90-DAY FINDING PETITION REVIEW FORM
LISTING AS A THREATENED OR AN ENDANGERED SPECIES

Federal Docket No. FWS-R6-ES-2022-0177

90-DAY FINDING ON A PETITION TO LIST THE PINYON JAY (*Gymnorhinus cyanocephalus*) AS A THREATENED OR ENDANGERED SPECIES UNDER THE ENDANGERED SPECIES ACT

Petitioned action being requested:

☒ List as an endangered or a threatened species
☐ Reclassify (uplist) from a threatened species to an endangered species
☐ Other

Petitioned entity:

☒ Species
☐ Subspecies
☐ DPS of vertebrates

Background

Section 4(b)(3)(A) of the Endangered Species Act (Act) requires that we make a finding on whether a petition to list, delist, uplist (reclassify the species from a threatened species to an endangered species), or downlist (reclassify the species from an endangered species to a threatened species) a species presents substantial scientific or commercial information indicating that the petitioned action may be warranted. Our regulations provide that, for a petition to meet the "substantial scientific or commercial information" standard, we must determine in the 90-day petition finding that the petition includes "credible scientific or commercial information in support of the petition's claims such that a reasonable person conducting an impartial scientific review would conclude that the action proposed in the petition may be warranted" (50 CFR § 424.14(h)(1)(i)).

The Act and our regulations are clear that the responsibility is squarely on the petitioner to present the requisite level of information to meet the substantial information test to demonstrate that the petitioned action may be warranted. This means that the petitioner must not only present credible information that threats may be present; they also need to present credible information concerning a species' documented or likely response to that threat, and that the species' response is to such a level that listing or uplisting may be warranted. Where the petitioner has failed to do so, we should make a not-substantial finding on the petition -- we should not augment their petition with our own knowledge or other information we are aware of. If we are aware of species that may be in danger of extinction, we should undertake a status review on our own accord, regardless of the receipt of a petition.

Our regulations further state that we will consider whether a petition presents a complete and balanced representation of the relevant facts when making our finding of whether a petition presents substantial information that the requested action may be warranted. Thus, if we find that a petition cherry-picked information, ignored relevant and readily available information, and presented a biased and incomplete representation of facts, we should consider whether the petition has met the requirement to present substantial information (see instructions below for more information).

We note that designating critical habitat is not a petitionable action under the Act. Petitions to designate critical habitat (for species without existing critical habitat) are reviewed under the Administrative Procedure Act and are not addressed here. See 50 C.F.R. § 424.14(j). To the maximum extent prudent and determinable, any proposed critical habitat will be addressed concurrently with a proposed rule to list a species, if applicable.

Petition History

On April 25, 2022, we received a petition from Defenders of Wildlife requesting that pinyon jay (*Gymnorhinus cyanocephalus*) be listed as a threatened species or an endangered species and critical habitat be designated for this species under the Act. The petition clearly identified itself as such and included the requisite identification information for the petitioner, required at 50 CFR 424.14(c). This finding addresses the petition.

Evaluation of a Petition to List the Pinyon Jay as an Endangered or a Threatened Species Under the Act

Species and Range

Does the petition present substantial information that the petitioned entity may be a listable entity (i.e., a species, subspecies, or distinct population segment)?

☒Yes
☐No

Pinyon Jay (*Gymnorhinus cyanocephalus*)
Historical range: Oregon; California; Nevada; Idaho; Utah; Arizona; Montana; Wyoming; South Dakota; Nebraska; Colorado; Oklahoma; New Mexico; and Baja California, Mexico
Current range: Oregon; California; Nevada; Idaho; Utah; Arizona; Montana; Wyoming; South Dakota; Nebraska; Colorado; Oklahoma; New Mexico; and Baja California, Mexico

The pinyon jay is a recognized species by the Integrated Taxonomic Information System and the American Ornithological Society's North American Classification and Nomenclature Committee.

Statutory and Regulatory Standards for Evaluation of the Petition

Section 4 of the Act (16 U.S.C. 1533) and its implementing regulations (50 CFR part 424) set forth the procedures for determining whether a species is an "endangered species" or a "threatened species." The Act defines an endangered species as a species that is "in danger of extinction

throughout all or a significant portion of its range," and a "threatened species" as a species that is "likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." The Act requires that we determine whether any species is an "endangered species" or a "threatened species" because of any of the following factors:

(A) The present or threatened destruction, modification, or curtailment of its habitat or range;
(B) Overutilization for commercial, recreational, scientific, or educational purposes;
(C) Disease or predation;
(D) The inadequacy of existing regulatory mechanisms; or
(E) Other natural or manmade factors affecting its continued existence.

These factors represent broad categories of natural or human-caused actions or conditions that could have an effect on a species' continued existence. In evaluating these actions and conditions, we look for those factors that may have a negative effect on individuals of the species, as well as other actions or conditions that may ameliorate any negative effects or may have positive effects.

In accordance with 50 CFR 424.14(d), the Service's determination as to whether the petition provides substantial scientific or commercial information indicating that the petitioned action may be warranted will depend in part on the degree to which the petition includes the following types of information:

(1) Information on current population status and trends and estimates of current population sizes and distributions, both in captivity and the wild, if available;

(2) Identification of the factors under section 4(a)(1) of the Act that may affect the species and where these factors are acting upon the species;

(3) Whether and to what extent any or all of the factors alone or in combination identified in section 4(a)(1) of the Act may cause the species to be an endangered species or threatened species (i.e., the species is currently in danger of extinction or is likely to become so within the foreseeable future), and, if so, how high in magnitude and how imminent the threats to the species and its habitat are;

(4) Information on adequacy of regulatory protections and effectiveness of conservation activities by States as well as other parties, that have been initiated or that are ongoing, that may protect the species or its habitat; and

(5) A complete, balanced representation of the relevant facts, including information that may contradict claims in the petition.

Evaluation of Information in the Petition

When evaluating a petition, we assess the information in the petition and may use any readily available information (e.g., in our files or published literature that we are aware of) to determine the credibility of the information presented in the petition. Our implementing regulations at 50 CFR 424.14(h)(1)(i) state that conclusions drawn in the petition without the support of credible scientific or commercial information will not be considered "substantial information." "Credible scientific or commercial information" may include all types of data, such as peer-reviewed literature, gray literature, traditional ecological knowledge, etc. Thus, we first must determine

whether the information provided in the petition is credible. In other words, the Service must evaluate whether the information in the petition is substantiated and not mere speculation or opinion. Any claims that are not supported by credible scientific or commercial information do not constitute substantial information and will not be further evaluated. Next, we determine whether the conclusions drawn in the petition are reasonable (i.e., actually supported by that credible information).

After identifying the claims in the petition that are supported by credible information, we consider those claims in the context of the factors in section 4(a)(1) of the Act. When evaluating information presented in the petition, we consider factor D in light of the other factors, not independently. In other words, we consider whether the petition presents substantial information indicating that existing regulatory mechanisms may be inadequate to address the magnitude or imminence of threats identified in the petition related to the other four factors; therefore, we consider existing regulatory mechanisms in conjunction with each relevant claim presented in the petition.

To complete our analysis for a 90-day petition finding to list or uplist, we first identify the claims in the petition that are supported by credible information indicating that a potential threat is occurring or is likely to occur within the species' range. After identifying the claims that are supported by credible information that a threat is occurring or likely to occur, we next determine whether the petition has presented credible information that those threats affect the species at a population or species level, after taking into account any mitigating actions or conditions that may ameliorate those threats, such that the petitioned action may be warranted. If we find that the petition does not present substantial information that the petitioned action may be warranted based on the information provided regarding the status and trends of the species or on one or more factors, we consider the cumulative impact of all of the threats that are supported by credible information. Based on these steps, we draw our conclusion and petition finding based on the standard for 90-day findings, which is whether the petition presents "credible scientific or commercial information in support of the petition's claims such that a reasonable person conducting an impartial scientific review would conclude that the action proposed in the petition may be warranted." Our evaluation assesses the extent to which the credible information in the petition indicates that a reasonable person would conclude that the petitioned action may be warranted.

Claims Addressing Threats

We first assess whether the claims in the petition are supported by credible information (i.e., whether the petition has presented credible information that the threat is occurring or is likely to occur and that the species may be exposed to the threat) (Table 1). If the supporting information indicates that the threat is occurring or is likely to occur in the future and that the species may be exposed to it, we then assess whether the petition presented credible information that reasonably indicates the presence of negative effects on the species as a whole.

If there is no credible information indicating population-level effects, our analysis of that individual threat presented in the petition is complete, as there would be no species-level effects; we may then analyze that threat later if we need to evaluate cumulative effects. If the credible information about the particular threat indicates species-level effects, our analysis of that individual threat presented in the petition is complete. If the credible information about the

particular threat does not indicate species-level effects but does indicate population-level effects, we assess the extent to which the credible information in the petition indicates that the scale of the effects of that threat are such that a reasonable person would conclude that listing or uplisting may be warranted.

If we find that there is credible information indicating that threats are having or are likely to have a negative effect on the species as a whole, such that a reasonable person would conclude that listing or uplisting may be warranted, we can stop and make a positive "substantial information" finding. We would then evaluate all of the threats in detail based on the best scientific and commercial data available when we conduct the status assessment and make the 12-month finding. A positive 90-day petition finding does not indicate that the petitioned action is warranted. Such a finding indicates only that the petition presents substantial information that the petitioned action may be warranted and that a full review should occur.

TABLE 1: Evaluation of claims in the petition. Assessment of the credibility of scientific and commercial information in the petition and the extent to which claims supported by credible scientific or commercial information in the petition corroborates the presence of negative effects to populations, or the species.

Threat or Activity	**Exposure. Is the claim of the threat in the petition supported by credible scientific and commercial information? Does the petition support the claim that there is a potential threat and it is occurring or is likely to occur within the range of the species? If no, explain. If yes, include brief summary statement and citations to the credible information.**	**Response (Populations/Species). Do the claims and the supporting information indicate negative effects such that listing or uplisting may be warranted? Yes or no. Explain and describe below.**
Woodland Management – including Historical Woodland Dynamics and Disturbance Regimes, Management for Other Wildlife species, and Agricultural Practices/Grazing (Factor A)	Yes. The petition presents credible evidence that reducing the extent and density of piñon-juniper woodlands, often with complete tree removal, is taking place across the majority of the range of the pinyon jay (Bombaci et al. 2017, 63; Defenders of Wildlife 2022, 66-78) (1) to improve wildlife habitat (e.g. Greater Sage-Grouse, mule deer) (Bender et al. 2013, 55-56; Bergman et al. 2014, 449; Bombaci and Pejchar 2016, 40; Kramer at al. 2015, 30 and 33; Boone et al. 2018, 191) and livestock forage (Aro 1971, entire), (2) to reduce fuels and support fire mitigation plans (Schoennagel and Nelson 2011, 273-275), (3) to improve watershed function and reduce soil erosion (Jacobs 2015, 1427), and (4) increase plant community heterogeneity (Miller et al. 2014, 479).	Yes. The petition provides the limited available information indicating that certain habitat treatments in piñon-juniper woodlands are potentially having negative effects on pinyon jay occupancy and nesting colony sites and that they are occurring at a species level such that a listing may be warranted (Johnson et al. 2018, 5-6; Magee et al. 2019,7 and 10). The petition presents credible evidence that regulatory mechanisms to manage pinyon jays across their range may be inadequate to ameliorate the impacts of woodland management (Factor D). The petition claims that the National Environmental Policy Act reviews are inadequate to protect the species because habitat treatments, many of which are quite extensive, may be approved under Categorical Exclusions (Smith 2021, 5-7). The petition provides supporting evidence that the Migratory Bird Treaty Act does not provide for protection of pinyon jay habitat and that inclusion in the U.S. Fish and Wildlife Service's Birds of Conservation Concern 2021 list, Bureau of Land Management state-level sensitive species lists, the International Union for Conservation of Nature Red List of Threatened Species, and state Species of Greatest Conservation Need lists do not provide legal protection to pinyon jays or their habitat (Defenders of Wildlife 2022, 42-43).

Wildfire (Factor A)	Yes. The petition presents credible evidence that the annual area burned, number of fires per year, fire season length, and fire size have increased in piñon-juniper woodland habitat (Board et al. 2018, 40-45) throughout the range of the pinyon jay.	Yes. The petition provides supporting information to indicate that the change in fire frequency and intensity may result in the replacement of the piñon-juniper woodlands used by pinyon jays with non-native grassland vegetation and that this threat is occurring at a species level such that a listing may be warranted (Floyd et al. 2021, entire). Increased wildfire return intervals in areas where piñon-juniper woodlands were lost and replaced with non-native vegetation may further prevent recovery of a piñon-juniper woodland ecosystem and thus may result in permanent loss of habitat for pinyon jays (Floyd et al. 2021, entire). The petition provides supporting information that increased wildfire frequency can further contribute to the expansion of non-native vegetation that perpetuates the cycle of increased loss of piñon-juniper woodland cover (D'Antonio and Vitousek 1992, 73-75), which continues to reduce available habitat for pinyon jays.
Invasive Species (Factor A)	Yes. The petition presents credible evidence that invasive species including cheatgrass and other non-native bromes are establishing after woodland disturbance from wildfire and grazing (Shinneman and Baker 2009, 191) and fuels reduction (Havrilla et al. 2017, 617) throughout the range of piñon-juniper woodlands that provide habitat for pinyon jay (Floyd 2021, 20).	Yes. The petition provides supporting information to indicate increased invasive annual grasses can increase wildfire frequency and loss of piñon-juniper woodlands that provide habitat for pinyon jays and that this threat is occurring at a species level such that a listing may be warranted (D'Antonio and Vitousek 1992, 74-75).
Development (Factor A)	Yes. The petition presents credible evidence that various types of development may negatively affect pinyon jays. Examples cited in the petition include effects to pinyon jay communication and stress-levels from oil and gas development (Johnson et al. 2013, 30; Kleist et al. 2018, entire). Additional examples include urban development expansion and collisions with wind turbines, solar panels, windows, and additional various human	No. Although various types of development may cause negative effects to pinyon jay populations, including direct mortality of individuals, the petition does not present quantifiable evidence that development effects specific to pinyon jays are occurring at an extent such that a species listing may be warranted. The petition points to historical loss of piñon woodlands associated with mining and farming, but the petition demonstrates no quantifiable effect to pinyon jay populations as a result, and further mentions recovery of habitat due to changing landscape

	infrastructure placed in pinyon jay habitat (Walston et al. 2016, entire).	policies such that current effects are not as evidenced. Further, the evidence for negative effects due to oil and gas development and urban development provided are circumstantial and are not substantially quantified to support causation of effects at a population or species scale. Lastly, the description of renewable energy development and various infrastructure effects offer numbers associated with avian mortalities, in general, but the mortality information lack specificity to pinyon jays.
Disease (Factor C)	Yes. The petition presents credible evidence that pinyon jays are affected by West Nile Virus and external parasites (Centers for Disease Control and Prevention 2016, 1) throughout the range of the pinyon jay.	No. The petition does not present evidence that adverse effects from disease would occur at a species level such that listing may be warranted. The petition lacks specific details on the rates of disease transmission among pinyon jays and doesn't demonstrate effects are occurring at a population or species level.
Predation (Factor C)	Yes. The petition presents credible evidence that pinyon jays are affected by predation (Marzluff 1985, 559) throughout the range of the pinyon jay.	No. The petition does not present evidence that adverse effects from predation would occur at a species level such that listing may be warranted. Rates of predation by the avian predators listed in the petition are not adequately quantified to demonstrate measurable effects to pinyon jays across their distribution.
Climate Change (Factor E)	Yes. The petition presents credible evidence that climate change is occurring throughout the range of the pinyon jay and potentially affecting the piñon-juniper woodlands that provide habitat for the species (IPCC 2018, entire).	Yes. The petition provides credible evidence and supporting information on the current and future effects of climate change on piñon-juniper woodlands throughout the pinyon jay range. Negative effects of climate change include increased rates of tree mortality (especially piñon) (Mueller et al. 2005, 1087-1089; Shaw et al. 2005, 281-283; Clifford et al. 2011, 953, 956; Redmond et al. 2015, 5-9), reduced piñon mast production (Redmond et al. 2012, 7-11; Wion et al. 2019, 6-10), reduced piñon tree vigor (Johnson et al. 2017, 7-8), and reduced tree recruitment (Floyd et al. 2015, 24-26; Redmond et al. 2015, 5-9), which can have negative effects on pinyon jay survival and availability of suitable habitat (Ligon 1978, 122-125; Marzluff

		and Balda 1992, 209-210, 262-263; Johnson and Smith 2008, 15-17; Johnson et al. 2017, 8; Johnson et al. 2021, 7-8; Novak et al. 2021, 5-6). Accumulated effects of climate change, specifically drought and tree mortality, can lead to increased wildfire risk, resulting in loss of piñon-juniper woodlands per interaction of Wildfire and Invasives Threats under Factor A and this threat is occurring at a species level such that a listing may be warranted.
Additional Manmade Factors (Factor E)	Yes. The petition presents credible evidence that piñon seed harvesting occurs throughout the range of the pinyon jay (Somershoe et al. 2020, 27).	No. The petition does not present evidence that negative effects from piñon seed harvest would occur at a species level such that listing may be warranted. The petition does not quantify or demonstrate measurable effects of pinon seed harvesting on pinyon jay populations.

Cumulative Effects of Claims Supported by Credible Information

Because we have found that the petition presented substantial information that one or more threats are having an effect on the species to the point that the species' status may have changed, the petition presents substantial information indicating that the species may warrant listing. We do not need to assess cumulative effects at the 90-day finding stage because we will address cumulative effects of all threats in the 12-month finding.

Evaluation of Information Summary

The petitioner provided credible information indicating potential threats to pinyon jay such that listing may be warranted due to woodland management (Factor A), wildfire (Factor A), invasive species (Factor A), and due to climate change (Factor E). The petitioner also provided credible information that the existing regulatory mechanisms may be inadequate to address those potential threats (Factor D). Therefore, the petition presents substantial information indicating that the petitioned entity may warrant listing. We will evaluate these and all other potential threats in detail based on the best scientific and commercial data available when we conduct the status assessment and make the 12-month finding.

Petition Finding

We reviewed the petition, sources cited in the petition, and other readily available information. We considered the credible information that the petition provided regarding effects of the threats that fall within factors under section 4(a)(1) as potentially ameliorated or exacerbated by any existing regulatory mechanisms or conservation efforts. Based on our review of the petition and readily available information regarding woodland management (Factor A), wildfire (Factor A), invasive species (Factor A), inadequacy of existing regulatory mechanisms (Factor D), and climate change (Factor E), we find that the petition presents substantial scientific or commercial information indicating that listing the pinyon jay (*Gymnorhinus cyanocephalus*) as a threatened species or an endangered species may be warranted. The petitioners also presented information suggesting development, disease, predation, and additional manmade factors may be threats to the pinyon jay. We will fully evaluate these potential threats during our 12-month status review, pursuant to the Act's requirement to review the best scientific and commercial information available when making that finding.

Author

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References

Aro, R. S. 1971. Evaluation of pinyon-juniper conversion to grassland. Journal of Range Management 24:188–197.

Bender, L. C., J. C. Boren, H. Halbritter, and S. Cox. 2013. Effects of site characteristics, piñon juniper management, and precipitation on habitat quality for mule deer in New Mexico. Human-Wildlife Interactions 7:47–59.

Bergman, E. J., C. J. Bishop, D. J. Freddy, G. C. White, and P. F. Doherty. 2014. Habitat management influences overwinter survival of mule deer fawns in Colorado. Journal of Wildlife Management 78:462–445.

Board, D. I., J. C. Chambers, R. F. Miller, and P. J. Weisberg. 2018. Fire patterns in piñon and juniper land cover types in the semiarid western United States from 1984 through 2013. RMRS GTR-372. Fort Collins, CO: U.S. Department of Agriculture Forest Service, Rocky Mountain Research Station.

Bombaci, S., and L. Pejchar. 2016. Consequences of pinyon and juniper woodland reduction for wildlife in North America. Forest Ecology and Management 365:34–50.

Bombaci, S., T. Gallo, and L. Pejchar. 2017. Small-scale woodland reduction practices have neutral or negative short-term effects on birds and small mammals. Rangeland Ecology and Management 70: 363–373.

Boone, J. D., E. Ammon, and K. Johnson. 2018. Long-term declines in the Pinyon Jay and management implications for piñon-juniper woodlands. In Trends and Traditions: Avifaunal Change in Western North America (W. D. Shuford, R. E. Gill Jr., and C. M. Handel, Editors), Studies of Western Birds 3. pp. 190–197. Camarillo, CA, USA: Western Field Ornithologists. https://doi.org/10.21199/SWB3.10

Centers for Disease Control and Prevention. 2016. Species of dead birds in which West Nile virus has been detected, United States, 1999-2016. https://www.cdc.gov/westnile/resources/pdfs/BirdSpecies1999-2016.pdf

Clifford, M. J., N. S. Cobb, and M. Buenemann. 2011. Long-term tree cover dynamics in a pinyon juniper woodland: Climate-change-type drought resets successional clock. Ecosystems 14:949–962.

D'Antonio, C. M., and P. M. Vitousek. 1992. Biological invasions by exotic grasses, the grass/fire cycle, and global change. Annual Review of Ecology and Systematics 23:63–87.

Defenders of Wildlife. 2022. Petition to List the Pinyon Jay (Gymnorhinus cyanocephalus) as Endangered or Threatened Under the Endangered Species Act.

Floyd, M. L. 2021. Status and trends of piñon-juniper vegetation in the western United States. Report to Defenders of Wildlife. Prescott, Arizona: Natural History Institute.

Floyd, M. L., W. H. Romme, M. E. Rocca, D. P. Hanna, and D. D. Hanna. 2015. Structural and regenerative changes in old-growth piñon-juniper woodlands following drought-induced mortality. Forest Ecology and Management 341:18-29.

Floyd, M. L., W. H. Romme, and D. D. Hanna. 2021. Effects of recent wildfires in piñon-juniper woodlands of Mesa Verde National Park, Colorado, USA. Natural Areas Journal 41:28-38.

International Panel on Climate Change (IPCC). 2018. Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty [V. Masson-Delmotte, P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, & T. Waterfield (eds.)]. In Press. https://www.ipcc.ch/sr15/

Jacobs, B. F. 2015. Restoration of degraded transitional (piñon–juniper) woodland sites improves ecohydrologic condition and primes understory resilience to subsequent disturbance. Ecohydrology 8:1417–1428, https://doi.org/10.1002/eco.1591

Johnson, K., and J. Smith. 2008. Pinyon Jays and pinyon pines at North Oscura Peak, White Sands Missile Range, New Mexico, 2007 annual report. Natural Heritage New Mexico Technical Report No. 08-GTR-328. Biology Department, University of New Mexico, Albuquerque, New Mexico.

Johnson, K., J. Smith, N. Petersen, L. Wickersham, and J. Wickersham. 2013. Habitat use by pinyon juniper birds in Farmington BLM resource area. Natural Heritage New Mexico Technical Report No. 03-GTR-380. Biology Department, University of New Mexico, Albuquerque, New Mexico.

Johnson, K., G. Sadoti, and J. Smith. 2017. Weather-induced declines in piñon tree condition and response of a declining bird species. Journal of Arid Environments 146:1-9.

Johnson, K., N. Petersen, J. Smith, and G. Sadoti. 2018. Piñon-juniper fuels reduction treatment impacts pinyon jay nesting habitat. Global Ecology and Conservation. https://doi.org/10.1016/j.gecco.2018.e00487

Johnson, K., N. Petersen, and J. Smith. 2021. Pinyon Jay surveys at White Sands Missile Range 2021 final report. Natural Heritage New Mexico Report #21-419. Biology Department, University of New Mexico, Albuquerque, NM.

Kleist, N. J., R. P. Guralnick, A. Cruz, C. A. Lowry, and C. D. Francis. 2018. Chronic anthropogenic noise disrupts glucocorticoid signaling and has multiple effects on fitness in an avian community. Proceedings of the National Academy of Science 115:E648–E657.

Kramer, D. W., G. E. Sorensen, C. A. Taylor, R. D. Cox, P. S. Gipson, and J. W. Cain, III. 2015. Ungulate exclusion, conifer thinning, and mule deer forage in northeastern New Mexico. Journal of Arid Environments 113:29–34. https://doi.org/10.1016/j.jaridenv.2014.09.008

Ligon, J. D. 1978. Reproductive interdependence of Piñon Jays and piñon pines. Ecological Monographs 48:111–126.

Magee, P. A., J. D. Coop, and J. S. Ivan. 2019. Thinning alters avian occupancy in piñon-juniper woodlands. The Condor Ornithological applications 121:1-17.

Marzluff, J. M. 1985. Behavior at a Pinyon jay nest in response to predation. Condor 87:559-561.

Marzluff, J. M., and R. P. Balda. 1992. The pinyon jay: behavioral ecology of a colonial and cooperative corvid. London: T & AD Poyser.

Miller, R. F., J. Ratchford, B. A. Roundy, R. J. Tausch, A. Hulet, and J. Chambers. 2014. Response of conifer-encroached shrublands in the Great Basin to prescribed fire and mechanical treatments. Rangeland Ecology & Management 67:468–481.

Mueller, R. C., C. M. Scudder, M. E. Porter, R. T. Trotter III, C. A. Gehring, and T. G. Whitham. 2005. Differential tree mortality in response to severe drought: evidence for long-term vegetation shifts. Journal of Ecology 93:1085–1093.

Novak, M. C., S. T. McMurray, and L. M. Smith. 2021. Pinyon jay (Gymnorhinus cyanocephalus) nest site selection in central New Mexico. Journal of Arid Environments 92:104549. https://doi.org/10.1016/j.jaridenv.2021.104549.

Redmond, M. D., F. Forcella, and N. N. Barger. 2012. Declines in pinyon pine cone production associated with regional warming. Ecosphere 3:120.

Redmond, M. D., N. S. Cobb, M. J. Clifford, and N. N. Barger. 2015. Woodland recovery following drought-induced tree mortality across and environmental gradient. Global Change Biology 21:3685-3695. https://doi.org/10.1111/gcb.12976

Schoennagel, T., and C. R. Nelson. 2011. Restoration relevance of recent National Fire Plan treatments in forests of the western United States. Frontiers in Ecology and the Environment 9:271–277.

Shaw, J. D., B. E. Steed, and L. T. Deblander. 2005. Forest inventory and analysis (FIA) annual inventory answers the question: what is happening to pinyon juniper woodlands? Journal of Forestry 103:280–285.

Shinneman, D. J. and W. L. Baker. 2009. Environmental and climatic variables as potential drivers of post-fire cover of cheatgrass (Bromus tectorum) in seeded and unseeded semiarid ecosystems. International Journal of Wildland Fire 18:191-202. https://doi.org/10.1071/WF07043.

Smith, R. 2021. Projects on federal land involving approved or proposed treatment of piñon-juniper ecosystems in the American Southwest. Report provided to Defenders of Wildlife.

Somershoe, S. G., E. Ammon, J. D. Boone, K. Johnson, M. Darr, C. Witt, and E. Duvuvuei. 2020. Conservation Strategy for the Pinyon Jay (Gymnorhinus cyanocephalus). Partners in Flight Western Working Group and U.S. Fish and Wildlife Service.

Wion, A. P., P. J. Weisberg, I. S. Pearse, and M. D. Redmond. 2019. Aridity drives spatiotemporal patterns of masting across the latitudinal range of a dryland conifer. Ecography 42:1–12 https://doi.org/10.1111/ecog.04856.