d 1257, 1277 (10th Cir. 2004)).

[92] 42 U.S.C. § 4332(2)(E). *See also* 40 C.F.R. § 1501.2(c) (agencies must "study, develop, and describe appropriate alternatives to the recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources as provided by section 102(2)(E) of the Act.").

[93] *Bob Marshall Alliance*, 852 F.2d at 1228 (citation omitted).

[94] 42 U.S.C. § 4332(2)(C) & (E).

[95] 40 C.F.R. § 1508.9(b).

[96] *Environmental Defense Fund v. Corps of Engineers*, 492 F.2d 1123, 1135 (5th Cir. 1974); *Methow Valley Citizens Council v. Regional Forester*, 833 F.2d 810 (9th Cir. 1987), *rev'd on other grounds*, 490 U.S. 332 (1989) (agency must consider alternative sites for a project).

[97] *Ayers v. Espy*, 873 F. Supp. 455, 473 (D. Colo. 1994) (internal citation omitted).

[98] *Wilderness Soc'y v. Wisely*, 524 F. Supp. 2d 1285, 1309 (D. Colo. 2007) (quotations & citation omitted).

alternative is reasonable only if it falls within the agency's statutory mandate. Second, reasonableness is judged with reference to an agency's objectives for a particular project."[99]

Additionally, the Court recognizes two exceptions under which an agency may decline to consider an alternative: where it has in "good faith" found the alternative to be "too remote, speculative, or impractical or ineffective,"[100] or where the alternative is not "significantly distinguishable from the alternatives already considered."[101] When an alternative meets the guideposts, and is not subject to the exceptions, an agency must consider it in detail.[102]

Any alternative that is unreasonably excluded will invalidate the NEPA analysis. "The existence of a viable but unexamined alternative renders an EA inadequate."[103]

The agency's obligation to consider reasonable alternatives applies to citizen-proposed alternatives.[104] "In respect to alternatives, an agency must on its own initiative study all alternatives that appear reasonable and appropriate for study at the time, and must also look into other significant alternatives that are called to its attention by other agencies, or by the public during the comment period afforded for that purpose."[105]

Courts hold that an alternative may not be disregarded merely because it does not offer a complete solution to the problem.[106] Even if additional alternatives would not fully achieve the project's purpose and need, NEPA "does not permit the agency to eliminate from discussion or consideration a whole range of alternatives, merely because they would achieve only some of the purposes of a multipurpose project."[107] If a different action alternative "would only partly meet the

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[99] *Diné Citizens Against Ruining Our Env't*, 747 F. Supp. 2d at 1255 (quoting *New Mexico ex rel. Richardson*, 565 F.3d at 709). *See also Idaho Conservation League v. Mumma*, 956 F.2d 1508, 1520 (9th Cir. 1992) ("nature and scope of proposed action" determines the range of reasonable alternatives agency must consider).

[100] *Richardson*, 565 F.3d at 708 (quoting *Colo. Envtl. Coal. v. Dombeck*, 185 F.3d 1162, 1174 (10th Cir. 1999)).

[101] *Id.* at 708-09 (citing *Westlands Water Dist. v. U.S. Dep't of the Interior*, 376 F.3d 853, 868 (9th Cir. 2004)).

[102] *Id.* at 711.

[103] *Western Watersheds v. Abbey*, 719 F.3d. at 1050; *see also Diné Citizens Against Ruining Our Env't*, 747 F. Supp. 2d at 1256 ("The existence of a viable but unexamined alternative renders an alternatives analysis, and the EA which relies upon it, inadequate.").

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

[105] *Dubois v. U.S. Dept. of Agric*., 102 F.3d 1273, 1291 (1st Cir. 1996) (quoting *Seacoast Anti-Pollution League v. Nuclear Regulatory Comm'n,* 598 F.2d 1221, 1230 (1st Cir. 1979).

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

[107] *Town of Matthews v. U.S. Dep't. of Transp.*, 527 F. Supp. 1055 (W.D. N.C. 1981). *See also Citizens Against Toxic Sprays v. Bergland*, 428 F. Supp. 908, 933 (D. Or. 1977) ("An alternative may not be disregarded merely because it does not offer a complete solution to the problem.").

goals of the project, this may allow the decision maker to conclude that meeting part of the goal with less environmental impact may be worth the tradeoff with a preferred alternative that has greater environmental impact."[108]

Further, courts reviewing EAs have consistently found them lacking where there existed feasible mid-range or reduced-impact alternatives failing between the extremes of granting in full or denying in full the proposed action, but the agency opted not to analyze them in detail.[109]

The courts also require that an agency adequately and explicitly explain in the EA any decision to eliminate an alternative from further study.[110]

A Proposed Alternative for Analysis

Because of the impacts of domestic livestock grazing on riparian, aquatic, wetland, and watershed ecosystems, and because the continuance of domestic livestock grazing exacerbates ongoing stressors such as drought, climate change, recreation pressure, and invasive species, we propose a reasonable alternative for comparison. Our alternative is simple:

We request that a stand-alone alternative is analyzed that includes the currently proposed restoration interventions, plus 1) the closure of all riparian, aquatic, and wetland ecosystems to all domestic livestock grazing, and 2) a reduction in upland livestock stocking levels to reduce erosion and pollution of riparian systems where that is identified as a problem.

Some modification of the proposed action would be required, such as where water lanes are provided, these would need to be removed and additional upland waters would be required, at the ranchers expense. Several examples like this exist that would need to be modified to accommodate full exclosure as proposed in this reasonable alternative.

Our Alternative would meet the project purpose and need. The project scoping document lists riparian, wetland and associated upland and aquatic restoration management objectives associated with the purpose and need, which include the following (justification for our Alternative provided in italics):

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

[109] *See, e.g.*, *W. Watersheds Project v. Abbey*, 719 F.3d at 1050 (finding EA arbitrary and capricious where it failed to consider "reduced-grazing" alternatives); *Pac. Coast Fed'n of Fishermen's Ass'ns v. Dep't of Interior*, 655 F. App'x 595, 599 (9th Cir. 2016) (holding that agency's "decision [in EA] not to give full and meaningful consideration to the alternative of a reduction in maximum interim contract water quantities was an abuse of discretion, and the agency did not adequately explain why it eliminated this alternative from detailed study"); *Wild Fish Conservancy v. Nat'l Park Serv.*, 8 F. Supp. 3d 1289, 1300 (W.D. Wash. 2014) (finding agency's EA deficient because the "conclusion that there is not a meaningful difference, or viable alternative, between 0% and 90% [of fish survival] [was] suspect"), aff'd, 687 F. App'x 554 (9th Cir. 2017); *Native Fish Soc'y v. Nat'l Marine Fisheries Serv.*, 992 F. Supp. 2d 1095, 1110, (D. Or. 2014) (holding that agency "erred in failing to consider a reasonable range of alternatives" in EA, and finding that "[g]iven the obvious difference between the release of approximately 1,000,000 smolts and zero smolts, it is not clear why it would not be meaningful to analyze a number somewhere in the middle").

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

• Manage the composition and productivity of key riparian vegetation to protect or enhance wildlife habitat and habitat for riparian-dependent species.

Domestic livestock consume vegetation that is needed for hiding cover, feeding, stream shade, and soil retention that is required by riparian-dependent species. Numerous studies have shown that exclosure of livestock from riparian areas leads to profound vegetative recovery.

• Improve or maintain non-stream associated riparian and wetlands areas (ground water-dependent ecosystems), such as seeps, slope wetlands, springs, fens, bogs and wallows together with their associated vegetative structure.

Cattle congregate in wetland areas when they are available. The trampling and disturbance caused by livestock grazing in these extremely sensitive wetlands can only be avoided by full and permanent exclosure.

• Improve the rate of recovery in, and ecological function of, riparian areas that are not in a condition to meet management objectives by eliminating or reducing the impacts of management activities that may slow riparian recovery.

Immediate elimination of livestock from all riparian areas will speed recovery tremendously. Numerous studies have shown that fencing cattle out of riparian systems leads to vegetative recovery, with attendant benefits to wildlife. Recovery of riparian systems will occur at a pace commensurate with the project need only if livestock are removed.

• Maintain or enhance water quality and/or wildlife and aquatic habitat through instream, riparian and wetland/upland improvements.

Domestic livestock are non-native species and the wildlife native to southwestern riparian and aquatic ecosystems did not evolve with the disturbance brought upon by cattle, horses, and sheep. Livestock are shown to negatively affect water quality and wildlife habitat immensely. There are no credible scientific studies showing that livestock improve water quality or wildlife habitat in southwestern ecosystems. The most effective improvement that can be made is the full and permanent exclosure of livestock from al riparian, aquatic, and wetland ecosystems in the NNMRAWR project area.

• Provide the necessary habitat to maintain or increase populations of riparian and aquatic dependent species, such as the Jemez Mountains Salamander, NM Meadow Jumping Mouse, SW Willow Flycatcher, Rio Grande Cutthroat Trout, Rio Grande Chub, Rio Grande Sucker, Boreal Toad, and Northern Leopard Frog.

As we have discussed at length in this letter, livestock grazing is an existential threat to the species, and more. The only reasonable way to create the habitat needed for the protection and recovery of these species at a pace commensurate with the project need is the full and immediate exclosure of all riparian areas from livestock.

• Provide for input of large, woody debris, where appropriate, into streams to provide habitat and increase the level of the water table and baseflows. Remove material that causes unacceptable channel and/or bank damage.

Livestock voraciously consume woody growth and suppress the succession from early-successional herbaceous habitats to complex mid and late-successional deciduous riparian forests and woodlands. One legacy effect of centuries of livestock grazing in the southwest has been a dramatic reduction in the extent and connectivity of these forests. Even "conservative utilization" standards are not sufficient to allow the establishment of uneven aged deciduous forests. The only way to provide for input of large, woody debris, where appropriate, into streams to provide habitat at a pace commensurate with the project need is to fully and permanently exclude livestock and allow for the development of

streamside forests which will provide a continuous supply of large woody debris, as well as provide the structural elements necessary to retain woody debris, create step-pool complexes, and retain water.

• Improve rangeland habitat and forage.

If exotic grazers are removed, forage will improve.

• Create and enhance sheet flow across meadows and hillsides.

This seems counter to the project objectives. Wouldn't you rather create and enhance water infiltration and retention? Sheet flow increases erosion and the creation of gullies and head cuts. We suggest you use management tools to minimize sheet flow and erosion, like elimination of livestock grazing.

The purpose of this project is to maintain or enhance watershed and range health by restoring riparian, wetland, and associated upland and aquatic habitats and promote species recovery and diversity and allowing for sustainable human uses, such as grazing, hunting and fishing, as required by the Land and Resource Management Plans for the Carson, Cibola and Santa Fe National Forests and the Kiowa National Grasslands. Our Alternative can accommodate these multiple uses. "Where multiple consumptive biological uses occur (e.g. national forests), concerns persist regarding the ability to maintain habitats in the condition, connectivity, and quantity necessary to sustain viable and resilient populations of resident [Species of Greatest Conservation Need]. Whether or not national forests can host a variety of land uses without heightened resource conflicts is a serious question."[111]

According to the Multiple Use Sustained Yield Act, not all forest resources are likely to be available and suitable for use in every management area. Federal code states that "[i]n the administration of the national forests due consideration shall be given to the relative values of the various resources in particular areas."[112] A number of limitations must be considered as the Forest Service attempts to balance the production of forest products and services for a given management area. The Multiple Use Sustained Yield Act clearly establishes that "some land will be used for less than all of the resources" and that the national forests are utilized in such a manner that does not impair the productivity of the land.[113] Our Alternative, which would eliminate livestock grazing in riparian, aquatic, and wetland ecosystems, would remove a trivial amount of area available to the livestock industry. Any subsequent NEPA analysis should calculate and report the percent of grazing land that would become unavailable to the massively powerful livestock industry under our Alternative. The small reduction in available acreage would enhance the productivity of the land, and provide a buffer for the effects of climate change. Nowhere in the scoping document or attachments does the Forest Service explicitly state that the project purpose does not include the modification of stocking levels, so the reduced forage available to non-native livestock would likely result in a decrease in authorized stocking in uplands where grazing would be allowed to continue.

[111] 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 at 66.

[112] 16 U.S.C. § 529.

[113] 16 U.S.C. § 531.

The scoping document indicates that this project will be consistent with requirements of the 2012 planning rule. The Forest Service is obligated to make progress towards ecological sustainability, which consists of 1) the maintenance and restoration of ecological integrity, 2) the maintenance and restoration of air, soil, and water, and 3) the maintenance and restoration of riparian areas. The 2012 planning rule defines ecological integrity as "the quality or condition of an ecosystem when its dominant ecological characteristics…occur within the natural range of variation and can withstand and recover from most perturbations imposed by natural environmental dynamics or human influence."[114] In providing technical recommendations to Forest Service planning under the 2012 planning rule, Hayward et al (2016)[115] make clear that natural range of variation is synonymous with historical ecology and conditions. Therefore, ecological integrity is understood in the context of *historic* ecological conditions, and the impetus of planning is to maintain or restore systems so that they fall within the historic range of variation ("natural range of variation") for that system." [116]

Undoubtedly, domestic livestock are not native to northern New Mexico, and were not a disturbance regime that natural or historic ecosystems evolved with over millennia. Managing for natural range of variation is inherently incompatible with domestic livestock grazing. Further, in interpreting the Multiple Use Sustained Yield Act, consideration must be given to "[r]easonably foreseeable risks to ecological, social, and economic sustainability."[117] Livestock grazing is a reasonable foreseeable risk to the sustainability of riparian areas and other sensitive ecosystems and the wildlife that reside there.

Domestic livestock threaten the viability of riparian, wetland, and aquatic ecosystems as climate change increases the stresses on already degraded systems. Thank you for considering our comments, and we look forward to a productive dialogue about how to restore these vital ecosystems.

Sincerely,

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[114] 36 CFR §§ 219.8 and 219.9.

[115] Hayward, G.D., C.H. Flather, M.M. Rowland, R. Terney, K. Mellen-McLean, K.D. Malcolm, C. McCarthy, and D.A. Boyce. 2016. Applying the 2012 Planning Rule to conserve species: a practitioner's reference. Unpublished paper, USDA Forest Service, Washington, D.C., USA.

[116] Steinhoff, G. 2018. Biodiversity Conservation in the National Forests, and the 2012 Planning Rule. *Washington Journal of Environmental Law & Policy* 8(1).

[117] 219.10(a)(7).