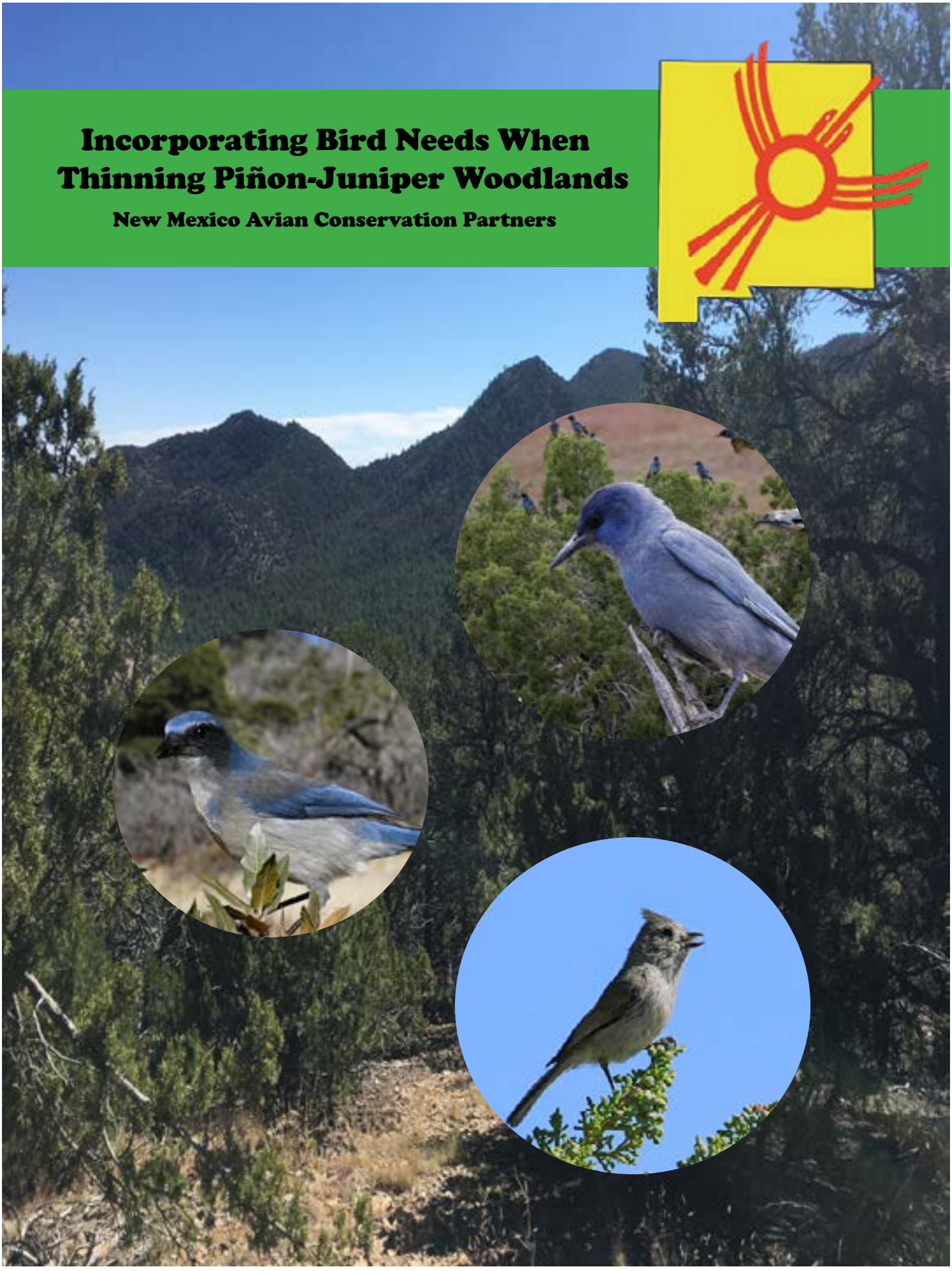
Incorporating Bird Needs When Thinning Piñon-Juniper Woodlands

New Mexico Avian Conservation Partners



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Document Updates

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Black-chinned Sparrow: Andy Reago & Chrissy McClarren*; Black-throated Gray Warbler: VJ Anderson*; Cheatgrass: Teton County Weed and Pest District; Gray Vireo: Mark Watson; Juniper Titmouse: Mark Watson; piñon-juniper woodland types: Natural Heritage New Mexico; piñon-juniper wildfire: New Mexico State University; piñon pine die-off: National Park Service; Pinyon Jay: Richard Crossley*; Virginia's Warbler: Mark Watson; Woodhouse's Scrub-Jay: Richard Crossley*; all other photos: Margaret (Peggy) Darr

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Five Reasons to Care About Birds in Piñon-Juniper (P-J) Woodlands

1. In New Mexico, more bird species of high conservation concern are dependent upon P-J woodlands than any other habitat type (New Mexico Avian Conservation Partners 2016).

2. P-J woodlands support a high diversity of bird species, high numbers of bird individuals, and a high number of obligate or semi-obligate bird species, such as the Pinyon Jay (Paulin et al. 1999).

3. The Pinyon Jay is one of the fastest declining bird species in New Mexico and the U.S.; its population has declined by more than 84% since the 1960s, and its remaining population is expected to decline by an additional 50% by 2035 (Rosenberg et al. 2016, Sauer et al. 2017).

4. New Mexico has more of the Pinyon Jay range-wide population than any other state (Partners in Flight 2022).

5. The best available science suggests some P-J habitat management approaches are detrimental for P-J dependent birds (Crow and Van Riper 2010, Bombaci and Pejchar 2016, Gallo and Pejchar 2016, Bombaci et al. 2017, Holmes et al. 2017, Fair et al. 2018, Johnson et al. 2018, Magee et al. 2019).

A Step-By-Step Guide to Incorporating Bird Needs Into P-J Management

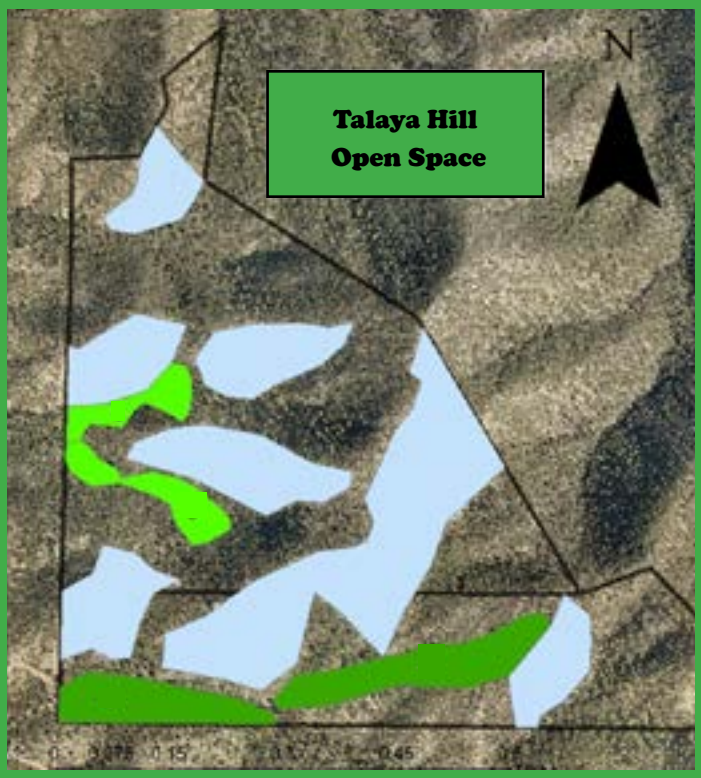
Step 1

Has Nature Done the Thinning For You?

- Map existing canopy openings (resulting from drought, beetle kill, or other factors), and determine if these areas of natural mortality may address your management objectives.
- Nature could have done the thinning for you, and no additional thinning will be necessary.

Case Study: Santa Fe County's Talaya Hill Open Space

- This open space is important for P-J birds AND for protection of the Santa Fe municipal watershed.
- Fire and biology staff worked together to balance wildlife and fuels reduction needs.
- Blue areas represent persistent P-J woodlands that endured significant past mortality, and thus were thinned by nature.
- Green areas represent ponderosa pine forest stands that were thinned, or will be thinned.
- Everything else is healthy persistent P-J woodland or ponderosa on slopes too steep to thin.
- Based upon this mapping exercise, it was determined thinning in the healthy persistent P-J woodlands could be avoided, while still meeting fuels reduction needs.



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Step 2

Know your P-J Woodland Types

Persistent P-J Woodland*

- Low to high tree cover
- Canopy of piñon, juniper, or both
- Rocky and coarse-textured soils
- Minimal plant ground cover
- Can have a significant oak component
- Fire regime: high severity, low frequency
- Found throughout NM

P-J Savanna*

- Low to moderate tree cover
- Canopy of piñon, juniper, or both
- Significant plant ground cover
- Deeper, coarse to fine-textured soils
- Fire regime: unknown, but suspected to be low severity, high frequency
- Found throughout NM

Wooded Shrubland*

- Low to high tree cover
- Canopy of piñon, juniper, or both
- Shrubs dominate understory
- Fire regime: high severity, low frequency
- Found primarily in northwestern NM

*Romme et al. 2009

Based upon fire regimes, thinning in P-J savanna is likely more ecologically appropriate than thinning in persistent P-J woodland or wooded shrubland. However, in all P-J woodland types, some treatment approaches are detrimental to woodland birds (Crow and Van Riper 2010, Bombaci and Pejchar 2016, Gallo and Pejchar 2016, Bombaci et al. 2017, Holmes et al. 2017, Fair et al. 2018, Johnson et al. 2018, Magee et al. 2019).

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Step 3

Address Bird Species of Conservation Concern

- **Conduct breeding bird surveys in the proposed treatment area.**
- **If the following priority bird species use the site, reconsider the necessity of treatment.**

Pinyon Jay

Juniper Titmouse

Woodhouse's Scrub-Jay

Gray Vireo

Black-throated Gray Warbler

Virginia's Warbler

Black-chinned Sparrow

- **Bendire's Thrasher is a species of high conservation concern that uses P-J savanna habitat in western New Mexico. Separate habitat management recommendations for this species are in development. Sign up for the NM Avian Conservation Partners listserv to receive these recommendations. Directions regarding how to sign up may be found at: http://avianconservationpartners-nm.org**
- **If a nesting Pinyon Jay flock uses the proposed treatment site, reconsider the necessity of treatment.**
- **An instructional video regarding Pinyon Jay survey methods may be found at: https://www.youtube.com/watch?v=4dc6W-SLiG0**

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Step 4

Address Invasive Species

- **Avoid treatment if cheatgrass, or other invasive plants, are in the treatment area (Somershoe et al. 2020).**
- **Research suggests cheatgrass may increase after thinning (Coop and Magee 2016), potentially increasing fire risk and fire intensity.**
- **Chambers et al. (2014) recommend a minimum of 20% perennial native herbaceous cover pre treatment to prevent a large increase in cheatgrass and other annual invasive plants post treatment.**
- **If you cannot avoid treatment, include aggressive invasive species control before and after thinning.**

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Step 5

Address Climate Change

Due to climate change effects, managing P-J woodlands with a goal of replicating "historic" conditions may no longer be applicable. Instead, consider managing piñon-juniper woodlands with the goal of increasing their resilience to climate change by doing the following:

- **Favor south- and west-facing slopes for thinning, as opposed to north- and east-facing slopes, because trees on north- and east-facing slopes are projected to better survive future climate change scenarios (Rondeau et al. 2017, Flake and Weisburg 2019), and Pinyon Jay nesting colonies tend to be located in areas of low heat load (north-facing slopes; Johnson et al. 2017b, Somershoe et al. 2020).**
- **However, research suggests some priority species prefer south- and west-facing slopes, so care should be taken to also maintain a mosaic of unthinned and thinned patches on south- and west-facing slopes (Pavlacky and Anderson 2001, Lynn Wickersham personal communication 2020).**
- **Retain trees within drainages, as trees in these areas may survive drought better than drier areas.**

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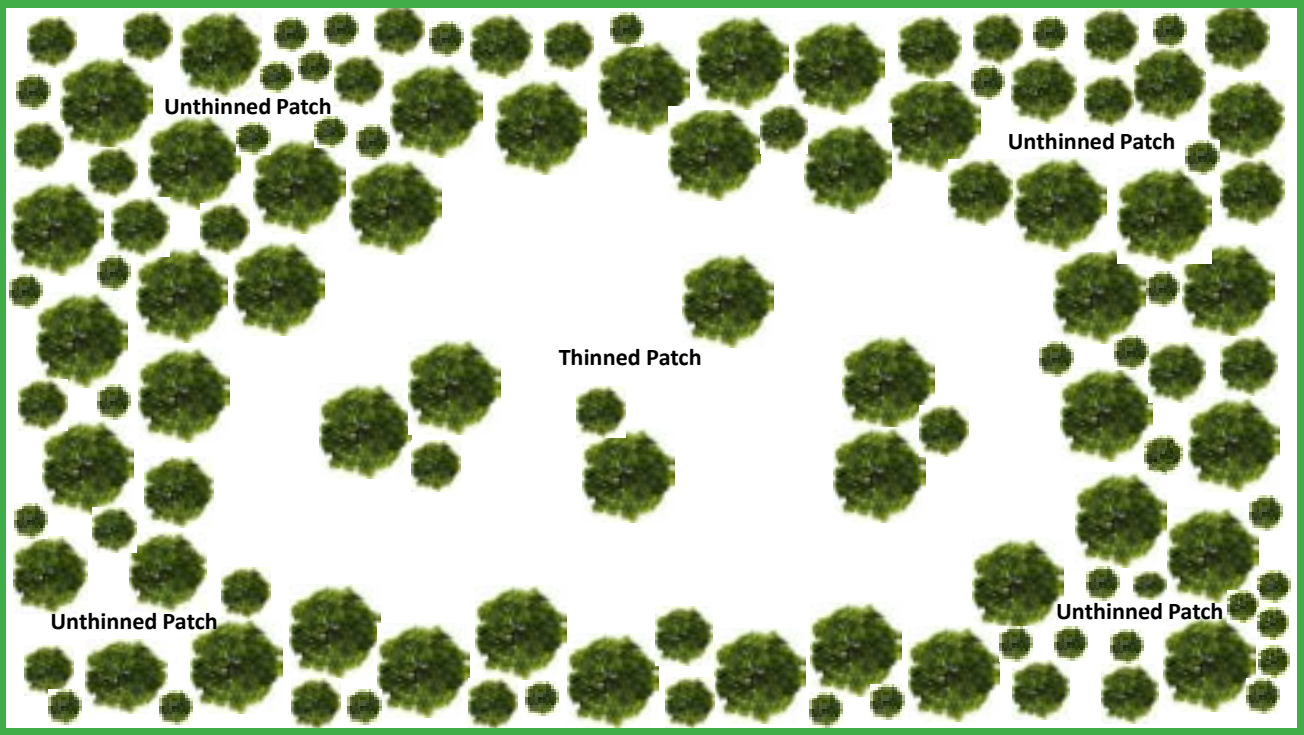
Step 6

If You Decide Thinning is Justified Implement a Mosaic Approach

- If you decide thinning is justified in persistent P-J woodland or wooded shrubland, create a mosaic of treated and untreated patches, as opposed to evenly-spaced thinning (Somershoe et al. 2020). Conduct thinning, but not clearcutting (Bombaci et al. 2017) in some patches, and leave other patches completely unthinned (see figure below).
- If you decide thinning is justified in persistent P-J woodland and wooded shrubland, map existing openings (resulting from drought, beetle kill, or other factors) in the canopy, and utilize these naturally occurring mortality areas by either expanding upon them, or conducting additional thinning within them (but not clearcutting).



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Step 7

If You Decide Thinning is Justified Minimize Canopy Cover Reduction

- Drastic thinning reduces P-J bird occupancy, so keep overall canopy cover reductions as small as possible (Johnson et al. 2018, Magee et al. 2019).
- In one study, canopy cover was reduced from a mean of 36% to a mean of 5%, resulting in P-J bird declines (Magee et al. 2019).
- In another study, trees per acre were reduced from a mean of 1,893 to a mean of 248, resulting in a nesting Pinyon Jay flock abandoning the thinned area (Johnson et al. 2018).

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Step 8

Determine Size and Location of Unthinned Patches

Best: map territories of priority bird species and avoid thinning within as many territories as possible.

Good: map nests of priority bird species and retain an unthinned buffer (the size of the maximum territory for the species) around the nest(s). See the next page for priority species buffer distances.

Acceptable: retain unthinned clumps within the home range sizes for P-J priority bird species using your site (excluding Pinyon Jay, which has a very large home range) AND large enough to accommodate the number of birds using the area before treatment. For example, if two Juniper Titmice are using a part of your site, and the maximum home range size is 3.2 acres, retain a 6.4-acre (or larger) unthinned patch in the location where they were found.

Minimum: retain unthinned clumps within the territory sizes for the six priority P-J bird species using your site (excluding Pinyon Jay, which has a very large home range). Maximum territory sizes for P-J priority bird species may be found on the next page. If priority bird species do not use your site, select the largest territory size possible from the table on the next page for your unthinned clumps.

Note: the minimum approach is likely not appropriate for Gray Vireo, which may have spatially-clumped nests (Lynn Wickersham personal communication 2020). The best, good, and acceptable recommendations above are better for Gray Vireo.




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Step 8 Cont.

Determine Size and Location of Unthinned Patches

Minimum buffer distance for a nest based on territory size

	Territory Size[a]	Citation	Buffer Distance (m)[b]
Black-chinned Sparrow	2.36 ha (5.8 ac)[c] (maximum mean)	Wiens et al. 1985	87
Black-throated Gray Warbler	4.15 ha (10.2 ac)[d] (mean)	Weinberg et al. 1996	120
Gray Vireo	4 ha (10 ac) (maximum)	Lynn Wickersham (Personal Communication)	115
Juniper Titmouse	1.3 ha (3.2 ac) (mean)	Panik 1976	65
Pinyon Jay	Nest colony size up to 100 ha (247 ac) (maximum)	Johnson and Balda 2020	500[e]
Virginia's Warbler	2.26 ha (5.6 ac) (maximum)	Fischer 1978	85
Woodhouse's Scrub-jay	6.5 ha (16.1 ac)[f] (mean)	Carmen 1988	92

[a] Territory size was reported in the literature as either mean, maximum mean, or maximum. We indicate which was reported for each species. We used maximum territory size, when available, for calculating buffer distances.

[b] Buffer distance was calculated as the radius of a circle after converting area from ha to m^2, and was rounded up to nearest meter. This distance does not take into account areas outside of the buffer area that may be needed for fledgling dispersal and survival.

[c] No information was found for the Black-chinned Sparrow, so we used the territory size of the Brewer's Sparrow as a surrogate.

[d] No information was found for the Black-throated Gray Warbler, so we used the territory size of the Golden-cheeked Warbler (a close relative that uses juniper woodlands) as a surrogate.

[e] See the Conservation Strategy for the Pinyon Jay at https://partnersinflight.org/resources/conservation-strategy-for-pinyon-jay/

[f] The only information on territory size for the Woodhouse's Scrub-jay was from very different habitat in Oaxaca, Mexico, so we used territory size for the California Scrub-jay as a surrogate.

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Step 8 Cont.

Determine Size and Location of Unthinned Patches

- **Size of trees should also be considered when determining placement of unthinned patches.**
- **Locate unthinned patches in productive (seed producing) piñon woodlands containing large and old, or very old, trees; these trees are likely of prime piñon nut producing age (Parmenter et al. 2018, Somershoe et al. 2020).**
- **Additionally, according to recent research, provided that sufficient suitable habitat is retained throughout the treatment area, retaining as many larger trees as possible within areas of higher tree density and/or canopy cover will likely conserve more Pinyon Jay nesting habitat than thinning all size/age classes to a uniform density; e.g., within the 25-75% quartiles of these measures at similar sites (Johnson and Sadoti 2019).**

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Step 9

Follow These Recommendations In Thinned Patches

- **Avoid thinning during the breeding season of priority bird species found on your site. Breeding season dates vary by priority species, and may be found below.**

Pinyon Jay: early March to late May, but can breed at any time of the year (Johnson and Balda 2020)

Gray Vireo: mid-May to mid-August (Barlow et al. 2020)

Juniper Titmouse: mid-March to late June (Cicero et al. 2020)

Woodhouse's Scrub-Jay: mid-March to late June (Curry et al. 2020)

Virginia's Warbler: early May to mid-July (Olson and Martin 2020)

Black-chinned Sparrow: mid-April to late June (Tenney 2020)

Black-throated Gray Warbler: early May to late June (Guzy and Lowther 2020)

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Step 9 Cont.

Follow These Recommendations In Thinned Patches

- **Retain as many mast-producing tree species as possible (Koenig et al. 2009, Cicero et al. 2020, Johnson and Balda 2020, Somershoe et al. 2020), especially piñon pine and oak.**
- **Parmenter et al. (2018) suggested piñon size as a correlate of age and potential nut productivity, and Zlotin and Parmenter (2008) found:**
  - **Low nut productivity: <3.5 inches or <9 cm diameter at breast height (dbh)**
  - **Medium productivity: 3.5-5.9 inches or 9-15 cm dbh**
  - **High productivity: >6.3 inches or >16 cm dbh**
- **Retain oak in all growth forms (large, single-stem oak; pole-sized oak clumps; shrubby oak groundcover; Sedgwick 1987, Stotz and Balda 1995, Olson and Martin 2020).**
- **Other deciduous trees may not be common, but if they do occur, retain them (Olson and Martin 2020).**

- **Retain as many tall and densely crowned trees as possible, particularly within areas of higher tree density (Johnson et al. 2014, 2015; Johnson and Sadoti 2019, Somershoe et al. 2020).**
- **Retain as many large junipers as possible, and avoid preferential thinning of juniper (Francis et al. 2011).**
- **In addition to retaining some juniper, retain other fruiting trees and shrubs (Curry et al. 2020).**
- **Retain some trees with mistletoe (Gillihan 2006).**
- **Retain some trees in all size and age classes.**

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Step 9 Cont.

Follow These Recommendations In Thinned Patches

- In north- and east-facing persistent P-J woodlands, retain all (or as many as possible) tree seedlings and saplings (Pavlacky and Anderson 2001, 2004).
- Retain and promote native grasses, forbs, shrubs, and cryptobiotic crust in the understory (Pavlacky and Anderson 2001, Schlossberg 2006, Bombaci and Pejchar 2016, Barlow et al. 2020, Somershoe et al. 2020, Tenney 2020).

- Retain all snags (or as many as possible; Cicero et al. 2020).
- Retain all trees with existing cavities (or as many as possible); these cavities are often not obvious from a distance, and may occur in both live trees and snags (USFWS unpublished data).
- Retain decadent/senescent trees and dead limbs (Pavlacky and Anderson 2001, Gillihan 2006).
- Retain some downed coarse woody debris (larger than 3 inches in diameter; Harmon et al. 1986, Grodsky et al. 2018).
- Use lop and scatter, when possible, over other slash management methods (Stoddard et al. 2008).
- Avoid limbing retained trees (Koenig et al. 2009, Barlow et al. 2020, Cicero et al. 2020, Curry et al. 2020, Guzy and Lowther 2020, Johnson and Balda 2020).
- Avoid overgrazing (Goguen and Matthews 1998, Tenney 2020) and/or overuse.

A Step-By-Step Guide to Incorporating Bird Needs Into P-J Management

Step 9 Cont.

Follow These Recommendations In Thinned Patches

- **The best available science suggests persistent P-J woodlands and wooded shrublands have a high-intensity, low-frequency wildfire regime (Romme et al. 2009). Because of this, thinning these woodlands to reduce fire risk likely does not represent ecological restoration. Therefore, in persistent P-J woodlands and wooded shrublands, we recommend fuels reduction only take place to protect human infrastructure.**
- **If thinning for fuels reduction must occur, limited research suggests retention of 15-35% canopy cover may be sufficient to stop many (but not all) P-J crown fires during extreme fire behavior (Coop and Magee 2016).**
- **Retained canopy cover of 15-35% may render a site unsuitable for some P-J birds (especially at the lower end of this range), but this needs further research.**
- **If thinning is to occur for fuels reduction, firebreaks to protect infrastructure are recommended in lieu of thinning large tracts of woodland.**

- **Prescribed surface fire is not recommended within persistent P-J woodlands and wooded shrublands because, unlike ponderosa pine forests, these ecosystems likely did not evolve with frequent, low-intensity surface fires, and surface fire usually kills adult trees (Baker and Shinneman 2004, Romme et al. 2009).**
- **If thinned sites must be maintained, follow-up thinning is recommended over prescribed surface fire.**

A Step-By-Step Guide to Incorporating Bird Needs Into P-J Management

Step 9 Cont.

Follow These Recommendations In Thinned Patches

Pinyon Jay Specific Recommendations:

- **Avoid treatments within Pinyon Jay flock nesting locations.**
- **Retain a 500-meter (0.31 mile) unthinned buffer around the colony nest site (Johnson et al. 2017a, 2018; Somershoe et al. 2020).**
- **Avoid treatments within colony sites that were active during the current and/ or preceding breeding season AND at any known, inactive nest sites for up to 10 years or more.**

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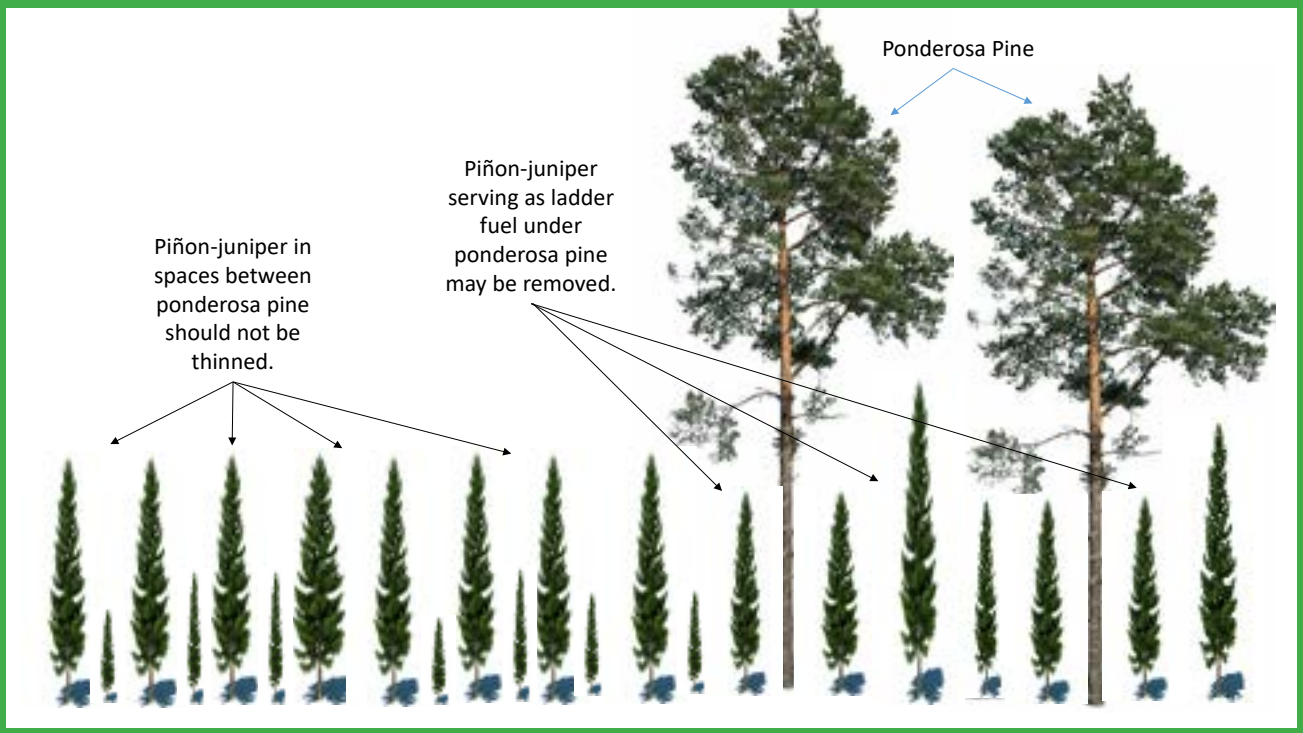
Step 10

Address Ecotone Areas

- **Where P-J woodland and ponderosa pine forest meet, there is usually an ecotone area with a ponderosa pine overstory and a P-J understory.**
- **Ponderosa pine forests are also very important for birds, so management of these ecotone areas requires special consideration.**
- **In ecotone areas with a signifiant P-J component, P-J may be removed if it is serving as ladder fuel under large, overstory ponderosa pine, but we recommend P-J in spaces between ponderosa pine remain unthinned (see figure below).**



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Step 11

Monitor Birds and Vegetation

- **Monitor birds and vegetation pre- and post-treatment, as well as in untreated control sites, and share your data with the scientific community.**
- **Numerous bird and vegetation protocols exist, including the Integrated Monitoring in Bird Conservation Regions protocol.**
- **For more information regarding survey techniques, contact the NM Avian Conservation Partners at: http://avianconservationpartners-nm.org/**

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