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May 20, 2024

Objection Reviewing Officer

Hungry Creek Vegetation Improvement Project

USFS Intermountain Regional Office

324 25th Street

Ogden, UT 84401

RE: OBJECTION OF THE HUNGRY CREEK VEGETATION IMPROVEMENT PROJECT

1. Objectors

Lead Objector Sara Johnson, Director, Native Ecosystems Council, PO Box 125, Willow Creek, MT 59760; phone 406-579-3286; sjjohnsonkoa@yahoo.com

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Steve Kelly, Director, Council on Wildlife and Fish, PO Box 4641, Bozeman, MT 59772; phone 406-920-1381; troutcheeks@gmail.com.

Jason Christensen, Director, Yellowstone to Uintas Connection, PO Box 363, Paris, ID 83261; phone 435-881-6917; jason@yellowtoneuintas.org.

Kristine Akland, Senior Attorney, Center for Biological Diversity, PO Box 7274, Missoula, MT 59807; phone 406-544-9863; kakland@biologicaldiversity.org.

Signed for Objectors this 20th day of June, 2024

Sara Johnson, NEC Director

2. Name and Location of Project

Hungry Creek Vegetation Improvement Project on the Escalante Ranger District of the Dixie National Forest.

3. Responsible Official

Kevin Wright, Supervisor of the Dixie National Forest.

4. Attachments

This objection includes 2 attachments. Attachment 1 is the relevant information provided in the Intermountain Region's old growth descriptions by Hamilton (1993). Attachment 2 includes hard copies of reports and/or publications cited in the objection.

5. Connection between proposed project and objectors public involvement

On November 19, 2021 objectors submitted scoping comments for the Hungry Creek Vegetation Improvement Project (hereafter "Hungry Creek Project"). On August 28, 2023, Objectors submitted comments on the draft Environmental Assessment. In our scoping comments, we identified a host of issues, including violation of the Roadless Area Rule, failure to complete wildlife surveys prior to a decision, failure of proposed treatments to address habitat management for wildlife, failure to demonstrate compliance with Forest Plan direction, including old growth, failure to demonstrate maintenance of wildlife viability, failure to demonstrate treatments in old growth will maintain wildlife values, failure to demonstrate how Forest Plan monitoring will be applied to a 20-year project, failure to demonstrate removal of conifers from aspen and riparian areas improves wildlife habitat, misrepresentation of pinyon-juniper treatments as habitat improvement, failure to adhere to the Migratory Bird Treaty Act (MBTA) to evaluate and conserve neotropical migratory birds, failure to provide measurable criteria for resilience, and misrepresentations that treatments are needed to prevent catastrophic fire.

In our August 28, 2023 draft EA comments, we summarized our November 19, 2021 issues and concerns (previously identified) and then provided additional comments to support those issues and concerns. We noted that the massive land area proposed for treatments could not comply with NEPA. For example, the agency has not completed wildlife surveys, so results and coordination of wildlife with proposed activities (mitigation) could not be provided to the public, as is required by the NEPA. The agency did not define how carrying capacity of wildlife would be altered by treatments, as is required by the NEPA. This information is critical for the agency to demonstrate treatments will supposedly improve wildlife habitat, including for the bird species identified as present within the various vegetation types. The agency did not define why habitats in the project area are "fire dependent" that will be "restored" with burning. The agency did not provide

a map of all goshawk nesting and post-fledging areas, as is required by the Forest Plan. The agency did not address the ongoing population trend of goshawks on the Dixie National Forest, or how trends may be affected by various vegetation treatments. The agency did not assess how past-ongoing vegetation treatments in the project area have affected wildlife habitat and populations. The agency provided unsupported claims that the project will have no significant adverse impacts on wildlife, as no habitat objectives for wildlife are addressed. The agency did not provide acres of big game winter range that will be treated, and why treatments (including monitoring of past treatments) will maintain or improve winter range. The monitoring protocol to assess when fencing is needed for aspen was never identified. The agency did not identify the monitoring protocol required for noxious weeds/invasive annuals that will be necessary on all treated acres. The agency did not clearly define how treatments would change existing habitat conditions in the various vegetation types to be treated. The agency falsely claimed that prescribed burning in IRAs is consistent with the Roadless Rule, even though changes to wildlife habitat will occur, changes that may be highly significant. The agency did not define how treatments will impact old growth habitat as well as shrublands. The project appears to be a continuation of agency long-standing practices of burning sagebrush to increase forage for cows. The proposal does not include any habitat measures for the Brewer's Sparrow, a species of conservation concern. There was no action alternative that stays out of IRAs. The basis for removing conifers from riparian areas was never provided. The actual desired condition for vegetation with treatments is never defined, even though this is the stated objective for treatments. There is no desired condition for wildlife habitat and populations ever defined. The agency did not define what the monitoring data shows for treatment of goshawk post-fledging area and nesting habitat, activities that are planned for the Hungry Creek Project. No documentation was provided as to how treatments in IRAs will increase the diversity of wildlife. There was no information provided on the declining goshawk population on the Dixie National Forest, or how the proposed vegetation treatments could impact this population trend. No information was provided as to why forest goshawk populations are in decline. The results of forest raptor surveys needed to be completed prior to project implementation were not provided.

None of the above issues and concerns were addressed in the agency proposed action. Although a second action alternative was included to reduce some treatments within IRA lands, slashing and burning is still required for both action alternatives. So the public concerns about degradation of wildlife habitat in IRAs, and increases in fire risk due to increases in cheatgrass from slashing and burning, were not addressed. We are carrying forward all of the issues and concerns we identified in our previous comments into this objection, with more specific information provided for a fuller description of our issues and concerns.

6. Remedy

Due to the host of legal violations that will be triggered by the Hungry Creek Project, including the National Environmental Policy Act (NEPA), the National Forest Management Act (NFMA), the Roadless Area Conservation Rule, the Administrative Procedures Act (APA), and the Migratory Bird Treaty Act (MBTA), objectors request that the Hungry Creek Project proposal be withdrawn. It is clear that agency plans to implement 20-plus year projects on many thousands of acres while knowingly avoiding the requirements of these multiple laws. Yet there is no exception that we are aware of that these laws are not required to be adhered to by planning massive projects over a 20-plus year time line, which is outside the scope of both the NEPA and the NFMA monitoring requirements.

7. Legal violations that will be triggered by the Project

A. The Proposed Hungry Creek Vegetation Improvement Project (hereafter "Hungry Creek Project" will trigger violations of the National Environmental Policy Act (NEPA), the National Forest Management Act (NMFA),

the Administrative Procedures Act (APA), the Roadless Rule, and the Migratory Bird Treaty Act (MBTA).

1. Management of Old Growth

The Forest is currently in violation of the Forest Plan direction for old growth, which requires 7-10% old growth per watershed. The agency claims that there is 26% old growth in the project area based on acres within the 5 watersheds (38%, 27%, 36%, 8% and 9%). The total acres claimed as old growth for these 65 watersheds would be 33,513 acres, which would be 27% of the project area. The EA at 11, 78, 85, for example, also state the project area has 26% old growth. At the same time, the agencies analysis of goshawk territories in the project area demonstrate there is almost no old growth in the 14 territories that were summarized for the proposed treatment areas. The old growth levels in 3 other territories in the project area are unknown. While not specifically noted, it appears that these 17 goshawk territories, with an average of 6,000 acres per territory, would encompass all the project area of 103,296 acres. Table 5 in the Wildlife Report at page 28 shows that for the project area, the structural stage 6, which is old forest, comprises 0.2% in aspen habitat, zero % in mixed conifer forest habitat, 9.3% in ponderosa pine forests, and 1.3% in spruce/fir habitat. This shows that old growth levels in the project area are below 9.3%. Actual levels are unknown.

There was no documentation in the project documents as to why claimed old growth stands meet the criteria identified in Hamilton (1993) that defines old growth forest types for the Intermountain Region. The basis for the claim of 26^ old growth is thus unsupported with any actual analysis, in violation of the NEPA.

Violation of this forest plan direction for old growth means that significant adverse impacts already exist for wildlife, impacts that would require completion of an Environmental Impact Statement (EIS).

The agency falsely repeatedly claims that project treatments will not affect old growth habitat, in violation of the NEPA. The acres of proposed treatments within actual old growth are never identified, so it is unknown how many acres of old growth will be treated. The expected changes to old growth based on treatments are also not defined. It is thus unknown how treatments will alter old growth conditions as defined by Hamilton (1993). Claiming treatments will maintain old growth without actual documentation of habitat changes that will be triggered by treatments is a NEPA violation.

2. Management of the Northern Goshawk (hereafter "goshawk")

The Dixie National Forest is currently in violation of the Forest Plan direction for the goshawk. The Forest Plan, including the Goshawk Amendment, states that each territory will have 20% old forest in structural state (SS) 6, and 20% mature forest (SS5). Table 3 of the Wildlife Report shows that none of the nest areas of 14 goshawk territories in the project area contain any old forest. There are only 2 territories that meet the 20% direction for SS5, with 7 territories having no SS5. As such, significant adverse impacts currently exist for this forest sensitive species in the project area. This failure to meet goshawk habitat requirements may be directly related to the ongoing decline of the goshawk population on the Dixie National Forest. The 2006-2014 monitoring report shows the percent occupancy of goshawk territories over this time period was 36%, 40%, 30%, 26%, 23%, 24%, 26%, and 22%; over this time period, the number of territories monitored increased from 138 to 187 territories, which means that occupied goshawk territories have continued to decline over time. This ongoing decline of goshawks was noted in the 2017-18 monitoring report, but not noted in the Hungry Creek NEPA analysis. It was also not noted that goshawk declines have been noted elsewhere in Utah, such as on the Wasatch Planning Area (USDA 2022).

The Forest Plan direction for managing goshawk habitat for the Hungry Creek Project will be violated. This Forest Plan direction requires that canopy cover of mid, mature and old growth stages (4,5, and 6) have to be maintained at 40-70% (50-70% for SS6). The proposed treatment effect of canopy cover in forested and pinyon-juniper types was not disclosed by the agency. However, the proposed treatments will significantly reduce canopy cover for mixed conifer forests from up to 250 basal area (square feet per acre) down to only a 50 basal area. This reduction for ponderosa pine forests will be from a potential 200 basal area down to a 50 foot basal area. For spruce-fir forests, the reduction in basal area will go from up to 265 down to a 70 basal area. The potential reduction in basal area of pinyon-juniper woodlands, wooded-shrublands, and savannas was not provided. The reduction in basal area of aspen stands and aspen/conifer stands was also not provided. There is no information provided in the Hungry Creek NEPA documents as to what the target basal area will be for treatment areas of SS 4, 5 and 6, and if these will adhere to the Forest Plan.

Adhering to the Forest Plan direction for goshawk nesting and post-fledging areas was not defined to the public. This Forest Plan direction requires a nesting area, 3 alternate, and 2 replacement nesting areas, each 30 acres for a total of 180 acres, be identified for each goshawk territory. A 420-acres post-fledging area is also to be identified. This information was not provided to the public for the Hungry Creek Project for the 17 goshawk territories in the project area. There is no map of these areas for each of the 17 goshawk territories in the project area. The Goshawk Forest Plan Amendment Decision Notice at page 4 states that the public will have the opportunity at project level of decision making to assure that goshawk management direction is applied to meet the needs of each site-specific situation. This required direction has not been met for the Hungry Creek Project. The public has not been shown where each nesting area and goshawk post-fledging area for each of the 17 territories in the project area occurs via a map and summary of acres.

The agency did not define to the public how aspen management will be consistent with goshawk management. There will be 15,880 acres of aspen treatment in the project area (EA table 12 at 33). The EA at 31 notes that aspen can have clearcuts up to 40 acres in size as per the Forest Plan. However in conifer forests, openings are limited to 2-4 acres as per the Forest Plan. There is no discussion as to why 40 acre clearcuts in aspen is consistent with goshawk management, while such openings in conifer forests would be inconsistent with goshawk management. It is also not clear why conifer forests require 40% mature-old forest habitat for goshawks, while aspen habitat requires only 30% mature and old forest habitat. Also it is never defined as to at what stage does a mixed aspen/conifer stand fall under the conifer forest requirements, or is to be managed aspen habitat. As a result, it is not clear to the public how the entire project area is to be managed for goshawks, including both aspen and aspen/mixed conifer stands. As such, the agency has failed to define to the public how this sensitive species, which is currently in decline on the Dixie as well as other areas in Utah, is going to be managed to promote viability, in violation of the NEPA.

The EA at 101 states that aspen habitats are some of the most valuable goshawk habitat in the state. This includes nesting habitat. On the Manti-La Sal National Forest in Utah, 80% of goshawk nests are in aspen/conifer stands, and 70% of nests are in aspen (USDA 2021). The Hungry Creek analysis did not define the composition of aspen and aspen/conifer habitat within each of the 17 goshawk territories in the project area. Since 15,880 acres of aspen and aspen/mixed conifer habitat in goshawk territories will be treated, including clearcut, the agency needs to define why removal of conifers in aspen stands, and clearcutting aspen, promotes goshawk habitat. The agency seems to be stating that in areas with aspen, conifers are detrimental to goshawks, and so removing conifers represents habitat improvement for goshawk. Since there is no actual information ever provided as to why conifers in aspen stands are detrimental to goshawks, the agency has failed to provide the public with supporting documentation for this treatment of goshawk habitat in violation of the NEPA.

The agency failed to demonstrate that Forest Plan direction for management of aspen within goshawk territories will adhere to Forest Plan direction. This requires that there be at least 30% mature-old growth aspen. Currently, aspen habitat in the project area has 26% mature and 5% old growth (EA at 13). This is basically achieving the Forest Plan direction, which would mean no treatment can be completed in mature and old aspen stands.

3. Aspen Management

The Hungry Creek proposal includes massive treatments of aspen with conifer removal (up to 15,880 acres of treatment). However, neither the Dixie Forest Plan, the Goshawk Amendment, or the Hungry Creek NEPA analysis define why removal of conifers from aspen is habitat improvement for wildlife in general. This is a violation of the NEPA. As just one example, conifer seeds provide forage for a host of forest birds (at least 28 species), including the Hairy Woodpecker, Clark's Nutcracker, Gray Jay, Stellar's Jay, Mountain Chickadee, Black-billed Mapgie, White-breasted Nuthatch, Red-breasted Nuthatch, Mountain Bluebird, Cassin's Finch (Species of Conservation Concern), various species of crossbills, Pine Siskin, Pygmy Nuthatch, Common Flicker (Forest MIS), Lewis Woodpecker (Species of Conservation Concern), Crow, Winter Wren, Robin, English Sparrow, Evening Grosbeak (Species of Conservation Concern), Pine Grosbeak, Red Polls, Goldfinch, Slate-colored Junco, Oregon Junco, Chipping Sparrow, Song Sparrow, and Pinyon Jay (Species of Conservation Concern). The loss of conifer seeds as forage for these 28 bird species by removing conifers from aspen is habitat degradation, not habitat improvement as is falsely claimed by the agency in the Hungry Creek Project. Pinyon pine seeds are known to have a very high value to birds due to their high fat content.

The removal of conifers from aspen stands also results in a huge loss of forage to birds as provided by juniper berries. One hectare of juniper foliage can contain from 19-38 million berries, with a cubic meter of juniper foliage have up to 20,000

berries) (Balda and Masters 1980). Removing juniper from aspen stands is clearly detrimental to birds due to a loss of forage.

Removing conifers from aspen stands will also reduce snag levels as being contributed by conifer species. Conifer species will also provide snags in sizes up to double or more in dbh than aspen trees, and thus meet the snag requirements of more cavity nesting birds than aspen stands alone. This would include cavities for the sensitive Flammulated Owl and Lewis Woodpecker, a Species of Conservation Concern, and the MIS Northern Flicker. The Wildlife Report notes that snag levels across much of the Hungry Creek Project Area are below Forest Plan recommendations (page 29). Further reduction in snags will violate Forest Plan direction, since deficiencies will be exacerbated instead of improved.

Removing conifers from aspen stands will reduce the levels of both hiding cover and thermal cover, since conifers provide much more effective hiding and thermal cover than aspen. In particular, juniper trees provide the highest quality hiding and thermal cover for forest birds. The removal of conifers from aspen stands as a result will increase the vulnerability of forest birds to extreme weather events during both nesting and migration (increased wind speeds, increased precipitation effects), impacts that have been documented to create massive mortality of birds triggered by a lack of forage (starvation) as well as severe weather (D'Ammassa 2020; USGS 2020). Removal of conifers from aspen, as well as clearcutting aspen stands, will also be detrimental to forest birds due to general temperature increases during the breeding season due to forest removal/thinning. Temperature tolerances of the goshawk, for example, were never addressed in the Hungry Creek NEPA analyses. Given that climate change is already creating higher summer temperatures in western forest bird habitat, agency actions that will exacerbate these ongoing temperature increases will clearly not improve habitat for birds.

Removing conifers from aspen stands will reduce the availability of nesting sites for forest birds that select conifers as nesting sites.

The agency failed to take a "hard look" at the proposal to remove conifers from aspen across large portions of the Hungry Creek Project Area regarding impacts to not only the sensitive goshawk and Flammulated Owl, but as well, forest birds associated with forests and aridland habitats. If the agency had actually evaluated how conifer removal from aspen would impact birds, they would have identified a host of significant adverse effects and chose different proposed actions.

4. Pinyon-juniper Management

The agency noted there are 3 types of pinyon-juniper habitats (woodland, wooded-shrublands, and savannas) but did not define the acreage of each type in the project area. Thus impacts to these 3 different types of pinyon-juniper habitats were not evaluated. Nor were these 3 types of pinyon-juniper habitats mapped or defined as how many acres of each type would be treated.

The three different types of pinyon-juniper habitat were summarized by Somershoe et al. (2020) at page 12. The persistent pinyon-juniper woodlands have sparse to dense tree cover, with minimal herbaceous ground cover. Pinyon-juniper savannas have low to moderate tree density with dense, nearly continuous grass and forb understory. Wooded shrublands have variable tree density, from very sparse to relatively dense, and shrubs are the dominant understory plants, including sagebrush. Photo examples of these 3 types of pinyon-juniper habitats are provided in Somershoe et al. (2020) in figures 8 through 20.

The project Wildlife Report at 34 identified the following birds as Species of Conservation Concern. These include the Black-throated Green Warbler, Brewer's Sparrow, Broad-tailed Hummingbird, Cassin's Finch, Evening Grosbeak, Grace's Warbler, Gray Vireo, Lewis's Woodpecker, Olive-sided Flycatcher, Pinyon Jay, ands Virginia's Warbler. Of these species, the Black-throated Gray Warbler, Gray

Vireo, Pinyon Jay, and Virginia's Warbler are associated with pinyon-juniper habitats (Gillihan 2006). Gillihan also identified the following additional bird species associated with pinyon-juniper habitats as species of conservation concern: Black-chinned Hummingbird, Ferruginous Hawk, Ash-throated Flycatcher, Gray Flycatcher, Juniper Titmouse, Townsend's Solitaire, Western Bluebird, and Scott's Oriole. Generally, there are approximately 12 bird species of noted conservation concern associated with pinyon-juniper habitats. Gillihan (2006) also identified 6 other bird species associated with pinyon-juniper habitats, including the Western Scrub Jay, Bushtit, Bewicks Wren, Blue-gray Gnatcatcher, Mountain Bluebird, and Chipping Sparrow. Overall, a large number of birds are known to use pinyon-juniper habitat as breeding, migration or winter habitat. Freschknecht (1975) reported that up to 60 bird species use pinyon-juniper habitats, while Balda and Masters (1980) reported that 73 bird species use pinyon-juniper habitats.

Of the birds using pinyon-juniper habitats, the Pinyon Jay is the most vulnerable. It has been identified as a "tipping point" species by the North American Bird Conservation Initiative (2022). A tipping point species is one that has lost at least 50% of their population in the last 50 years, and is projected to lose another 50% of their populations in the next 50 years. In April of 2022, the Pinyon Jay was proposed for listing under the Endangered Species Act (Great Falls Tribune 2022). The Hungry Creek NEPA analysis does not include any inventory of occupied Pinyon Jay habitats. Nor do these analyses include identification of key nesting areas, which occur in more dense pinyon-juniper areas and cover up to a 141 acres (Somershoe et al. 2020, page 8; also Figure 7 at page 11). Somershoe et al. (2020) also notes at page 19 that Pinyon Jay nesting areas occur in dense pinyon-juniper habitats, with up to 2725 trees per acre; nesting areas are to be buffered by at least 500 meters. The Hungry Creek project proposes to thin pinyon-juniper areas to 137 trees per acre (EA at 32), which would destroy Pinyon Jay nesting areas. Since no Pinyon Jay nesting areas have been identified within the 103,000 acre project area, the number of nesting areas that will be destroyed is unknown.

Another severe impact of the proposed pinyon-juniper treatments is the chaining effect, or removal of pinyon pines and juniper from shrublands. It is unclear how

many acres of wooded shrublands have already been "chained" in the project area. Figure 3 of the scoping notice identifies the location of multiple chaining units in the Hungry Creek project area. The acres of this past chaining, much of what appears to be in the Hog Ranch IRA, is not provided. These appear to include the Whites Flat project and expansion (project EA at 47). The project EA at 47 defines this chaining as "habitat improvement." For the Hungry Creek project, the agency has now changed the name of treatments to remove conifers from wooded shrublands as simply a removal program for conifers. The effect are similar to wooded shrublands.

Of the bird species identified in the Wildlife Report at 34 as Species of Conservation Concern, 4 are associated with pinyon-juniper habitats, including the Black-throated Gray Warbler, Gray Vireo, Pinyon Jay, and Virginia's Warbler (Gillihan 2006). All 4 of these Species of Conservation Concern identified by the Dixie National Forest are also associated with pinyon-juniper wooded shrublands (Gillihan 2006). Somershoe et al. (2020) provided expansion information on the association with the Pinyon Jay with wooded shrublands for foraging habitat. Other birds of conservation concern identified by Gillihan (2006) that will be harmed by chaining activities in pinyon-juniper habitats include the Ferruginous Hawk, that nests in juniper trees; also included would be the Gray Flycatcher that selects pinyon-juniper areas with high seedling and sapling densities, trees that would be removed with prescribed fire; also harmed would be the Juniper Titmouse, Western Bluebird and Ash-throated Flycatcher, species that require nesting cavities in juniper and pinyon pine trees as current and potential snag habitat would be reduced with thinning; also harmed would be the Townsend's Solitaire that depends heavily upon juniper berries which would be reduced due to thinning; the Scott's Oriole would be harmed by conifer removal in pinyon-juniper wooded shrublands as it has been documented to use these types of woodlands. Gillihan (2006) also lists other birds that use pinyon-juniper wooded shrublands, including the Western Scrub-Jay, Bewick's Wren, Blue-gray Gnatcatcher, as well as the Mountain Bluebird, that uses cavities for nesting in wooded shrubland areas as well as forages on shrubs.

The Hungry Creek NEPA analysis failed to address the acres of proposed pinyon-juniper chaining. These activities are identified in Figure 3 of the scoping notice as White Flats Chaining, Upper Spring Chaining, and Chaining expansions. The acres of these chaining treatments are not identified to the public. Instead, the agency noted in the EA f 47 that chaining is now being defined as "habitat restoration." This terminology is in itself a violation of the NEPA, because as we have noted, taking out pinyon pines and juniper is habitat removal for most wildlife species, not restoration. What is actually planned in the mapped areas is unknown, including whether chaining is still the planned activity. Proposed chaining activities are required to be disclosed to the public, as per the NEPA. We are also concerned about past chaining in the project area. The Wildlife Report at 40 identified 9,279 acres of "grapple piling in the Jacobs Valley VIP project. Are these pinyon-juniper chaining projects? In summary, past and planned pinyon-juniper chaining projects need to be clearly disclosed to the public, so that the public can understand how pinyon-juniper habitats have been managed in the past, and will be managed in the Hungry Creek project, as is required by the NEPA.

All told, the proposed pinyon-pine juniper treatments, which is specific cases is similar to past chaining activities to remove trees, will remove habitat for at least 11 species with an identified conservation concern (Gillihan 2006; Hungry Creek Wildlife Report at 34). The severe adverse impact the Hungry Creek Project will have on these 11 species was never evaluated, even though the agency concluded that there would be no significant adverse impacts to these species. The lack of any actual analysis to support this conclusion is a violation of the NEPA. Also a violation of the NEPA is the failure of the agency to identify a single habitat plan for any pinyon-juniper associated bird species, while at the same time concluding that massive alteration of their habitat will not significantly impact populations. Finally, the agency is violating the NEPA by claiming that the proposed pinyon-juniper treatments will restore and/or improve habitat for associated bird species, even though no habitat plans exist. Random alteration of bird habitat without any specific habitat objectives does not constitute habitat restoration or improvement.

Even though there will be over 20,000 acres of pinyon-juniper treatments for the Hungry Creek Project, the agency concluded that there will be no significant adverse impacts to the potential 73 bird species that use pinyon-juniper habitats. Again, without any analysis of project impacts on these species' habitats, the conclusion of no significant impacts on these birds is a violation of the NEPA. Nor does the agency address the ongoing decline of western forest birds, and birds associated with aridlands, including how agency activities have likely contributed to these ongoing declines. This is a violation of the NEPA, because while the agency is contributing to habitat losses for western forest and aridland birds, at the same time the agency is ignoring how these activities will affect population trends. For western forest birds, 64.2% of 67 species are in decline, while for aridland birds, 56.5% of 62 species are in decline. This failure to address how the Hungry Creek Project will impact declining bird trends is also a violation of the Administrative Procedures Act (APA), as habitat management is clearly an important aspect of management of these birds. There is not a single habitat plan for any pinyon-juniper bird species for the Hungry Creek Project.

There was no analysis as to how the proposed pinyon-juniper treatments will interact with ongoing climate change. The current ongoing decline of juniper trees in Utah is a concern, with causes not clear (Maffy 2018). And Somershoe et al. (2020) provided extensive documentation of how climate change will impact pinyon-juniper woodlands, with lower mast production, increased mortality, and reduced recruitment. The proposed Hungry Creek removal/thinning of pinyon pine and juniper trees will exacerbate the ongoing adverse impacts of climate change, an impact that was not discussed by the agency. This is a NEPA and APA violation, as an important ongoing concern with pinyon-juniper habitats was completely ignored by the agency in regards to the proposed actions.

There was no analysis in the Hungry Creek NEPA documents regarding current cheatgrass infestations within the pinyon-juniper habitats. Acres of cheatgrass infestations were not mapped or summarized, even though cheatgrass populations are a national ecological concern (Forest News 2024; High Country News 2024). Currently, cheatgrass dominates at least 31.3 million acres in the

western U.S. (High Country News 2024).The threshold for avoiding ecological consequences of cheatgrass infestations is estimated at between 5% and 25% of the land area; two factors that promote cheatgrass invasions are ground disturbance and seed spread, including by livestock; forest health treatments that involve thinning create favorable conditions for cheatgrass infestations; removal of the tree canopy also promotes cheatgrass; cheatgrass can outcompete native plants for water and nutrients due to its early germination/growth in the spring; cheatgrass infestations also increase fire cycles (Forest News 2024).

The expected increase in cheatgrass acreage within treatment units was never identified. The agency has not taken a "hard look" at the impact of this project on cheatgrass expansion. This impact was never considered in the proposed action alternatives. The agency has no basis for concluding that cheatgrass infestations will not significantly increase with the proposed treatments, which would require completion of an EIS.

The likely massive increase of cheatgrass in the Hungry Creek Project Area will be an irretrievable impact. Given the massive acreages of cheatgrass in the western U.S., it is apparently extremely difficult to eradicate. As per the Hungry Creek Project Area, the agency did not define why current infestations of cheatgrass have not been eradicated. This is important information, as the agency needs to demonstrate that increases of cheatgrass due to treatments can be eradicated, which would be the only qualified "mitigation." The NEPA requires that mitigation measures be demonstrated to be effective. The ability of the agency to eradicate new infestations of cheatgrass (possibly thousands of acres) must be demonstrated to the public to support claims this invasive annual will not significantly increase due to proposed actions.

5. Shrubland Management

The Hungry Creek project proposes to treat almost all the shrubland habitat in the project area. Table 1 of the EA at 9 shows there are roughly 4161 acres of shrubland-silver sage in the project area, excluding oak. The EA at 84 notes that 4,000 acres of shrublands will be treated. The goal of the treatments, in addition to removing trees, is to remove shrubs on 30% of the habitats (Wildlife Report at 66). This will be done through various measures, including burning (Figure 6 of the Wildlife Report shows vast areas of the project area that will be burned, which would include shrublands. Killing of shrubs will also be done with herbicides, in patches up to 100 acres. The agency does not provide any science as to why having a 30% zero age class of shrubs is the management objective. This 30% killing of shrubs is supposed to create a "mosaic" of shrub age classes. The reason for creating this mosaic for wildlife is never identified. We have not found any science for shrubland species that recommends a mosaic of age classes, with 30% being "zero" in age.

Bird species that are typical of shrublands include the Black-throated Sparrow, Northern Mockingbird, Loggerhead Shrike, Gray Flycatcher, Western Meadowlark, Brown-headed Cowbird, Mourning Dove, Lark Sparrow, Vesper Sparrow, Green-tailed Towhee, Horned Lark, Sharp-tailed Grouse, Burrowing Owl, Ferruginous Hawk, Prairie Falcon, Golden Eagle, and Common Nighthawk (Utah Partners in Flight Avian Conservation Plan – Priority species accounts for the Sage Sparrow and Brewer's Sparrow 2002). The Brewer's Sparrow is identified as a Species of Conservation Concern for the Dixie National Forest (Project Wildlife Report page 35-36). There are an estimated 2,586 acres of Brewer's Sparrow habitat in the project area (Id.). The Montana Partners in Flight Bird Conservation Plan (2000) does not identify a 30% level of "zero" sagebrush age classes for the Brewer's Sparrow; there is no recommendation for a "mosaic" of age classes in this species habitat; reductions in sagebrush cover and vigor from control actions such as burning or herbicides will reduce or eliminate habitat suitability for this species; long term viability will depend on the maintenance of large stands of sagebrush throughout the species range; large patch size and robust shrub cover

increases the likelihood of use by this species; this species is vulnerable to cowbird parasitism, especially where sagebrush patches have been broken up. Brewer's Sparrow nests are usually located in tall sagebrush in denser patches; management recommendations include "no net loss of shrubsteppe habitat; manage for large blocks for contiguous shrubsteppe habitat and avoid activities that cause fragmentation; avoid pesticide use; avoid increases in cowbirds by avoiding habitat fragmentation (Utah Partners in Flight Avian Conservation Strategy 2002). In summary, burning up sagebrush to create a mosaic structure will degrade/eliminate habitat for this species of conservation concern. It is clear as per management recommendations for the Brewer's Sparrow that the Hungry Creek project will remove habitat for this species, as well as degrade remaining habitat due to fragmentation and increases in cowbird parasitism.

The Loggerhead Shrike is a sagebrush associated species that has been identified as a common bird in decline by Audubon (2007). The Montana Partners in Flight (2000) conservation plan for the Loggerhead Shrike is to maintain a suitable distribution of large sagebrush plants by controlling the application of herbicdes in known nesting areas; distribution of this species should be delineated, and the relative nesting success in various habitats should be monitored. This species has a strong association to sagebrush/shrubsteppe habitats in the southwestern U.S. (Woods and Cade 1996); preservation of sagebrush rangelands is noted to be important for the long-term survival of this species. The Hungry Creek project wildlife analysis did not define why a mosaic of shrublands, including 30% "zero" habitat, is recommended for management of the Loggerhead Shrike. The Hungry Creek NEPA documents do not identify any habitat plan or conservation plan for the Loggerhead Shrike. The level of Loggerhead Shrike habitat to be lost in the project is unknown, even though the agency determined that no significant adverse impacts would occur to birds in the project area, which would of course include the Loggerhead Shrike.

The Sage Thrasher is a shrubsteppe species that has suffered long term population declines (North American Bird Conservation Initiative 2022). This species is believed to be a sagebrush obligate, in that it depends entirely on

sagebrush as breeding habitat (Montana Partners in Flight 2000); it is highly sensitive to fragmentation of sagebrush habitats, and the management recommendations for habitat include large sagebrush patches of at least 250 acres. The proposed burning and spraying of sagebrush habitat in the Hungry Creek project area will fragment Sage Thrasher habitat, which will not only directly remove habitat but degrade remaining patches due to reduction in patch size. The Partners in Flight (2000) management recommendations for the Sage Thrasher do not include provision of a habitat mosaic, including 30% "zero" sagebrush age classes. The proposed Hungry Creek project will directly remove Sage Thrasher habitat and degrade remaining habitat due to a reduction in patch size. No habitat management guidelines were identified for this species in the Hungry Creek NEPA documents, while at the same time, proposed habitat alterations were noted to have no significant adverse impacts on birds, which would include the Sage Thrasher.

The Sage Sparrow is associated with shrubsteppe habitats, and is considered an obligate for this habitat (Utah Partners in Flight5 Avian Conservation Strategy 2002); they prefer taller shrubs with larger canopies providing more cover for nests; they nest in shrubs 1-2 meters high; alternation of sagebrush habitats resulted in significant declines of this species; fragmentation of sagebrush habitats will increase cowbirds which are detrimental to Sage Sparrows; cowbirds rarely intrude on large patches of sagebrush; habitats invaded by cheatgrass are abandoned by Sage Sparrows; management recommendations include provision of large tracts of sagebrush habitats where suitable sagebrush habitat is provided. The Hungry Creek NEPA documents do not include any habitat management plans for the Sage Sparrow, even though their habitats will be treated. Claims that this project will not significantly impact birds, which would include the Sage Sparrow, were thus not supported in violation of the NEPA.

Burning and spraying of shrubsteppe habitats in the Hungry Creek Project will not only remove and/or degrade habitat for species associated with large tracts of older, taller, more dense sagebrush, as noted above, but will likely result in increases of cheatgrass. Cheatgrass is known to increase fire cycles (Forest News

2024), which will make shrubsteppe habitats burned/sprayed in the Hungry Creek Project vulnerable to future fires. This demonstrates that the agency claim that burning/spraying sagebrush is needed to reduce fire risk is a false claim to the public, in violation of the NEPA, as fire risks will actually increase as a result of these treatments. Replacing shrubs with cheatgrass is not a valid fire reduction strategy, as is being presented to the public.

The loss of seeds produced the sagebrush plants to wildlife was not identified as an adverse impact on burning/spraying 30% of the shrubs in the project area. Sagebrush plants are known to produce up to 50 million seeds per hectare (Owens and Norton 1992), and this seed resource will be lost when sagebrush plants are killed. This impact was not considered in the proposed project, even though burning/spraying sagebrush is claimed to be a benefit to wildlife.

6. Baseline Wildlife Information

There is essentially no inventory information provided on wildlife for the Hungry Creek project area. However, this baseline inventory information is a requirement of the NEPA, as otherwise, impacts of past as well as planned vegetation treatments cannot be defined to the public as is required by the NEPA. The agency claims that wildlife inventory data will be obtained later, post-decision. As such, the public will not be provided any wildlife inventory information, or what specific mitigation measures are being applied to various located wildlife nests, such as for Flammulated Owls, Norther Flickers, and Three-toed Woodpeckers. In addition, the public has no ability to understand how the proposed treatment acres for the Hungry Creek Project are related to wildlife. There apparently has been no consideration of wildlife in this planning, in violation of both the NEPA and the National Forest Management Act, which requires maintenance of viability of wildlife.

Inventory wildlife information is also essential in order for the agency to meet the requirements of the NEPA to evaluate cumulative impacts. The Hungry Creek Project Area has had almost 40% of this landscape either previously treated or is currently being treated. These projects include the Hungry Creek Farm Bill Project (5,026 acres of treatment) which is ongoing, and the Jacobs Valley project (16,159 acres of treatments) which is ongoing. This latter project apparently includes 9,279 acres of pinyon-pine chaining, referred to as "grapple piling," which appears to be pinyon-juniper chaining. There has also been 16,159 acres of previous treatments, for a total of 41,452 acres of past-ongoing treatment decisions in this project area. This comes to 40% of the Hungry Creek Project Area. Yet the agency has not provided any wildlife inventory results for any of the past treatment acres. Some type of wildlife inventory in these past treatment units is not only required to provide baseline information for the Hungry Creek Project, but is required as per the NFMA for Forest Plan monitoring. If effects of past treatments are not monitored, the agency has no basis for claiming that additional treatments will have no significant adverse impacts on wildlife, as was claimed for the Hungry Creek Project. In essence, the agency is proposing expansive, continued habitat alterations for wildlife without a semblance of inventory data. This means that wildlife management is not an aspect of this project, in spite of agency claims that these various treatments, including within IRAs, are habitat restoration for wildlife. As such, the agency cannot meet the NFMA to maintain viable populations of wildlife, as vegetation treatments are being implemented without any wildlife inventory data.

AT a minimum, the agency needs to provide the public with valid inventory data for the project area, including past treatment areas, for the bird species of conservation concern (11 species) as well as the sensitive goshawk and flammulated owl. Habitat occupied by the 11 bird species of conservation concern, including the Pinyon Jay which has been petitioned for listing under the ESA, need to be identified along with proposed treatments for this occupied habitat. For the goshawk, all Forest Plan requirements need to be met, including identification of nesting areas, post-fledging areas, and foraging habitat. For the sensitive Flammulated Owl, all possible nesting areas need to be identified, along with how nest sites will be protected from disturbance during treatment

activities. These owl nests are difficult to locate, and require considerable inventory efforts. The agency cannot meet the requirements of the NEPA by claiming Flammulated Owl inventories will be done later. This prevents the public from knowing survey results and how these results affected the proposed action and treatment plans, along with mitigation measures. This brings the issue of adhering to the NEPA for projects as Hungry Creek. The agency is clearly unable to complete valid wildlife inventories prior to a project decision because a huge project area is being used. The agency is using the use of large project areas as a means to escape NEPA. If there is some exemption for NEPA requirements due to a large project area, this exemption was not identified in the Hungry Creek NEPA documents.

In regard to surveys, it is not clear the agency is actually completing valid wildlife surveys for projects, including those already completed, or in progress. There were no wildlife survey results provided in the Hungry Creek NEPA documents from other activities, even though these include 40% of the project area. If surveys were completed for wildlife in this 40% of the project area, why weren't any of these survey results provided in the Hungry Creek NEPA documents? This would seem to be an essential part of a cumulative effects analysis and project planning. What types of habitats were wildlife identified in past/ongoing projects in 40% of the Hungry Creek Project Area? What type of mitigation measures, as well, are being applied/were applied to these other projects? Have these mitigation measures been effective? Without this information on past surveys and associated mitigation measures, the agency is not meeting the requirements of the NEPA to demonstrate to the public that wildlife surveys are actually being done, and will actually be done for the Hungry Creek Project.

As per mitigation measures, the agency failed to demonstrate that migratory bird nests will be protected from disturbance. Claims that these nests will be located prior to treatments are highly questionable, as this would take a massive effort by a huge number of surveyors. This mitigation measure appears to be a false narrative to avoid identifying that an untold number of bird nests will be destroyed when vast acres of their habitat are treated, including spring burning.

Providing a false narrative regarding protection of wildlife is a violation of the NEPA as well as the Migratory Bird Treaty Act (MBTA).

The agency did not identify any mitigation measures for the potentially massive bird mortality that will created from toxicity to smoke (Defiance Canyon Raptor Rescue 2022). The number of birds expected to be directly killed by smoke toxicity, including nestlings that are unable to move away, as well as the long-term mortality to all exposed birds due to reduced fitness, needs to be included in the Hungry Creek NEPA analysis, as is required by the NEPA. The agency did not provide any information demonstrating that smoke is not toxic to birds.

The agency did not provide an analysis of the cumulative mortality expected to birds from smoke toxicity and destruction of nests during vegetation treatments. Without this assessment, the agency avoided evaluating alternative development and selection, as an important impact of the proposal was not considered. This is both a NEPA, APA, and MIBTA violation. If bird mortality is not assessed, the agency cannot address whether a "take" permit from the USFWS is required for this project.

The only way the public can be guaranteed that valid wildlife surveys for species of conservation concern and sensitive species will be done for projects as Hungry Creek is for the agency to provide the results of these surveys before a decision is made. Completion of these surveys is also essential in order for the agency to actually measure project impacts on wildlife, as impacts cannot be based on "potential surveys." Since the results are as yet unknown, project impacts on wildlife are also unknown, in violation of the NEPA when no significant impacts are predicted.

The agency failed to provide a valid cumulative effects analysis regarding past and ongoing vegetation treatments on wildlife, such as the chaining of pinyon-juniper habitats. The expected acres of this important wildlife habitat to be

degraded/removed from agency activities were not addressed. AS we noted previously, landbirds in general have suffered huge population declines, including a loss of over 3 billion birds since the mid-1970s (Rosenberg et al. 2019). Given that continued pinyon-juniper treatments are planned, the agency has a responsibility to address how these past and planned treatments are affecting wildlife, including Birds of Conservation Concern associated with pinyon-juniper habitats, such as the Pinyon Jay. The agency's failure to look at the big picture for proposed degradation/removal of pinyon juniper habitats as per declining wildlife populations, while proposing vast acreages of additional treatments, is a clear violation of the NEPA as well as the NFMA. In turn, the goshawk population on the Dixie National Forest, as well as in other areas of Utah, was not addressed even though vast acres of goshawk habitat have been recently impacted in the Hungry Creek project area (40% of the project area), with extensive additional treatments planned. It is not clear that the Dixie National Forest is maintaining this sensitive species due to management of their habitat. Yet these cumulative effects for this sensitive species were not addressed in the Hungry Creek Project, in violation of the NEPA.

7. Potential wildlife surveys and potential adherence to the Forest Plan

By basing project assessments and developments of alternatives without existing wildlife surveys, including for sensitive birds and species of conservation concern, the agency can not adhere to the requirements of the NEPA in evaluating project impacts on resources. Estimates of impacts cannot be based on "potential surveys," which have not yet been done. The same is true for "potential" adherence to Forest Plan direction. Actual implementation of the Forest Plan on the ground has not been demonstrated. As such, the agency cannot claim compliance with the NFMA.

In our previous comments, objectors noted a host of Forest Plan directions that are required for the agency to meet while implementing the Hungry Creek

Project. There is no demonstration in the associated NEPA documents that any Forest Plan direction has been incorporated into the proposed treatments. The agency cannot simply tell the public that Forest Plan direction will be adhered to. The agency is required by the NFMA and the NEPA to demonstrate specifically how the Forest Plan direction has been "implemented" in project design, as well as how meeting this direction affected alternative selection. At present, the agency has not demonstrated that any of the proposed action alternatives are consistent with the Forest Plan, and thus are valid action alternatives.

Specifically, we again would note that the agency has not demonstrated where and how Forest Plan direction to maintain at last 20% thermal cover in management area 5A, which is big game winter range. There is no analysis of current levels of thermal cover in 5A. These areas also are not mapped. It is not defined how many, if any, thermal cover areas will be treated, and if so, what indicates that thermal cover will be maintained. Also, as previously noted, the agency has not demonstrated that Forest Plan direction for goshawk nesting and post-fledging areas (to be mapped) was not followed. The agency has not completed any site-specific amendments to allow these Forest Plan violations. As such, the agency has failed to provide any action alternatives that meet legal requirements.

While the agency claims that Forest Plan Desired Conditions for forested vegetation types will be adhered to by moving towards the composition of structural stages per vegetation type (e.g., percentage of grass/forb, seedling/saplings, young forest, mid-aged forest, mature forest, and old forest as identified in the project EA in Table 2 (spruce/fir), Table 3 (mixed conifer), Table 4 (aspen), Table 5 (ponderosa pine), and Table 6 (pinyon-juniper), there is no actual analysis to demonstrate how the project will change existing structural stages as a result of the proposed treatments. The tables addressing Forest Plan desired conditions to be implemented for the Hungry Creek Project have existing desired conditions, desired conditions, but do not identify what the desired conditions will be after project implementation. This lack of information clearly indicates that desired conditions have actually nothing to do with the proposed project. In fact,

most of the proposed treatments are "thinnings" which would not change structural stages. Thus the agency is not actually managing for Forest Plan desired conditions, as is claimed as a purpose of this project. This is both a NEPA violation (false rationale for project activities) and a NMFA violation, as conifer/aspen desired conditions identified in the Forest Plan are not actually being managed for.

8. Violation of the Roadless Area Rule

The agency is violating the NEPA by claiming that the proposed Hungry Creek Project adheres to the requirements of the Roadless Area Rule (hereafter "Roadless Rule").

The desired conditions identified as a rationale for treatments appear to be used for management of IRAs (e.g., EA at 75). The NEPA documents do not separate out desired conditions being managed for within and outside of IRAs. This would be a violation of the Roadless Rule as the agency is applying vegetation goals to IRAs that require massive management actions, instead of being managed as natural habitat.

As we have noted in the previous sections of this objection, the management of IRA lands will result in massive habitat degradation to almost all wildlife, which cannot be defined as habitat restoration. The Roadless Rule does not direct degradation of wildlife habitat. One aspect not mentioned before is the intention to burn large tracts of habitat in IRAs with burning. The NEPA documents for the project did not define why burning vegetation is habitat restoration for wildlife.

The Roadless Rule will be violated by extensive timber harvest (logging) to be done within IRAs (potentially up to over 17,000 acres of timber harvest). This

timber harvest in turn will create massive visual impacts to IRAs, and destroy their natural appearance. As just one example, skid trails will be spaced at roughly 100-150 feet apart to transport wood products out of IRAs; there will be an estimated 40 miles of skid trails in IRAs. These skid trails will be used for tree removal, including thousands of acres of commercial wood products for all sizes of tree dbhs.

The agency did not define why "skid roads" do not qualify as road development within IRAs. How do skid roads (as defined in the Wildlife Report at 46) differ from roads within IRAs? What is the basis for determining that skid roads do not qualify as new roads within IRAs? The Roadless Rule prohibits the construction of new roads with IRAs, and this restriction is being violated in the Hungry Creek Project.

There appears to be a pattern of IRA violations on the Dixie National Forest. The pinyon-juniper chaining mapped in Figure 3 of the scoping notice is largely, if not completely, with an IRA. It appears that this chaining activites included over 9,000 acres (referred to as grapple piling). This has created severe habitat degradation for multiple wildlife species, while creating massive visual carnage and likely, skid roads. The agency did not address cumulative effects to IRAs due to past treatments, in violation of the NEPA and demonstration to the public that IRA adherence is being implemented by the agency.

The agency will violate the Roadless Rule by removing more than generally small diameter trees. In fact, the actual dbh of trees to be removed/killed in the proposed project is never identified, other than sporadically, such as spruce over 14 inch dbh (EA 41). Also, all sizes of conifers will be cut out from aspen trees, not just small dbh trees. This tree removal also will not be relatively infrequent, as it covers much of the IRA landscape in the project area. The combined disturbances to wildlife from an undisclosed acreage of IRA treatments is not identified, as treatment overlaps prevent actual IRA treatment acres to be disclosed to the public (vegetation treatments are 40,617 acres, and silviculture treatments are 24,348 acres, but total treatment acres cannot be identified due to overlap),

which is a NEPA violation. Thus the percentage of IRAs to be disturbed as wildlife habitat for the next 20 years is unknown, but clearly severe.

The agency repeatedly claims that the proposed IRA actions are consistent with the Roadless Rule as these treatments will reduce the potential for "uncharacteristic fire" which is attributed to "uncharacteristic (too dense) vegetation. However, there is never any actual data provided to define why the vegetation within the IRAs of this project area are "uncharacteristic." Claiming that vegetation is uncharacteristically dense, and thus creates a risk of uncharacteristic fire, without any actual analysis and data is a violation of both the NEPA and the Roadless Rule. If all that is necessary for the agency to manage IRAs by simply unsupported claims that vegetation is "uncharacteristic," the Roadless Rule would be meaningless, which was clearly not the intention of this Rule. It would not have been necessary, as it would have no actual effect on management of IRAs.

The agency did not define the expected increase in acreage of cheatgrass that will result from treatments in IRAs. Increasing cheatgrass would increase fire risk over existing conditions, which is the opposite of the claims the agency made as the need for fuels management in IRAs to prevent uncharacteristic fire. Cheatgrass will increase uncharacteristic fire. Increasing cheatgrass will also not "restore" wildlife habitat in IRAs. The agency did not define why cheatgrass would benefit wildlife habitat within IRAs.

9. Use of a 20 year timeline

The agency did not define how a 20-year site-specific plan could incorporate Forest Plan monitoring, including annual and up to 5-year monitoring reports. How can future monitoring be applied to past decisions? What is the process for this? Why wouldn't it be possible for future monitoring results to change management direction for resources over 20 years? The agency did not address

why forest plan monitoring is not an important aspect of the Hungry Creek Project. In what instances is forest plan monitoring allowed to be discarded for management decisions? In effect, a 20-year project is essentially an "exemption" from forest plan monitoring requirements. The source of this exemption was not identified, however, for this project.

The agency also did not define how future changes in resource values, including impacts of climate change, can be applied to past decisions. The timeliness of NEPA is approximately 5 years, so that resource conditions can be addressed in management decisions. One example is a severe decline in a specific wildlife species, and/or listing of a species as the Pinyon Jay. Why wouldn't an "in place" decision have to be withdrawn and reassessed, including with public involvement? What is the current administrative process direction for 20 year decisions in regards to being based on current environmental conditions? What is the rationale for the agency's expectation that environmental conditions will not significantly change in the Hungry Creek landscape in the next 20 years, including climate change effects?

10. Failure to develop alternatives

There is no action alternative that would adhere to the Roadless Rule by implementing no vegetation treatments of any kind within IRAs. Management actions within IRAs was clearly a public issue. This issue was not addressed in the proposed alternatives. As such, the agency has violated the NEPA by failing to include action alternatives that address public issues and concerns.

Attachment 1 for the Objection filed by NEC et al. for the Hungry Creek Vegetation Improvement Project on the Dixie National Forest on 6/20/24.

Attachment 1 includes pertinent pages of the Intermountain Region report "Characteristics of old-growth forests in the Intermountain Region" compiled by R. Hamilton (1993).

CHARACTERISTICS OF OLD-GROWTH FORESTS

IN THE INTERMOUNTAIN REGION

COMPILED BY

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APRIL 1993

U.S.D.A. - FOREST SERVICE

Limitations

The teams developed a set of minimum qualification criteria that in combination define old-growth. The criteria are considered to be screening criteria and in many cases more than one old-growth vegetation condition can be described because of major variations in ecological circumstances. Variations in those circumstances also make some descriptions specific to a certain geographic area. Those limitations are identified for each cover type. In some instances differences occur between administrative boundaries because of large separations between forested lands. In all cases the limits of vegetative and geographic application are determined by cover type. This is because each predominant species has a different optimal response zone that causes a lack of commonality between and among species in cover types between geographic areas.

Old-growth definitions apply to each cover type described in the *Cover Types of the United States and Canada* 1/. The book describes species composition and geographical situations for each cover type. Unfortunately, in some geographic areas cover types will change as plurality of stocking changes. Therefore, the descriptions should be considered to be dynamic. Definitions are only applicable to the described cover type in stands that meet the species composition and locational criteria. Additional specific limitations are found within the cover type description.

Definitions were developed from observations and data obtained from stands with no apparent substantive human intervention or apparent drastic natural disturbance. Stands with minimal tree removal, firewood cutting, or other minor human-induced intervention of a limited scope were included in the old-growth assessment.

Stand Structure and Disturbance - General

Forests are often simplistically described as passing through six or more vegetation structural succession stages as they develop through time. Natural events and human-induced activities directly influence the rate of movement through these successional stages. Fires, wind, hailstorms, and insect outbreaks are but some of the natural influences. Prescribed fire, grazing, timber harvesting, fire suppression, recreational use are some of the human-induced activities influencing successional development.

Old-growth is considered to start at the sixth stage of vegetation structural succession and is further defined as early and late old-growth. That sixth stage is used by the definition team as the general "model" to describe old-growth stand attributes (see appendix A). Occasionally, predictable disturbances combined with the physiological characteristics of some tree species within specific cover types may preclude reaching the sixth or "model" stage. In these cover types the fifth stage is the oldest predominating stand with a moderate amount of stability before rejuvenation; it is considered old-growth.

1/ Eyre, F.H. editor 1980 Cover Types of the United States and Canada Society American Foresters, Washington D.C. 143 pages.

In the sixth stage of succession, stand conditions would be expected to include both seral and climax tree species. Compositionally in fire-dependent species and short-lived intolerant species with only single species composition, forests are dominated by seral species. Shade tolerant, long-lived species tend to make up the old-growth systems, with long large fire occurrence frequency and minimal natural disturbances.

Fire historically has dominated as a natural disturbance mechanism in the Rocky Mountain forests. Up to the late 1800's it was the primary influence on successional development. Frequent low intensity fires moved through the lower elevation forested stands removing down-woody residues, seedlings, other small plants, and shrubs. Fire-resistant trees with thick bark such as ponderosa pine and Douglas-fir survived the frequent fires, maintaining many stands in an open, park-like condition featuring large mature trees with small pockets of seedlings and saplings, occasionally occurring with understory grasses, forbs, or brush.

Forested stands at higher elevations have short cool summers with frequent high-intensity short duration lightning storms. These green moist forests burn in-frequently. When they burn the result is a patchy incomplete burn pattern. However, these forests have been plagued by insect epidemics which were followed by broad-scale high intensity large fires. Stands were often completely destroyed or a range of forest mosaics was created, depending on weather, fuel loading, and other influences.

The ecological relationships of fire are contained in three fire ecology publications by the Intermountain Research Station, General Technical Reports INT-218 covers central Idaho, INT-290 eastern Idaho and western Wyoming, and INT-287 the forests in Utah. The composition, structure, and function of the ecological landscape continues to dramatically be influenced by fire and the human intervention through its control.

With fire suppression activities and livestock grazing beginning in the early 1900's, the Forests of the Intermountain Region began to develop a complex character with a wider variety of tree species and more shrubs and down-woody debris. The forest succession pattern grossly depicted in Appendix A became evident. Large, seral species, such as ponderosa pine, were slowly replaced by shade tolerant climax vegetation such as Douglas-fir or grand fir. Stand replacing fires are less frequent in lodgepole pine forests, which naturally depend on fire to help regenerate the species. The high elevation forests are losing their diverse mosaic character, creating stands with high fuel loads and insect and disease susceptible trees. These stand conditions, historically, seldom occurred naturally and today are producing a situation where high intensity catastrophic fires will occur.

A typical scenario for the sixth successional stage follows (see appendix A). During the early old-growth stage, seral species (if present) usually dominate the tree canopy layer with various sizes of the climax species present in the understory. A few large trees (size is species dependent) and snags are present as the seral species succumbs to various pathogens. Some of the older upper canopy trees reveal the decadence of the stand. They may have dead (spiked) or broken tops with a patchy appearance as their crowns become sparse and contain open areas or "windows;" fire scars or fungi fruiting bodies may be present. The seral species have obtained their mature height, and crown width; and upper crowns may appear rounded. Evidence of disease, insects, and fungi are usually present in the stand. Both climax and seral forbs, grasses, and brush may be present in the understory if such a capability exists. The area begins to develop holes or gaps where trees have died and fallen, allowing climax vegetation to release.

If succession continues the seral species are replaced in the overstory canopy by climax tree species. Usually moderate numbers of large snags, down logs, and woody material are present due to seral tree deaths, caused by pathogens and disturbances. Tree deaths resulting in standing dead and down woody materials, plus some living trees with broken tops or rotting boles contribute to decadence, a necessary attribute of old-growth. Decadent conditions in old-growth result in important snags, logs, and rotting trees that provide potential habitat for several species of birds and small mammals. Decadent conditions also indicate suitable habitat for certain plants which are not easily seen such as saprophytes and lichens which are not readily inventoried. Because forest sites vary in growth and stand development, specific old-growth attributes vary by forest type. As succession advances, as it could with some species, a late sixth stage composed of climax, relatively tolerant species could occur having less patchiness and variation in tree and understory canopy. Decadence of the seral vegetation with its snags, down logs, and rotten trees is less common in this situation. Plant and animal occupancy is also different because of a difference in niche diversity 1/.

This effort to define old-growth recognizes the considerable variability that can exit for specific ecological attributes that characterize late seral and climax stages of development across the geographical range of a given forest cover type. The attribute values identified in this report generally reflect averages across a broad range of habitat types. When compared to similar descriptive efforts for a given cover type located in areas other than those addressed in this report, some variances may be noted in specific attributes as changes in latitude, longitude, or other geographic or topographic changes are encountered.

1/ Thomas, J.W., ed. 1979. Wildlife habitats in managed forests: the Blue Mountains of Oregon and Washington Hdbk No. 553. Washington, DC: Service p. 52.

Method of Determination

A variety of methods were used by each team to develop the specific definition for old-growth for each cover type. All definition teams included ecologists, National Forest and/or District silviculturists, wildlife biologists, and a research silviculturist or ecologist. To assist the team, various members of interested or concerned publics were contacted to obtain information and concerns about old-growth and how it was defined. Interest and input was variable between the six sub-Region team areas.

Data from a variety of sources were used to start the identification process. Each sub-Region team developed minimum standards for old-growth that utilized attributes identified as mandatory by the National old-growth group. Teams used stand examination, forest survey, and other inventory data for National Forest stands to develop old-growth definitions. In addition, the experience of team members was relied on to refine or assist in the development of standards for the definition. Research information, such as habitat type survey plots, was used to identify and confirm definitional standards.

COVER TYPES

Old-growth definitions and descriptions for 12 cover types found in portions of Intermountain Region are developed. Each type description and definition follows the same organization pattern. The cover type name and accompanying SAF type code begin each section. Following those the section is organized as follows:

1. Species Name
2. Description
3. Area of Application
4. Standard Summary of Old-growth Characteristics
   (DBH*, TPA*, and AGE*, columns * indicates required minimums)
5. Description of Attributes
6. Stand Size and Shape
7. Habitat Types Where it Occurs.

Make sure that you read each old-growth definition in its entirety to assure that application is correct and the location is appropriate. Review each SAF cover type to assure appropriate application of the definition.

Each old-growth definition and description conforms to a western forest cover type described between pages 80 to 128 of the publication *Forest Cover Types of the United States and Canada*; F.H. Eyre, Editor, published by the Society of American Foresters, 1980. The old-growth definitions comply with the indexing used in the above publication for the 12 cover types. The index is found on Table 2, page 80 of the publication. The 12 cover types are indexed as follow:

HIGH ELEVATIONS

Engelmann spruce - subalpine fir (206)
Whitebark pine (208)
Bristlecone pine (209)

MIDDLE ELEVATIONS

Interior Douglas-fir (210)
Grand fir (213)
Blue spruce (216)
Aspen (217)
Lodgepole pine (218)
Limber pine (219)

LOW ELEVATIONS, INTERIOR

Interior ponderosa pine (237) (North Plateau Race)
Interior ponderosa pine (237) (Rocky Mountain Race)
Pinyon juniper (239)

SAF COVER TYPE
ENGELMANN SPRUCE-SUBALPINE FIR
CODE 206

Species: *Picea engelmannii* - Engelmann spruce
Abies lasciocarpa - Subalpine fir

Description

The spruce-fir forests, as commonly referred to, have Engelmann spruce and subalpine fir growing in common association. Both species occur in the high-elevation Rocky Mountain forests of the Intermountain Region. They dominate sites with cool and humid climates, long, cold winters, and short, cool summers. Subalpine fir together with Engelmann spruce forms a climax or long-lived seral forest. Each species also can form nearly pure stands. Engelmann spruce is rated as tolerant in its ability to endure shade, but it is less tolerant than subalpine fir. Engelmann spruce is usually a much taller and longer lived species than subalpine fir. Subalpine fir seldom endures for more than 250 years while Engelmann spruce exceeding 450 years is not uncommon. This disparity in age and stand height often influences stand composition; the spruce persists while the fir suffers mortality, regenerates and becomes a secondary canopy in the old stands of spruce.

Pure stands of Engelmann spruce often occur at low elevations along broad valley bottoms where cold air accumulations and high water tables are common. Pure subalpine fir stands are common at the highest elevations of forests where available moisture is a problem. Subalpine fir with its reduced leaf area and smaller canopy area per tree controls transpiration loss; this favors its survival on such sites.

Both species are very susceptible to fire, insects, disease, and wind damage. Fire does not occur frequently in the high elevation, cool-moist zones where the species occur. Both species have very thin bark and are easily affected by even low surface temperature fires. Where accumulations of fuels occur from windthrow or insect mortality catastrophic fires can occur. Such fires would dramatically alter this ecosystem, usually eradicating spruce or fir from the site for periods as long as 300 years.

The spruce beetle is a very serious insect pest for mature and over mature spruce. Several major epidemics were recorded in recent history, usually triggered by a windfall in this rather unstable species. This insect, because of response capability and difficulty in detection, often places large areas with young and old aged spruce at very high risk. Losses can range to several thousand acres in extensive spruce-fir areas and can occur within a few years.

Standard Summary of Old-Growth Characteristics

Vegetative Series: Engelmann spruce, Subalpine fir, Grand fir
SAF Cover Type: Spruce - fir
Applicable Area: Intermountain Region
Site Productivity: N/A

Live trees

Main canopy			Variation in tree diameter	Tree decadence	Tree canopy layers
DBH*	TPA*	Age*	6-in Classes	TPA-DBH	Number
Warm/moister environments					
≥20 Utah ≥24 Idaho	≥25	≥220	≥2	Evidence	≥2
Cold/dry environment					
≥15	≥15	≥150 to 180	≥2	≥2-14	≥2
Alpine transition environment					
≥12	≥10	≥150 to 180	≥2	Evidence	≥2

Dead Trees

Standing		Down	
DBH/ht ft	TPA	Diameter (in)	Pieces/acre length in ft (min. length)
Warm/moist environment			
≥12/15	≥2	≥12	≥1-8
Cold dry environment			
10/15	2 to 4	≥8 or >6	≥16-8 ft or 100 pieces >8 ft
Alpine transition environment			
N/A	Infrequent	N/A	Infrequent

The old-growth nature of these stands results in horizontal and vertical diversity due to variety of tree sizes. There are at least two recognizable size classes that differ by at least 6 inches in diameter. The size difference also creates at least two canopy layers rather than just small trees in the same canopy layer. Upper canopy coverage ranges from an open canopy created by numerous tree fall gaps to 60 percent canopy closure in the stand. Both even-aged and uneven-aged stands exist depending on disturbances and species occurrence.

Live trees in an alpine transition environment: The most severe sites in this cover type contain pure stands of subalpine fir in the transition zone between subalpine forest and the alpine zone. Old-growth features are not striking. Trees become more widely spaced with much bare ground or rocks evident in the stand. Regeneration by seed is very sporadic, usually occurring in areas of developed or accumulated soils that can hold moisture during dry periods. Subalpine fir also reproduces vegetatively through layering of basal branches. It successfully occupies the available suitable growing sites. Often near the more exposed, harsher environments subalpine fir becomes a krummholz cushion. Natural regeneration occurs mainly where uprooted trees have exposed mineral soil and provided protection from desiccation. Site limitations reduce tree numbers to about 10 per acre with dominant trees averaging more than 150 years old and exceeding 12 inches DBH.

Dead trees

Dead trees in a warm/moist environment: Decadence is perhaps the most important component in old-growth. Down woody material resulting from fallen trees, broken tree tops, or large limbs varies with the production capability of the site. These sites are normally very moist and at times the decay rate may exceed the wood production accumulation rate. However, in the old-growth condition high rates of tree fall should result in at least 16 linear feet of 8-foot and longer pieces that are 10 or more inches in diameter. Dead standing trees may be scarce; small size predisposes them to rapid decay. Two or more snags per acre at least 12 inches DBH and 15 to 20 feet in height should occur randomly in the stand. The rapid decay and strong winds that are common on some of the sites often control the abundance and duration of standing dead trees.

Dead trees in a cold/dry environment: Dead standing tree are less scarce than in the moister and warmer areas because of less fungal activity. Although small in size, as few as two, but more commonly at least four standing dead trees, at least 10 inches DBH and 15 feet in height should occur in the stands.

SAF COVER TYPE
INTERIOR DOUGLAS-FIR
CODE 210

Species: *Psuedotsuga menziesii* variety glauca -
Rocky Mountain Douglas-fir

Description

Rocky Mountain Douglas-fir grows in extensive pure stands, that are both even and uneven-aged in southern Idaho, western Wyoming, and Utah. It also occurs associated with a broad belt of other species, between the lower elevation ponderosa pine and the upper elevation spruce-fir zones. It is associated with a variety of species.

Douglas-fir can be either a seral dominant or a climax dominant on a wide range of sites and is associated with several species. Old-growth Douglas-fir shall be stratified into these different situations. Each situation is defined by the species variable response. The responses are associated with the productivity of the site and general situation of occurrence. These situations are described as follows:

1. Douglas-fir on dry or colder, lower productivity sites with the following attributes:

    a. Douglas-fir often the seral dominant as well as the climax dominant. Engelmann spruce or subalpine fir also are the climax habitat type series. Lodgepole pine occasionally is seral.

    b. Under growth variable, ranging from shrub layers to scattered, dry-site grasses. Some dry sites have open-forest, savannah appearance.

    c. Dryer, low production of understory vegetation.

2. Douglas-fir often with ponderosa pine a common seral species occurs on moist higher productivity sites.

    a. Ponderosa pine, a vigorous seral, dominates the early stages in most habitat types.

    b. Lodgepole pine may also be a vigorous early dominant, seral component in a few habitat types.

STANDARD SUMMARY OF OLD GROWTH CHARACTERISTICS

Vegetative Series: Douglas-fir, Grand fir, White fir, Engelmann spruce, and Subalpine fir
SAF Cover Type: Interior Douglas-fir
Applicable Area: Intermountain Region
Site Productivity: N/A

SERAL AND CLIMAX

Live Trees

Main canopy			Variation in tree diameter	Tree decadence	Tree canopy layers
DBH*	TPA*	Age*	6-in Classes	TPA-DBH	Number
Higher productivity sites					
24	≥15	≥200	≥2	Evident	≥2
Lower productivity sites					
18 (14)*	10 (5)**	≥200 (-25yr)	≥2	≥2-15	≥2

Dead Trees

Standing		Down	
DBH/ht ft	TPA	Diameter (in)	Pieces/acre length in ft (min. length)
Higher productivity sites			
20-20	≥1	≥12	≥0-16
Lower productivity sites			
16-10	Variable-3 0-3	≥15 large end	Infrequent 4-≥8

Note:

( )* Minimum diameter of Douglas-fir/heartleaf arnica lowest productivity sites or common juniper habitat types.

( )** Minimum trees per open savannah and/or dry, harsh sites.

Description of Attributes

Live trees

Live trees on lower productivity sites: are characterized by an over topping canopy of Douglas-fir in either late seral or climax successional stage. Larger dominant and co-dominant trees within the stand equal or exceed 18 inches in diameter. There are 10 or more tree per acre in the over topping canopy that is 200 years or older, except where other minimums are met. Height growth has almost ceased resulting in flattening of the upper crown. A reduced minimum diameter of 14 inches is necessary for the poor site quality the Douglas-fir heartleaf arnica and common juniper habitat types as well as a reduction by 25 years of the minimum age, or dry, harsh sites the minimum is reduced to five dominate trees per acre.

Live trees on higher productivity sites: The principal difference from the lower productivity sites minimums are the larger minimums 24 inches in diameter and an age exceeding 200 years. More productive sites reach the larger diameters quicker and usually survive to older ages with less risk from pathogens and insects.

Diameter classes, canopy layers and tree decadence: Horizontal and vertical diversity are important attributes of old-growth. Stands shall have a variety of tree ages and sizes, at least two 6 inch diameter classes will be recognizable. The diameter difference should also create at least two layers in the tree canopy rather than just smaller diameter trees in the same layer. Pathogens and insects have a variable influence on these stands. Lower productivity sites due to higher drought and other stresses have at least 2 damaged live trees with a broken or dead top and/or deformed boles that are randomly distributed.

Dead trees

Dead trees in most stands have snags from 16 inches in diameter on the lower productivity sites to 20 inches on the higher productivity sites. On the lower productivity sites more snags are apt to be found because of the more stressful environment. One or less snags per acre will be found on higher producing sites. On lower productivity sites three or less snags is the average per acre. Snags commonly occur in groups throughout the stand seldom occurring as individuals scattered throughout an area. Insects, root, and stem pathogens, and fire are the principle agents causing the development of snags.

SAF COVER TYPE
GRAND FIR
CODE 213

Species: *Abies grandis* - Grand fir

Description

Grand fir, a shade tolerant species, is a climax species on the sites where it occurs in the Intermountain Region. Grand fir predominates in these stands and makes up the plurality of stocking. In the absence of fire, it will replace its common associates--ponderosa pine, Douglas-fir, western larch, lodgepole pine, and Engelmann spruce. The shade tolerance of the species allows it to establish itself under brushy conditions, therefore, there may not be any of its less shade tolerant associated species present in these conditions. As a result of low intensity surface fires, frost cracks, and other bole injuries many stands have a large proportion of trees with defects that have bole and root rotting fungi. In the Intermountain Region grand fir is considered a hybrid of grand fir and white fir exhibiting true traits of both.

Area of Application

In the Intermountain Region grand fir is found only on the Boise, Payette, and Salmon National Forests of southern Idaho.

Standard Summary of Old-Growth Characteristics

Vegetative Series: Grand Fir
SAF Cover Type: Grand Fir
Applicable Area: Boise, Payette, Salmon NF's
Site Productivity: Moderate-High

Live Trees

Main canopy			Variation in tree diameter	Tree decadence	Tree canopy layers
DBH*	TPA*	Age*	6-in Classes	TPA-DBH	Number
≥24	≥15	≥200	≥2	Evidence	≥2

Dead Trees

Standing		Down	
DBH/ht ft	TPA	Diameter	Pieces/acre length in ft (min. length
20-20	≥2	≥12	2-25

Descriptions of Attributes

Live trees

When a combination of 15 or more trees per acre occur in the overtopping canopy, with a minimum diameter breast height (DBH) of 24 inches and an age of 200 years or older, old-growth characteristics are evident. These trees can be any species on the site meeting the trees per acre (TPA), diameter (DBH), and age requirements. The minimums are not absolute so minor variations may be acceptable if other characteristics are present.

The old-growth nature of these stands results in a variety of tree ages and sizes. Consequently, there should be at least two recognizable size classes that differ by at least 6 inches in diameter. The size difference should also create at least two layers in the tree canopy rather than just smaller diameter trees within the same layer. These attributes are necessary for the structural diversity common to old-growth stands in this cover type. The upper-most tree canopy may be quite open with natural openings created by fallen trees.

Dead trees

Insects, root and stem pathogens, and fire are the principal agents resulting in snags in the grand fir series. A minimum of two snags larger than 20 inches DBH and at least 20 feet in height would be found in an old-growth stand. Smaller snags less than 20 inches DBH would also be common. Snags would commonly occur randomly in groups throughout the stand and seldom on each individual acre.

Down-woody material is measured by the length of the dead material segments which are at least 12 inches in diameter at the small end. It is a function of site productivity, age, and the degree of decadence in each stand. We would normally expect more down material than the minimum two pieces totaling 25 lineal feet, but past fire activity influences the amount of material on site.

Stand Size and Shape

Ten acres or more. Past inventory procedures have classified stands as 10 acres or larger. Viable old-growth stand sizes have not been determined at this point. Surrounding stand conditions should be considered in determining old-growth stand size in addition to management objectives.

SAF COVER TYPE
BLUE SPRUCE
CODE 216

Species: *Picea pungens* - Blue Spruce

Description

Blue spruce is native to the central and southern Rocky Mountains. This slow growing, long lived species, of medium size is found growing in the cool and humid zone. Most of its annual moisture occurs during the growing season. It's moderate in shade tolerance.

Blue spruce grows on sites that are usually more moist than those of ponderosa pine but warmer than those of Engelmann spruce and subalpine fir. It is found growing in the montane zone; on gently sloping upland and subirrigated areas, in well watered tributary drainages, extending down intermittent streams, and on northerly slopes. Because of its growth character it occurs with a variety of streamside or riparian hardwoods such as as aspen, cottonwood, water birch, willow, and others. In Utah blue spruce is considered a climax species in three environments; gentle to steep mountain slopes, flood plains and valley bottoms, and montane sites on alluvium or aqueous north-aspect deposits. Often these sites have soils derived from sedimentary parent material. The species is successful because it withstands drought and low temperatures successfully.

The areas that blue spruce occupies, normally are not large or extensive. It often grows in almost pure stands. On dryer slopes it may be open and broadly spaced. It often occurs as isolated stands or groups of trees.

Although a slow growing species blue spruce has good longevity. Trees 18-22 inches DBH may be 275-300 years old. Fire is not a dominate influence in blue spruce stands, although its thin bark makes it quite susceptible to damage. While numerous species of insect and disease affect blue spruce no single species has a major influence on them.

Area of Application

In the Intermountain Region Blue spruce is confined principally to southeastern Idaho, western Wyoming, and Utah.

STANDARD SUMMARY OF OLD GROWTH CHARACTERISTICS

Vegetative Series: Blue Spruce, Subalpine fir, and White fir
SAF Cover Type: Blue Spruce
Applicable Area: Targhee, Bridger-Teton, Caribou, Wasatch-Cache, Uinta, Ashley, Fishlake, Manti-LaSal, and Dixie National Forests
Site Productivity: N/A

Live Trees

Main canopy			Variation in tree diameter	Tree decadence	Tree canopy layers
DBH*	TPA*	Age*	6-in Classes	TPA-DBH	Number
≥16	≥10	≥250	≥3	≥1-14	≥3

Dead Trees

Standing		Down	
DBH/ht ft (in)	TPA	Diameter (in)	Pieces/acre length in ft (min. length
3-10	0-1	3-10	Infrequent

SAF COVER TYPE
ASPEN
CODE 217

Species: *Populus tremuloides* - Quaking aspen

Description

Aspen is the most widely distributed forest type in North America. Over its extensive range it associates with a number of tree species. Generally, aspen forests are considered seral to conifer forests over much of its range. However, aspen forests are also noted for their stability. Aspen in the Intermountain Region constitutes a typical topo-edaphic climax at the lower elevations of the upper montane and subalpine forests. Extensive stands are usually attributed to repeated wildfires and in some instances to excessive grazing. Aspen is an aggressive pioneer usually dominating sites until replaced. That replacement process may take up to 1,000 years of fire exclusion.

In the Intermountain Region aspen is considered a permanent (stable) type on some sites. Conifers would invade the type if seed trees were available. In some instances the un-evenaged character in some aspen stands indicates a *de facto* climax.

The principal separation between seral and stable (*de facto* climax) aspen stands seems to be tied to the presence of specific indicator species, Muegeller (1988) in "Aspen Community Types of the Intermountain Region" identified types as: stable, seral to conifers, and grazing disclimax. The stable and grazing disclimax situations represent long-term persistent aspen stands where the conditions tied to the Forest Service generic definition of old-growth can be met.

Seral stands have vigorous and abundant conifer reproduction in the tree canopy layer that constitutes more than 10 percent of the layer. The stable stands have little or no conifer reproduction, thus less than 10 percent of the tree canopy is conifer. A grazing disclimax is much more difficult to determine, but is of little concern because of the lack of conifers.

Old-age is a relative term with aspen. Stands of aspen seldom persist for more than 200 years. However, root systems, where most regeneration occurs, persist up to 8,000 years, research suggests.

Aspen aerial shoots are moderately short lived. Life span is controlled primarily by site capability, elevation, and biologically damaging agents. Aspen stands older than 100 years are usually affected by heart and butt rotting fungi, plus species of several canker. These stable aspens stands are typically characterized as late mature or seral stage five (see appendix A). The time in this stage is usually short because of the number and virulence of pathogens.

Area of Application

The old-growth aspen definition applies only to the stable (aspen is both seral dominant and potentially climax-dominant) and grazing disclimax (severe alteration from past intense grazing) stands. The seral stands may contain what may qualify as old-growth, but its maintenance would require a treatment to remove the competing conifers. Stable and disclimax stands are located primarily in northern Wyoming, southeastern Idaho, Utah, and Nevada.

Standard Summary of Old-growth Characteristics

Vegetative Series: Quaking Aspen
SAF Cover Type: Aspen
Applicable Area: Southern Idaho, N. Wyoming, Utah, and Nevada
Site Productivity: N/A

Live Trees

Main canopy			Variation in tree diameter		Tree decadence	Tree canopy layers
DBH*	TPA*	Age*	6-in Classes	TPA-DBH	Number	
≥12	10 dry 20 mesic	100	≥2	N/A	≥2	

Dead Trees

Standing		Down	
DBH/ht ft	TPA	Small diameter (in)	Pieces/acre length in ft
≥10-15	2	8	≥10-10

Description of Attributes

Live trees

A 100-plus year old stand that contains trees greater than 12 inches in diameter; and ranges from 10 trees per acre on dry sites to 20 trees per acre on the more mesic environments. These large diameter trees dominate a canopy of smaller diameter trees that may overtop clumped or uniformly distributed seedling and sapling sizes. Two or more 6-inch diameter classes will be common.

Dead trees

On the average four snags at least 10 inches in diameter and 15 feet or greater in height per acre will occur in the stand. The snags would be created primarily by various fungi killing trees. Clumps of dead trees are common.

Dead material that is on or near the ground is composed primarily of 10 large trees broken or blown down that are larger than 8 inches at the small end and 10 feet in length.

Stand Size and Shape

Ten acres is the minimum area identifiable with normal inventory procedures. Viable old-growth stand sizes have not been determined at this point. Surrounding stand situations plus area management objectives should be considered in determining old-growth stand size.

SAF COVER TYPE
LIMBER PINE
Code 219

Species: *Pinus flexilis* - Limber pine

Description

Where limber pine occurs in pure stand or composes the majority of the stocking it is a long lived very shade intolerant, slow growing, small to medium sized tree, predominating only on windswept, very dry environments on rocky gravels and coarse sands. The species has an affinity for sedimentary and calcareous derived soils. It occurs on low, and high altitude sites between the 40th and 45th parallels. South of the 45th it tends to shift to the upper montane and alpine treeline.

The species grows throughout the Intermountain Region on a variety of topographies, from gently rolling terrain to steep rocky slopes and cliffs. In the northern portion it is generally found at lower timberline and because of its small stature is considered an associate of the woodlands. However, it is also found on dry sites in the upper montane forest and on dry, wind-swept sites near timberline. While limber pine can and will grow in association with ponderosa pine, Douglas-fir, quaking aspen, and Great Basin bristlecone pine, its ability to survive on very dry windswept sites at various elevations allows it to predominate.

In the Intermountain Region limber pine is divided into two variants because of its occurrence and growth character. The first variant (northern) is principally a lower timberline, open forest type with an understory of shrubs or grass. The second variant (southern), which occurs mostly in Utah, is a harsh site woodlands type occupying poor soils in the upper montane forest zone to alpine timberline. The first variant is identified as "lower timberline" and the second is the "montane woodlands."

The "lower timberline" variant occurs, as described by its name in open woodlands and savannahs. Often it is a pure type, but may occur in association with Douglas-fir. These harsh sites have an open-grown character, with widely-separated clumps of trees on favorable micro-sites, separated by open grassy or shrubby areas with very few trees. The sites are often subject to much wind.

The middle and upper elevation montane woodlands are areas with moisture capability to support "montane woodlands," limber pine trees along with juniper and pinyon pine. On high elevation severe sites limber pine, whitebark pine, and Great Basin bristlecone pine occur. The trees are widely spaced, crooked, and often multi-stemmed, with sparse shrubs or herbaceous understory. The trees are often affected by strong winds on these sites. On the more favorable sites with more moisture balance, Douglas-fir may be present. Even on these sites canopies remain open; tree numbers increase only because favorable sites increase.

Most sites are relatively inaccessible and have little use by man. Most disturbances, such as fire, are very limited, as is insect and disease damage. This species, life expectancy is long as is that of its common associate, bristlecone pine. The term old-growth may have special significance on these sites as trees may live for a thousand or more years.

Area of Application

"Lower timberline" limber pine occurs primarily in the northern part of the Intermountain Region, principally in southern Idaho and western Wyoming. However, in some of this same area, some limber pine Forest also occur in the near timberline situation. This is usually where sedimentary soils are common. The overlap of this species with whitebark pine sometimes makes them difficult to distinguish. Cone characteristics are the most quickly distinguishable feature.

In most of Utah and Nevada the "montane woodlands" variant prevails. However, in a few situations a "lower timberline" stand may occur. In most cases the harsh sites are the only place that limber pine will predominate. Parent materials often control the occurrence of limber pine.

Standard Summary of Old-Growth Characteristics

Vegetative Series: Limber Pine, Bristlecone Pine, and Douglas-fir
SAF Cover Type : Limber Pine
Applicable Area: Intermountain Region
Site Productivity: Low

Live Trees

Main canopy			Variation in tree diameter	Tree decadence	Tree canopy layers
DBH*	TPA*	Age*	6-in Classes	TPA-DBH	Number
Lower timberline					
≥16	≥10	>250	≥1	Evident	≥2
Montaine woodlands					
≥16	≥10	≥500	≥1	Evidence	1

Dead Trees

Standing		Down	
DBH/ht ft	TPA	Diameter (in)	Pieces/acre length in ft (min. length)
Lower timberline —			
N/A	Few	≥16	Rare
Montane woodlands			
N/A	Few	N/A	Rare

SAF COVER TYPE
INTERIOR PONDEROSA PINE
CODE 237

Species: *Pinus ponderosa* variety *ponderosa*
Pacific ponderosa pine-North Plateau Race

Description

The SAF defined interior ponderosa pine cover type encompasses a very large area of the western United States. In the Intermountain Region it occupies two distinct ecosystem situations. Pacific ponderosa pine, a broadly distributed species, has a distinct north plateau race. That race occurs east of the Cascade Mountains throughout Oregon, Washington, and into Idaho and Montana, and is the sole race discussed in this section.

This cover type has been dramatically altered by human activity. Exclusion of fire and intensive livestock grazing activities have altered stand composition. Often seral ponderosa pine stands are being replaced by associated species, such as Douglas-fir, grand fir, and occasionally lodgepole pine. In all cases, regeneration is much more abundant and has created a layered stand structure largely uncommon in presettlement conditions. Current descriptions of old-growth could be greatly contrived by man's somewhat sporadic actions. Susceptibility to catastrophic events such as fire and pathogens is dramatically changing. The capability to maintain current characteristics of developed old-growth stand attributes is not fully known or understood. However, ponderosa pine, which is a long-lived species may be slowly lost as a major cover type through successional advances, control of fire, and other human-controlled, ecosystem-altering practices.

Area of Application

In the Intermountain Region this interior ponderosa pine north plateau race cover type occurs only on the Boise, Payette, Sawtooth, and Salmon National Forests. Within the interior ponderosa pine cover type in southwest Idaho, there are also two distinct categories of situations for old-growth ecosystem definitions:

1. Interior ponderosa pine cover type where ponderosa pine is the climax species; climax sites,

2. Interior ponderosa pine cover type where ponderosa pine is the dominant seral species; serial sites.

Refer to the "Habitat Types Where It Occurs" portion for those habitat types where ponderosa pine is the climax or seral species.

Standard Summary of Old-Growth Characteristics

Vegetative Series: Douglas-fir, grand fir
SAF Cover Type : Interior ponderosa pine
Applicable Area: Boise, Payette, Salmon, and Sawtooth NF

Live Trees

Main canopy			Variation in tree diameter	Tree decadence	Tree canopy layers
DBH*	TPA*	Age*	6-in Classes	TPA-DBH	Number

Seral sites

24	≥10	200	≥2	N/A	2

Climax sites

24	≥5	200	≥2	N/A	1

Dead Trees

Standing		Down	
DBH/ht ft	TPA	Diameter	Pieces/acre length in ft (min. length
Seral sites			
20/20	≤1	12	0-16
Climax sites			
N/A	Infrequent	N/A	Infrequent

SAF COVER TYPE
INTERIOR PONDEROSA PINE
CODE 237

Species: *Pinus ponderosa* variety *scopulorum*-
Rocky Mountain ponderosa pine - Rocky Mountain race

Description

This cover type has been altered by human activity. Some human encroachment through selection harvesting and cattle grazing has occurred on most lower elevation cover types. Fire prior to settlement played a dominant role in the development of these stands. However, the recent exclusion or control of fire has dramatically influenced the understory structure and composition of much of this type. Where ponderosa pine is seral, Douglas-fir and white fir are the climax vegetation species and ponderosa pine is being replaced. Large ponderosa pines remain in the overstory while the understory is dominated by the more shade tolerant species. In climax ponderosa pine areas, ponderosa pine is the overstory but a clumpy, patchy ponderosa pine understory is more common; regeneration may also be nearly absent. Such changes in stand character certainly alter the capability of maintaining or perpetuating the open, park-like stand character that existed prior to European influences. In all cases the current, denser, storied stand character is not only more susceptible to catastrophic fire, but to certain insect and disease pathogens. These mortality factors often affect whole stands rather than individual trees.

Two varieties of ponderosa pine currently are recognized. Rocky Mountain ponderosa pine, the eastern geographical variety, associated with both sides of the Continental Divide, is considered a separate variety. This Rocky Mountain variety is distinguished from the Pacific variety by the brushlike, bushy tuft (scopulate) appearance of the foliage; the Pacific variety has an plumelike foliage. This bushy tuft variety grows on the discontinuous mountains, plateaus, and canyons on both sides of the Rocky Mountains, from north-central Montana south.

Area of Application

Rocky Mountain ponderosa pine's occurrence in the Intermountain Region is limited to areas south of the northeastern portion of the Uintah Mountains near Flaming Gorge. The National Forests involved include the Ashley, Wasatch, Manti-LaSal, Fishlake, Dixie, plus the Mt. Charleston area in the Toiyabe, and the Snake Mountain Range of the Humboldt. Ponderosa pine is absent from a large portion of this area; it occurs in smaller, often discontinuous situations.

Standard Summary of Old-Growth Characteristics

Vegetative Series: White fir, Douglas-fir
SAF Cover Type: Interior ponderosa pine
Applicable Area: Utah and southeastern Nevada
Site Productivity: N/A

Live Trees

Main canopy			Variation in tree diameter	Tree decadence	Tree canopy layers
DBH*	TPA*	Age*	6-in Classes	TPA-DBH	Number
Seral sites					
20	14	≥200	≥2	≥3-5	2
Climax sites					
16	7	≥200	≥1	≥2-14	1

Dead Trees

Standing		Down	
DBH/ht ft	TPA	Diameter	Pieces/acre length in ft (min. length

Seral sites

≥15-15	2	15	2-15

Climax sites

≥14-15	1	N/A	Infrequent scattered

SAF COVER TYPE
PINYON-JUNIPER
Code 239

Species: *Pinus monophylla* - Singleleaf pinyon
Juniperus osteosperma - Utah juniper

Description:

Pinyon-juniper woodlands consist of relatively few tree species, but stands exhibit considerable diversity in appearance and composition. Some stands have closed canopies with one or both species present, and little or no understory vegetation. Other stands, in contrast, are open with widely scattered junipers and/or pinyons and a wide variety of shrub and herbaceous species in a well distributed understory. Stands may consist of all ages or one age, and may have sprawling multi-stemmed or tall, single-stemmed trees.

Historically there has been a great deal of use by man in pinyon-juniper stands. This use has had a profound influence on current stand structure and character of the understory. Most of the historical and some current use has centered around grazing and mining activities. Fire suppression has also influenced stands. Most of the negative impacts on the stands have occurred within the last 150 years. Few areas were avoided because the low elevations where it occurs were usually near settlements. Because of past grazing and deforestation, for mining and heating, a great proportion of the exiting plant communities is neither climax or near climax. This cover type is, in a real sense, the result of much past human activity more than natural ecological processes.

The woodlands in the Intermountain Regions western area pinyon-juniper are either pure singleleaf pinyon, pure Utah juniper, or a combination of the two. Pinyon often is predominant in the mixed-species stands. Pure juniper stands are found only at the lowest elevations on ranges below where pinyon occurs. Juniper is generally absent from upper elevation areas of the range. These woodlands at upper elevations border the mountain brush zone. In some upper elevation areas singleleaf pinyon is mixed with curlleaf mahogany or locally with limber pine, Jeffrey pine, ponderosa pine, white fir, or Rocky Mountain juniper. Pure stands of singleleaf pinyon occur on all elevations along the western side of the Great Basin in western Nevada and eastern California. On more productive sites pinyon can grow to large size. Juniper is generally small in size and sparsely distributed on the lower drier portions of the woodlands, but larger juniper will grow on more productive sites. Junipers are also found in pure stands at all elevations across the northern Great Basin and into southern Idaho, northern Utah, and western Wyoming.

Area of Application

Pinyon-juniper woodlands in the Intermountain Region occur in two broad ecological areas. The boundary between these two areas generally coincides with the boundary between Colorado pinyon and singleleaf pinyon (Betancourt, J.L., Proceedings, 1987 pinyon-juniper conference. GTR INT-215. Ogden, Utah, USDA Forest Service page 133). Areas of hybridization between the two species are included in the Colorado pinyon region. Geographically the areas are separated by a boundary that runs through and connects the lowest elevations of the Bonneville Basin, Sevier Desert, and Escalante Desert in western Utah. The entire Toiyabe and Humboldt National Forests, the Wellsville mountains and Cache Valley portions of the Wasatch-Cache National Forest, and the Goose and Grouse Creek Mountains, Raft River Range, Black Pine Mountains, and the Cassia areas of the Sawtooth National Forest are included in this description of old-growth criteria.

For the remainder of Utah National Forests, the eastern sites influenced by Colorado pinyon and the zone of hybridization, the description and old-growth criteria developed by the Southwest Region (Region 3) are applicable.

Standard Summary of Old-Growth Characteristics

Vegetative Series: Singleleaf Pinyon - Utah Juniper
SAF Cover Type : Pinyon - Juniper
Applicable Area: Humbolt and Toiyabe NF, Sawtooth National Forest south the Snake River, the Wasatch-Cache NF portions encompassing the Wellsville Mountains and Cache Valley drainage.
Site Productivity: See description of attributes

Live Trees

Main canopy			Variation in tree diameter	Tree decadence	Tree canopy layers
1/ DRC*	TPA*	Age*	6-in Classes	TPA	Number
Low					
>12	≥12	>200	≥1	N/A	N/A
High					
>18	≥30	≥250	≥1	N/A	N/A

Dead Trees

Standing		Down	
1/ DRC/ht ft	TPA	Diameter (in)	Pieces/acre length in ft (min. length)
Low			
12-5	≥.05*	≥10	≥2-5
High			
15-8	≥1	≥12	>2-8

*Dead limbs help make up the deficit for dead material.
**Some allowance for firewood and burning activity may be allowed.
1/ Diameter root crown.

Description of Attributes:

The following attributes are the minimum acceptable criteria for threshold old-growth in the singleleaf pinyon and Utah juniper portion of the pinyon-juniper cover type.

There are two stand potential production descriptions that should be used to segregate the stand situations encountered. Low production potential stands are usually found at lower elevation, drier portions of the type. Trees are short, with diffuse, sprawling crowns, often multiple stems, and low density per acre. Juniper-dominated areas have a well developed shrub-herbaceous understory. Increased pinyon presence diminishes understory to low and sparse levels.

High production potential sites are usually the upper elevation, moister regions of the type, where trees are taller and tend to be single stemmed with less diffuse crown area. Stands are usually dense; often pinyon predominates with little understory vegetation.

Live Trees

On low production potential sites, rather open stand types have 12 trees per acre greater than 12 inches in diameter (DRC, diameter root crown), and at least 200 years of age that produce at least 8 square feet of basal area per acre average. The total canopy coverage for all live trees on this site is 15 percent or more.

On high production potential sites, total canopy coverage exceeds 35 percent for all the live trees. These largely single-stemmed stands have 30 or more trees per acre that exceed 18 inches in diameter (DRC) producing at least 30 square feet of basal area. The trees are 250 or more years of age.

Dead trees

Low production potential, open growing stands, have few standing trees that are dead. They are widely scattered with about one per 20 acres that is 12 inches in diameter (DRC) and at least 5 feet in height. Stands unaffected by firewood removals should have two pieces longer than 5 feet in length and at least 10 inches in diameter at the small end as down woody debris.

High production, denser stands have more snags per acre, with at least one 15 inches or more in diameter (DRC) and 8 feet in height per acre. The down logs on these sites occur at about two per acre greater than 8 feet in length and 12 inches in diameter.

APPENDIX A

Forest Successional Stages

SUCCESSION: Plant communities evolve through a general series of conditions as they progress from bare ground to the final stage (climax). This gradual process is called succession and is subdivided into various stages that are known as successional stages.

1. GRASS-FORB - the vegetation is dominated by grasses and forbs. Many times remanent snags and downed logs are present in the stand. This stage is usually short-lived in most forest successions.

2. SHRUB-SEEDLING - the brush may be low brush (e.g. snowberry) or tall brush (e.g. willow) depending on the habitat type. Tree seedlings/saplings are usually under 10 feet tall. Remnant snags and downed logs may still be present in this stage.

3. POLE-SAPLING - the trees are usually taller than 10 feet, but are usually less than 8 inches in diameter. An occasional dead tree, or a few remaining snags, may be present.

4. YOUNG - trees are usually greater than 8 inches in diameter and in a vigorous stage of growth. Few snags are present and most down material is small limbs and twigs.

5. MATURE - trees have reached their height growth and their crowns start to widen, but stand conditions do not meet all the old growth characteristics. Climax (shade tolerant) tree species are becoming evident in the understory, but large snags and down woody materials are uncommon.

6. OLD-GROWTH (early phase) - has seral species as the overstory canopy (if seral species are present), with climax tree species of various sizes in an understory. Snags are starting to develop with some large down woody material present. Only occasional small openings are present.

6. OLD-GROWTH (late phase) - some describe this stage as "Stage 7." All seral species in the overstory have been replaced by climax vegetation. The understory contains various sizes of climax tree species. Usually large amounts of down woody materials are present, and most of the seral species snags have fallen to the ground. The stand may appear very patchy with many small opening containing seedlings/saplings and tall brush.

Attachment 2 for the Objection filed by NEC et al. for the Hungry Creek Vegetation Improvement Project on the Dixie National Forest on 6/20/24.

Attachment 2 includes relevant portions of the following reports and/or publications cited in the objection:

Audubon. 2007. State of the birds: #8common birds in decline - Loggerhead Shrike *(Lanius ludovicianus)*.

Balda, R. and N. Masters. 1980. Avian communities in the pinyon-juniper woodland: a descriptive analysis. Pages 146-168 in Workshop proceedings: management of western forest and grasslands for nongame birds. USDA Forest Service Gen. Techn. Report INT-GTR-86.

D'Ammassa, A. 2020. 'Hundreds of thousands, if not millions'; New Mexico sees massive migratory bird deaths. Las Cruces Sun-News September 12, 2020.

Defiance Canyon Raptor Rescue. 2022. Cal Fire burns next to Bald Eagle nest, eaglets die. Daily Kos April 15, 2022.

Dobkin, D. 1992. Neotropical migrant landbirds in the Northern Rockies and Great Plains.

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Frischknecht, N. 1975. Native faunal relationships within the pinyon-juniper ecosystem. Pages 55-65 in proceedings of a symposium on the pinyon-juniper ecosystem. USDA Forest Service Intermountain Range and Forest Experiment Station.

Gillihan, S. 2006. Sharing the land with pinyon-juniper birds. Partners in Flight Western Working Group. Salt Lake City, Utah.

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Maffly, B. 2018. The juniper mystery: Why is a tree that's supposed to withstand drought suddenly dying in southern Utah? The Salt Lake Tribune 11/20/2018.

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Smith C. and R. Balda. 1979. Competition among insects, birds and mammals for conifer seeds. American Zoologist 19:1065-1083.

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

USGS. 2020. Starvation, unexpected weather to blame in mass migratory songbird mortality. USDS National Wildlife Health Center.

Utah Partners in Flight Avian Conservation Strategy. 2002. Priority Species Accounts -Brewer's Sparrow, pages 121-126.

Utah Partners in Flight Avian Conservation Strategy. 2002. Priority Species Accounts – Sage Sparrow. Pages 161-167.

Woods, C. and T. Cade. 1996. Nesting habitats of the Loggerhead Shrike in sagebrush. The Condor 98:75-81.

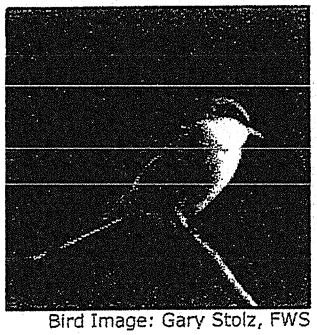
Who knew?

Loggerhead Shrike males may impale multiple prey items and adorn them with bird bills and feathers to attract a mate.

#8 Common Bird in Decline
Loggerhead Shrike
(Lanius ludovicianus)

French Name: *Pie-grièche migratrice*
Spanish Name: *Alcaudón verdugo*

Genus: *Lanius*
Species: *L. ludovicianus*
Order: *Passeriformes*
Family: *Laniidae*



Bird Image: Gary Stolz, FWS

Range Map

Rate of Decline: 71 percent in 40 years

Global Population: 2.9 million

Continental Population: 2.9 million now, 10 million 40 years ago

Watch List Status:

Appearance: A robin-sized gray bird with black wings, white wing-patches, a black m black tail. A close look reveals a hooked beak.

Vocalization: Harsh *"bzeek, bzeek"* alarm call. Song is a very quiet combination of sh clear notes, and harsh notes. Listen *(© Lang Elliot, Nature Sound Studio)*.

Habitat: Short grass with isolated trees or shrubs, especially pastureland.

Range: Found year-round in most of Mexico and the southern half of the United State breeding season only in eastern Washington and Oregon, the northern Great Plains, a Midwest. No longer found in New England and disappearing from the Mid-Atlantic stat northern portions of the Midwest.

Feeding: An opportunistic forager that consumes arthropods, amphibians, small repti mammals, birds, and even roadkill and carrion. Often forages in recently plowed fields lacks heavy talons with which to capture and hold larger prey, the Loggerhead Shrike from a perch, attacks from behind, and impales prey on thorns or barbed-wire fences. poisonous prey, including monarch butterflies and eastern narrow-mouthed toads, for to allow the poison to break down.

Reproduction: Available cover is the most important criterion for nest site selection, with thorns are preferred. The nest is usually well hidden and located on top of an exi Mean clutch size is 5.4 eggs, and birds located at higher latitudes and farther west ter

In DeGraff, R. M. Tilghman, Eds.
1980 Workshop Proceedings:
Mngt of Western Forests & Grasslands for non game birds
SLCity Ogden, UT Feb 11-14.
Intermt. F&R Exp. Stn.
INT-GTR-86.

AVIAN COMMUNITIES IN THE PINYON-JUNIPER WOODLAND:

A DESCRIPTIVE ANALYSIS

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ABSTRACT

The expansive range and elevational distribution of the pinyon-juniper woodland in the western United States contributes to the wide variety of forms of this habitat type. Similarily, the breeding-bird community expresses this variety. A total of at least 73 different bird species are known to breed here. About 31 of these species breed with regularity in pinyon-juniper woodlands. Only about 5 of these species are restricted to this habitat type. Usually less than half of the breeders are permanent residents. A high proportion of the breeding birds forage for seeds or insects on the ground. The number of species that breed in cavities and/or forage on trunks and branches is positively correlated with pinyon pine density. Seasonal densities of breeding birds vary greatly depending on annual fluctuations in precipitation and seed and berry production. Winter diversity and density is strongly correlated with juniper berry production. Both junipers and pinyons show an adaptive suite of characters for dispersal by birds.

KEYWORDS: pinyon pine, juniper, avifauna, guilds, diversity, density, breeding-birds, winter birds.

The pinyon-juniper woodland could be labeled the characteristic habitat-type of the southwest because of its expansive range.

Extending over large areas of Arizona, Colorado, Nevada, New Mexico, and Utah it occupies somewhere between 43 and 76 million acres of land in the West. In New Mexico alone the woodland covers over 32,000 square miles or 26 percent of the state (Pieper 1977). The woodland stretches from the east slope of the Sierras to Oklahoma and from Oregon to Texas and into Mexico. It is the common vegetation-type of the foothills, low mountains, escarpments, and mesas of the southwest (Fig. 1). Throughout its range this "pygmy forest" shows broad tolerance limits ranging in elevation from a high of 10,000 ft. in the Sierras to a low of 3200 ft. in the four corners area, with junipers alone extending even lower in many areas (West et al. 1975). It is found on a variety of soils derived from granite, basalt, limestone, and mixed alluvium (Hurst 1975).

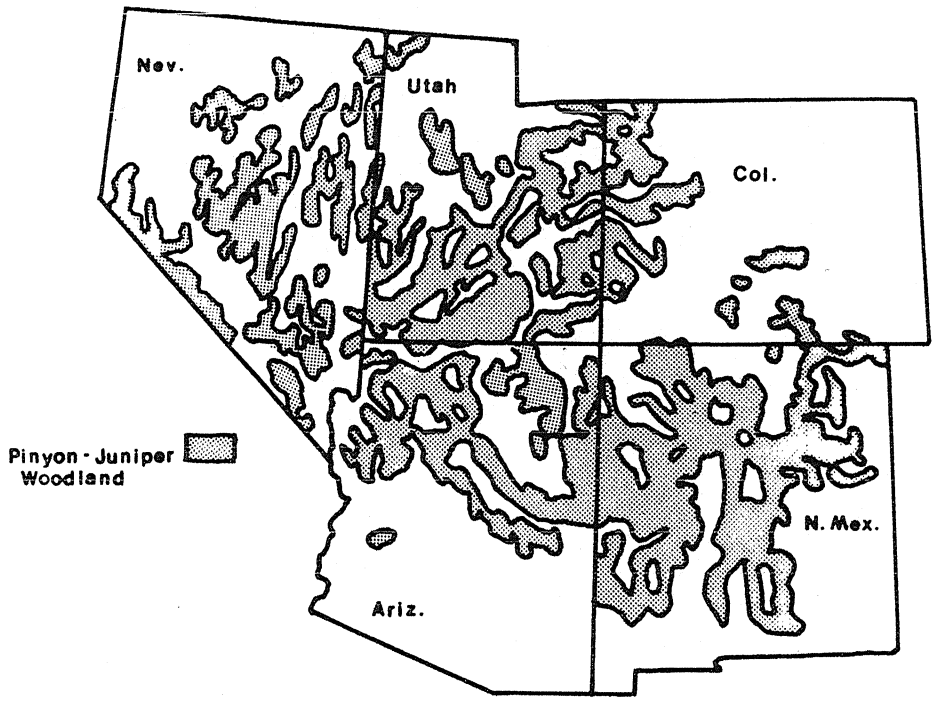

Figure 1. The distribution of pinyon-juniper woodland in the five western states where it is most abundant (From Clary 1975).

4 sps.

The major trees of this woodland consist of four species of junipers, Juniperus occidentalis, J. deppeana, J. monosperma and J. osteosperma. The latter species is the most wide-spread of the junipers. The two most common pinyon pines are Pinus monophylla and P. edulis with the latter species having the most extensive distribution. The dominant trees of the area are relatively small (hence the name pygmy forest) ranging in height from 15-40 ft. with individual trees having dense foliage. In general the junipers are more drought-resistant than pinyon pines and therefore occur in highest densities at lower elevations, whereas, pinyon pines become more abundant at higher elevations in this woodland (Short and

McCullock 1977). The density of these trees varies from very sparse to very dense depending on elevation, climate, and soil type. Total plant cover increases with elevation up to about 6600 ft. (Tueller et al. 1979).

The understory vegetation of the pinyon-juniper woodland is highly variable depending on soil type, exposure, and climatic pattern. Tueller et al. (1979) lists 240 positively identified species of vascular plants from the Great Basin pinyon-juniper woodlands. The list includes 67 species of shrubs and succulents, 46 grasses, and 122 forbs that grow under pinyon and juniper trees. Major shrubs include sagebrush (Artemisia sp.), bitterbrush (Purshia tridentata), rabbitbrush (Chrysothamnus sp.), and various species of oaks (Quercus spp.). Few of these species are found growing in association with one another, as the understory is reasonably depaupered. None of the shrubs, succulents, grasses or forbs are listed as rare and endangered and none are restricted to this vegetation type. Most woodlands contain only a few of these species. Thus, plant species diversity (as well as density) is reasonably low compared to other vegetation types in the southwest.

The climate of this vegetation-type can be summarized as being rather severe with hot summers, cold winters, low amounts of precipitation in the form of rain and snow, low relative humidity and high winds. Mean daily maximum temperatures for the hottest month of the year vary from 26°C to 36°C. Total yearly precipitation varies between 8 and 18 inches (West et al. 1975).

The lower limits of this woodland now mingle with grassland, desert scrub, Great Basin Desert or shrublands in different parts of its range. Because of climatic cycles (cool, moist to hot, dry) this lower boundary has been very active during the last 10,000 years (Martin and Mehringer 1964, Wright et al. 1973, Wells and Berger 1967). Evidence from pollen deposits, sloth dung, and wood rat middens indicate a considerable lowering of this boundary. This depression caused isolated areas of the woodland to come into contact with other such areas thus increasing the potential for redistribution of the flora and fauna. The return of a warmer, drier climate caused an upward retreat leaving behind isolated relict pockets of pinyon-juniper woodland, with its faunal components.

Even though early settlers heavily used pinyons and junipers for mine props, fence posts, and fuel, during the last 130 years the vegetation type is undergoing an expansion into low shrublands, grasslands and Great Basin Deserts (West et al. 1975). At the same time the density of trees in more permanent stands is also increasing. Numerous causes have been proposed to explain this increase, but the major culprit seems to be overgrazing by cattle and sheep (Aro 1971). Improper grazing has reduced forage production thereby releasing the trees from competition with the herbs and shrubs. Johnsen (1962) believes the spread of juniper in northern Arizona is due to the increased spread of seeds by livestock, lack of periodic fire, overgrazing which reduces competition of grasses with juniper seedlings, and a gradually changing climate which favors the spread of juniper. La Marche (1974) presents evidence that the period from 1850 to 1940 was ~~wetter and warmer than~~ the period before or after this.

It is evident that this woodland as a whole is an extremely complex, variable community. As stated by West et al. (1975), "Early attempts to explain distribution, composition, successional changes, and management responses in terms of single factors were overly simplistic. These variations can be better explained in terms of a complex of environmental patterns, historical events, and successional mechanisms. The relative importance of each factor of the environmental complex varies with the synecological context."

A major characteristic of this woodland as far as birds are concerned is the periodic production of vast quantities of pinyon pine seeds and juniper berries. Large crops of pine seeds are produced once every five or six years whereas juniper berry production occurs every two to three years. In many years neither tree forms reproductive propagules. Both life-forms appear to have intra-specific synchrony. For example, in a year of a good berry crop, one hectare contains between 19 and 38 million berries. A cubic meter of foliage holds 20,000 berries. The number declines steadily through the late fall and winter as birds and mammals consume them. The flesh of a single berry has about 315 calories making it a desirable source of energy. The berries are a shiny blue in color making them conspicuous; they ripen in the fall when insects are sparse and bird densities are high due to migration (Salomonson 1978). Thus junipers have adaptations favoring zoochory (Morton 1973). The pinyon pine also has a constellation of adaptations that favor dispersal by animals, especially birds (Table 1) (Vander Wall and Balda 1977). This pine not only allows animals easy access to its seeds but may entice dispersal agents. This means the seeds are easily located, extracted from the cones and eaten or cached for future use (Vander Wall and Balda 1977, Ligon 1978). More Pinus edulis seeds are cached in dry, exposed soils than can be used by the birds in years of high cone crops. In some years, pinyon pines produce absolutely no cones per hectare (Balda, unpubl. data), whereas in other years they may produce as many as 1800 cones/tree (Ligon 1971). These seeds are extremely nutritious, containing about 7400 cal/g (Little 1938). A pinyon pine seed contains 14.5 percent protein, 60 percent fat, and 18.7 percent carbohydrate (Botkin and Shires 1948). The large size, high energy content, and high protein level makes this seed a highly desirable food stuff.

Management of pinyon-juniper woodlands since the mid-40's has largely consisted of control of the spread of junipers (and in some cases pinyon) into grasslands and type-conversion of pinyon-juniper woodlands into grazing lands. Both eradication of the type and control has been justified on public lands because the trees are generally considered as of low commercial value relative to other harvestable trees of the West. During the period 1950 to 1964 Box et al. (1966) estimate that approximately three million acres of pinyon-juniper woodland were converted to grazing lands. Between 1950 and 1961, more than one million acres were converted in Arizona alone (Arnold et al. 1964).

The major objective of most type-conversion projects, often referred to as "Range Improvement Projects" is to produce additional forage for livestock (Terrel and Spillett 1975). These conversions represent "a change from multiple use to one use, grazing" (Little 1977). Land managers today are going through a period of cautious

soul-searching about how to proceed with management on these lands. This treatment has not been popular, leaves the area an aesthetic diaster, has questionably proven long range benefits and "Most questions concerning wildlife and pinyon-juniper range conversion are unanswered and probably will remain so." (Terrel and Spillett 1975). The best synopsis of pinyon-juniper management and guidelines for future use can be found in a symposium edited by Gifford and Busby (1975).

TABLE 1. Features of pines with different dispersal strategies

Characteristic	*P. ponderosa* (wind)	*P. edulis* (animal)
Seed size	small	large
Seed conspicuous	no	yes
Seed quickly released	yes	no
Seed coat labelled	no	yes
Synchronous cone opening	yes	no
Position of cone	down, out	up, out
Cone scales	present	absent

BREEDING BIRDS

A total of 73 different species of birds are reported to breed in pinyon-juniper woodlands (Table 2). Undoubtedly more records are known but these will most often be rare or unusual occurrences. These 73 species are taxonomically aligned in 8 orders and 25 families. Because of the geographic area span by this plant community and the wide physiognomic variety (over its range), no one area contains near this breeding diversity. For example, in north-central Arizona 5 pinyon-juniper plots were sampled intensively during two breeding seasons (Grue 1977, Masters 1979) and the number of breeding species per 40 ha plot ranged from 12 to 24 and averaged 19 species. Rasmussen (1941) reports 43 species inhabiting the pinyon-juniper woodland on the Kaibab Plateau in summer but has good evidence for breeding by only 12 species. Hardy (1945) lists 22 species as regular breeders in Utah pinyon-juniper woodlands whereas Hering (1957) reports 15 breeding species.

Relatively few of the 73 species are restricted to pinyon-juniper woodland. Table 2 lists 5 obligates and 13 semi-obligates. An obligatory species is defined for purposes of this presentation as one which nests only in pinyon-juniper woodland within a geographic area that contains other habitat types. A semi-obligatory species may nest in one additional plant community. This definition is knowingly broad as most of these species nest in different habitat types in portions of their range where pinyon-juniper woodland is absent. Hardy (1945) mentions only the Piñon Jay and Plain Titmouse as being obligatory [1/] and the Bushtit as a semi-obligatory species in this woodland type. But, the Piñon Jay often nests and forages in ponderosa pine forest (Balda and Bateman 1971) and the Bushtit is also known to use other habitats.

1/ Scientific names for all birds mentioned in the text or tables are given in Appendix I.

TABLE 2. Breeding birds of pinyon-juniper woodlands[1)]

Species	Status[2)]	Distribution[3)]	Niche Width[4)]
Turkey Vulture	S	4	
Cooper's Hawk	P	2	
Red-tailed Hawk	P	4	
Swainson's Hawk	S	1	
Ferruginous Hawk	P	2	
Golden Eagle	P	3 (Sp.)	
Prairie Falcon	P	2 (Sp.)	
American Kestrel	P-S	4	
Gambel's Quail	P	2	
Mourning Dove	P-S	7	
Screech Owl	P	3	obligatory
Great Horned Owl	P	3	
Long-eared Owl	S	1	
Saw-whet Owl	P	1	
Poor-will	S	2	
Common Nighthawk	S	3	
Lesser Nighthawk	S	2	
White-throated Swift	S	2 (Sp.)	
Black-chinned Hummingbird	S	4	semi-obligatory
Costa's Hummingbird	S	1	
Broad-tailed Hummingbird	S	3	
Common (red-shafted) Flicker	P	6	
Hairy Woodpecker	P	4	
Ladder-backed Woodpecker	P	1	
Western Kingbird	S	1	
Cassin's Kingbird	S	2	
Ash-throated Flycatcher	S	7	semi-obligatory
Say's Phoebe	S	2	
Gray Flycatcher	S	2	obligatory
Western Wood Pewee	S	1	
Violet-green Swallow	S	2	
Cliff Swallow	S	1 (Sp.)	
Scrub Jay	P	6	obligatory
Black-billed Magpie	P	2	
Common Raven	P	6	
Piñon Jay	P	5	semi-obligatory
Mountain Chickadee	P	3	
Plain Titmouse	P	7	obligatory
Bushtit	P	6	semi-obligatory
White-breasted Nuthatch	P	3	
House Wren	S	1	
Bewick's Wren	P-S	3	semi-obligatory
Cañon Wren	P-S	3 (Sp.)	
Rock Wren	P-S	4	
Mockingbird	S	4	semi-obligatory
American Robin	P-S	1	
Western Bluebird	P-S	1	
Mountain Bluebird	P-S	4	
Blue-gray Gnatcatcher	S	5	semi-obligatory
Loggerhead Shrike	S	2	

TABLE 2. (cont.)

Species	Status[2]	Distribution[3]	Niche Width[4]
Gray Vireo	S	3	obligatory
Solitary Vireo	S	2	
Black-throated Gray Warbler	S	5	semi-obligatory
Scott's Oriole	S	3	
Brown-headed Cowbird	S	4	
Hepatic Tanager	S	1	
Black-headed Grosbeak	S	5	
Lazuli Bunting	S	2	
Cassin's Finch	S	1	
House Finch	P-S	5	semi-obligatory
Lesser Goldfinch	S	2	
Red Crossbill	S	1	
Green-tailed Towhee	S	2	
Rufous-sided Towhee	P	6	semi-obligatory
Brown Towhee	P	2	semi-obligatory
Vesper Sparrow	P-S	2	
Lark Sparrow	S	4	semi-obligatory
Black-throated Sparrow	P-S	3	
Sage Sparrow	S	1	
Dark-eyed Junco	S	1	
Gray-headed Junco	P-S	1	
Chipping Sparrow	P-S	6	
Brewer's Sparrow	S	1	
Black-chinned Sparrow	P	2	semi-obligatory

Total: n = 74 P = 23 (32%) S = 38 (51%) P-S = 13 (17%) s-o = 13 o = 5

1) Data from Rasmussen (1941), Hardy (1945), Miller (1946), Hering (1957), Grue (1977), Masters (1979)
2) P = permanent resident; S = summer resident
3) The number indicates the number of census plots or study areas used for breeding. The maximum is 7. Sp. = special landscape required.
4) Obligatory = in a given geographic area the species breeds only in the pinyon-juniper woodland; semi-obligatory = same as above but breeds in one additional plant community.

Few, if any other natural habitat-types in North America have so few truly obligatory species. The reason(s) such should be the case is not clear but may relate to the great physiognomic diversity found in the pinyon-juniper woodland. Just as there is no typical pinyon-juniper woodland there are few obligate pinyon-juniper birds.

Just as the number of breeding species varies between woodlands so does breeding bird density. In southwestern Arizona where many oaks are found in the woodlands breeding bird density may reach 250 pairs per 40 ha (Balda 1967). This density is seldom if ever reached in the pinyon-juniper woodland where densities vary between 30 and 190 pairs

per 40 ha (Table 3). Ninety-five pairs is about an average figure. Grasslands usually have fewer breeding pairs and ponderosa pine forests more than the pinyon-juniper woodland.

TABLE 3. Characteristics of the avian woodland breeding birds

Study	Habitat	No. of Breeding Species	No. of Breeding Pairs/40 ha
Balda, 1967	oak-juniper	36	224
Balda, 1967	oak-juniper-pine	36	267
Grue, 1977	juniper-parkland	17-23	54-179
Beatty, 1978	juniper-grassland	11-12	35-40
Grue, 1977	juniper-pinyon	24-26	66-130
Masters, 1979	pinyon-juniper I	9-10	90-87
Masters, 1979	pinyon-juniper II	18-21	191-138
Masters, 1979	pinyon-juniper III	19-19	122-133
Hering, 1957	pinyon-juniper (?)	15	33
Beidleman, 1960	pinyon-juniper	2	30
Hardy, 1945	pinyon-juniper	22	--
Miller, 1946	pinyon dominated	55	--

Breeding bird densities in a single location show rather large annual fluctuations that appear to be linked to biotic and physical factors. In very dry years the breeding bird populations may be reduced between 50 and 70% (Grue 1977). Possibly pinyon pine seed crops may attract breeding birds the next spring. Masters (1979) found a 28% increase in populations after a large cone crop (Table 4).

Table 4. Changes in breeding bird densities (pairs/40 ha) and diversities between years

Study	First Year Density/Diversity	Second Year Density/Diversity	%Change	Reason
Masters, 1979	191/21	138/18	28/14	Pinon seed crop before first year
Grue, 1977	130/26	66/24	49/8	Annual fluctuation in precipitation
Grue, 1977	179/23	54/17	70/26	Same as above

Masters (1979) attempted to explain the relationship between various habitat parameters and characteristics of the breeding bird

fauna. At the level of the community, she found that the number of breeding bird species was significantly correlated with a) the density of pinyon pine, b) total tree density and c) pinyon pine foliage volume. Foliage height diversity (as measured in two-meter height classes) was a significant predictor of bird species diversity. Breeding bird density was significantly correlated with pinyon pine density when the bird population figures following a large pinyon pine cone crop are ignored.

A "typical avifauna" of the pinyon-juniper woodland thus appears to be as simplistic an approach as trying to describe a typical vegetation for this woodland type. Never-the-less we have selected from the list of 74 breeding species a group that has a distribution score (Table 2) of four or higher and/or is listed as obligatory or semi-obligatory in niche width. A major danger here is that two closely related species may be sympatric and thus neither would have achieved the criteria for inclusion. Such could have been the case for nighthawks, kingbirds, hummingbirds, bluebirds, medium-billed sparrows and a few other cases. In these instances the most common of the dyad or triad was added to the list to make it as representative as possible. From Table 2, 29 species met the first criteria and the nighthawk and kingbird were added for reasons given above.

Resident Status

Of the 31 species that fit our "typical avifauna" criteria 14 (45%) are summer residents and 11 (35%) are permanent residents. Six species show variable patterns of residency either based on geographic considerations (i.e. summer residents in the northern portion of their range and permanent residents in the more southern areas) or variable weather conditions (i.e. migrate in harsh winter, remain stationary in mild winters). Hardy (1945) in eastern Utah described 36% of the nesting species as permanent residents and 64% as summer residents, almost identical to our typical avifauna if one includes the "switchers" in the summer category.

Data from intensively censused plots in central Arizona over a two year period showed about the same split as does the Utah data (Grue 1977). The proportion of permanent resident species ranged from 35 to 40%.

In north-central Arizona however, Masters (1979) censusing three pinyon-juniper plots for two years found a range of permanent resident breeders from 32 to 56% (Table 5), and Hering (1957) near Mesa Verde, Colorado had 53% permanent residents. One could expect permanent residency to increase in the woodlands with decreasing latitudes but such an increase is not apparent from either the proportion of the breeding population that is permanent or the absolute number of species that do so. On both of Masters' (1979) plots with proportion of permanent residence above 50% the ratio of pinyon to juniper trees was better than 2:1. (Hardy's 1945 ratio was 0.36 to 1). Hering (1957) did not provide the necessary data to assess this habitat feature but the general area of her study contains high densities of P. edulis (pers. obs. R. P. Balda). Of the 55 species of breeding birds (a woodland high!) listed by Miller (1946) in a southern California woodland predominated by pinyon pine, 27 species or 49% were apparently permanent residents. Two areas without pinyons had 33 and 35%

permanent resident breeders. Thus, we suggest with caution that a positive correlation may exist between the proportion of permanent residents in the community and the proportion of trees in the woodland that are pinyon pines. In all probability no one factor will answer the question, but this one does deserve future investigation. Of the 18 species listed as either obligatory or semi-obligatory in this woodland 8 are permanent residents.

Table 5. Residence status of breeding birds from specific sites in north-central Arizona (Masters 1979)

Status	Number of Species (%) Sites I		II		III	
Permanent Resident	3.0*	(32)	8.0	(53)	7.5	(56)
Summer Resident	6.5	(68)	7.0	(47)	6.0	(44)

* 2 yr. average

Foraging Guilds

An instructive way to look at avian communities is the use of foraging guilds (Root 1967). A guild is defined as one or more species in a community that use similar foraging techniques. Guilds can be defined as broadly or narrowly as the observations and data base permit. Here for the sake of simplicity and accuracy (but sacrificing specifics) I define foraging guilds only by substrate-type. This is done because very little information is known about the species under consideration to allow for finer distinctions. Foraging guilds used include ground, foliage, air, bark, and flowers. If a species used two of these substrates I assigned half the value to each guild.

The descriptive analysis from nine different intensively studied woodland sites shows few trends. The number of ground foragers varied from 6 (Hering 1957) to 16 (Grue 1977) species. Relative proportions of ground foragers varied between 40% (Hering 1957) and 57% (Grue 1977). No significant correlation (Spearman Rank Correlation) between the density of pinyon pine or juniper and either the number or proportion of ground foraging species was found.

The number of foliage foragers in the breeding community varied from a low of three in a juniper-grassland (Beatty 1978) to a high of 12 in a predominantly pinyon pine stand. The mean number of species that used foliage as a substrate where both pinyon and junipers were represented was 5. The number or proportion of foliage foraging species showed no significant correlation with pinyon or juniper density.

The number of species of hummingbirds (nectar feeders) also shows no correlation with tree species density. Hummingbirds most likely respond more to the species composition and flowering patterns of the shrub and forb strata which may be limited by physical factors (temperature, moisture, etc.).

There is also no trend for aerial feeders. Aerial foraging species number between 1 (Hering 1957) and 9 (Miller 1946). On areas containing both pinyon and junipers the mean number of aerial feeders was 4.

In some woodlands a small group of breeding species forage extensively on trunks and large branches. In no intensive study area analyzed for this report where the ratio of pinyon to junipers was less than 1:1 did any of these species breed. Where pinyons outnumbered junipers by 2:1 or better two species appeared. Almost invariably these two species were the Hairy Woodpecker and White-breasted Nuthatch. The former species obtains insects by hammering holes through the bark or flaking layers of bark off in small plates. The latter species probes the crevices in the bark to obtain insects. Both species reach higher densities in ponderosa pine forests (Szaro and Balda 1979) than in the woodlands. Either there are more insects in, under, and on pinyon pine bark than juniper or the bark pattern is such that insects are easily extracted.

The "typical avifauna" for pinyon-juniper woodlands has a slightly higher number of ground and foliage foragers than the studies described above (Table 6). This probably occurred because our selected sample of birds is slightly larger than would be found in any one woodland area.

Table 6. Foraging Guilds for a "typical pinyon-juniper woodland"

Guild	*Number of Breeding Species (%)
Ground	14.5 (52)
Foliage	7.0 (24)
Aerial	4.5 (16)
Bark	1.0 (4)
Flower	1.0 (4)

*Carnivores not included

The above analysis has dealt solely with numbers of species because of the high year-to-year variability in densities. Master's (1979) regression models to predict characteristics of the bird populations included foraging guilds. Eight independent foliage variables were used. Pinyon density was significantly correlated with densities of aerial feeders, bark feeders, and total density of all insectivorous birds (Table 7). No variable contributed solely by junipers was important as a predictor of any of the breeding bird characteristics measured. Why the above result should occur is not immediately obvious but suggests pinyon pine may provide a more suitable foraging substrate than juniper.

Only fragmentary data exists to support the contention that juniper is less attractive as a foraging substrate than is pinyon pine. In an oak-juniper-pine (*Pinus cembroides* and *P. leiophylla*) woodland in southeastern Arizona, Balda (1969) studied foliage use by the 36 breeding species. The number of observations in each tree species were compared to the foliage volume contributed by each tree species. Based on foliage volume an expected number of bird observations per tree species was calculated. Actual foraging

observations in juniper were far less than expected, whereas foraging observations in pines were much greater than expected. At that time Balda proposed that the breeding birds may simply have not yet learned to use juniper as it is known that juniper is presently spreading into new areas and increasing in areas where it was once sparse. The Black-throated Gray Warbler, Chipping Sparrow, Bridled Titmouse and Common Bushtit utilized juniper more than any other species. Three of the four species listed above are members of our "typical woodland avifauna." In a pinyon-juniper-ponderosa pine ecotone Laudenslayer and Balda (1976) found that pinyon pine was selected more intensely than predicted by expected numbers generated from foliage volume. Juniper was selected approximately as often as expected. We explained this difference by using the relative proportion of foraging surface within both trees. Although both species have their green foliage concentrated on the outer edges of the branches, needles of pinyon pine are found growing farther inward than in juniper. Thus, if the growing areas and areas of green vegetation on these trees are used as prime foraging surfaces then pinyon provides more of this surface per tree than does juniper.

Table 7. Percent variability explained (r^2) of breeding bird parameters by vegetation factors which are significantly correlated (Masters 1979)

Factor	Density of Feeding Guilds		
	Aerial Feeders	Bark Feeders	Insectivores
Pinyon Pine Density	.980	.781	.949
Total Tree Density	.979	.776	.947
Pinyon Foliage Volume	.902	NS	.834

Insect densities in pinyons and junipers may also be a reason why pinyon density is a good predictor of density of insect eating birds. Masters (1979) found, however, that junipers had a higher number of insect taxa than did pinyon. Insect abundance (as measured by total length) was about the same in both trees. The similarity coefficient (a measure of community similarity) indicated that pinyon and juniper have different arthropod faunas associated with them.

Nesting Guilds

The classification of the avian community by nesting habits may also provide clues as to how breeding birds interact with the structure of the vegetation. Of the 31 species used as a "typical avifauna" 60% (18.5) nested in foliage (the 0.5 is for the Mourning Dove that uses both foliage and ground for a nest substrate), 23% (7) used cavities and the remainder nest on the ground. Hardy's data (1945) fits well with 61% of the breeding birds nesting in the foliage, 21% in cavities, and 18% of the species nesting on the ground.

On two intensively studied plots in central Arizona Grue (1977)

found an average of from 60 to 68% foliage nesting species in the breeding bird community. From 15 to 20% of the species nested in cavities. Again the fit is reasonable with what a "typical avifauna" would show (Table 8).

Table 8. Nesting guilds of breeding birds from specific sites in central Arizona (Grue 1977)

Nesting Guild	Number of Species (%)	
	Pinyon-Juniper Woodland	Juniper Parkland
Foliage	16.5* (66)	14.0 (68)
Cavity	5.0 (20)	3.0 (15)
Ground	3.5 (14)	3.5 (17)
Total	25.0	20.5

* 2 yr. averages

In north-central Arizona Master's (1979) found cavity nesters to make up almost half of the breeding species on areas where pinyons outnumbered junipers (Table 9). Hering (1957) found cavity nesting species made up 47% of the breeding species on an area of presumable high pinyon densities. Both studies had 7 to 8 cavity nesting species present. The pinyon dominated woodland in California (Miller 1946) contained 11 cavity nesting species.

Table 9. Nesting guilds of breeding birds from specific sites in north-central Arizona (Masters 1979)

Nesting Guild	Number of Species (%) Sites		
	I	II	III
Foliage	7.0* (74)	7.5 (50)	6.5 (48)
Cavity	2.0 (21)	7.0 (47)	6.5 (48)
Ground	0.5 (5)	0.5 (3)	0.5 (4)

* 2 yr. averages

The emerging pattern is more than suggestive that cavity nesting species will occur with higher probability in woodlands containing large numbers of pinyon pines. On three study sites in north-central Arizona Masters (1979) found that 79% of the variability (r^2) in density of the combined cavity nesting species (not species numbers as discussed above) was explained by the density of pinyon pines.

Both density and diversity of cavity nesting species may be related to pinyon pine in some manner. Since cavity nesters depend on weakened or diseased trees to excavate cavities in, it is possible that pinyon pine are more prone to attack by insects and other disease

causing organisms. Also, it may be that pinyon branches are more brittle and are therefore more prone to breaking thus allowing disease agents entry. Dead junipers are hard whereas dead pinyon pines contain soft wood (pers. obs.).

The question that remains deals with tree-type selection by the foliage breeding birds: Do foliage breeders select for either juniper or pinyon when choosing a nest site? Both Hardy (1945) and Short and McCulloch (1977) make unsubstantiated comments that foliage nesting birds prefer junipers over pinyons for nest-sites. Based on the amount of data presently available it is not possible to answer that question and more research is required to show if any preference is shown (Table 10). The two species that showed regular use of juniper were the Black-chinned Hummingbird and Black-throated Gray Warbler whereas the Chipping Sparrow showed no preference for either tree (Masters 1979, Balda 1969).

Table 10. Nest sites of foliage nesting birds in western woodlands

Study		Number of Nests in pinyon	juniper	other
Balda, 1967	oak-juniper 67 1	(not present)	1	12
Balda, 1967	juniper-oak-pine 46 46 29	--	11	10
Laudenslayer and Balda, 1976	pinyon-juniper-ponderosa pine 48 46 27	3	--	--
Masters, 1979	pinyon-juniper I 32 33	--	1	--
Masters, 1979	pinyon-juniper II 87 33	10	5	--
Masters, 1979	pinyon-juniper III 87 34	6	2	--

WINTERING BIRDS

Winter bird populations of the woodland have been studied in central Arizona by Grue (1977) and in north-central Arizona by Shrout (1977). A total of 32 species have been recorded as wintering in these woodlands. These 32 species belong to five orders and 14 families. Of these, 18 are permanent residents, 10 are winter residents, and 4 are switchers. The most regular winter residents are the two species of juncos, White-crowned Sparrow, and Ruby-crowned Kinglet. Three of these four species are seed eaters. Prominent "switcher" species are the Mourning Dove, American Robin, the two bluebirds, and the House Finch. Only the Bushtit, kinglet and wren are insectivorous (Table 11).

Species numbers vary considerably from year-to-year. Shrout (1977) reported a diversity of 10 species in one winter and 20 the next on the same 40 ha plot. Mean number of wintering species in Arizona woodlands is about 15 (Grue 1977, Shrout 1977).

Table 11. Birds wintering in pinyon-juniper woodlands

Species	Status*	Distribution (max = 3)
Rough-legged Hawk	W	1
Merlin	W	1
Prairie Falcon	P	(pers. obs.)
Gambel's Quail	P	1
Mourning Dove	P-S	2
Hairy Woodpecker	P	1
Common (red-shafted) Flicker	P	3
Horned Lark	P	1
Common Raven	P	3
Pinon Jay	P	1
Scrub Jay	P	3
Mountain Chickadee	P	1
Plain Titmouse	P	3
Common Bushtit	P	3
White-breasted Nuthatch	P	(pers. obs.)
Red-breasted Nuthatch	W	(pers. obs.)
Bewick's Wren	P	2
Ruby-crowned Kinglet	W	2
American Robin	P-S	1
Townsend's Solitaire	W	1
Western Bluebird	P-S	1
Mountain Bluebird	P-S	1
Sage Thrasher	W	1
Evening Grosbeak	W	1
House Finch	P-S	2
Cassin's Finch	W	(pers. obs.)
Rufous-sided Towhee	P	1
Vesper Sparrow	P	1
Dark-eyed Junco	W	3
Gray-headed Junco	W	3
Chipping Sparrow	P	3
White-crowned Sparrow	W	3
n = 32	P=16, W=11 and P-S=5	

Winter densities vary greatly from place-to-place and from year-to-year. For example during the winter of 1973-74 Grue (1977) reported 318 individuals per 40 ha in a pinyon-juniper woodland and 251 wintering birds in a 40 ha juniper parkland. This is a 21% difference.

Year-to-year variations are even more striking. In some years the woodland supports huge flocks (too large to count) ~~of bluebirds~~, American Robins and mixed flocks of juncos. In other years one can walk for hours seeing only a very few birds (Vaughan pers. comm., R. P. Balda pers. obs.). Shrout (1977) found 293 wintering birds per 40 ha in the winter of 1973-74 and 75 individuals during the winter of 1974-75 on the same plot. Using a conservative calculation this is a 74% change in population density between years.

Farmington Daily Times

NEWS

'Hundreds of thousands, if not millions': New Mexico sees massive migratory bird deaths

Algernon D'Ammassa Las Cruces Sun-News

Published 2:41 p.m. MT Sep. 12, 2020 | **Updated 2:56 p.m. MT Sep. 12, 2020**

LAS CRUCES - Biologists from New Mexico State University and White Sands Missile Range examined nearly 300 dead migratory birds Saturday at Knox Hall on the university's main campus.

Over the past few weeks, various species of migratory birds are dying in "unprecedented" numbers of unknown causes, reported Martha Desmond, a professor at NMSU's Department of Fish, Wildlife and Conservation Ecology.

"It is terribly frightening," Desmond said. "We've never seen anything like this. ... We're losing probably hundreds of thousands, if not millions, of migratory birds."

In August, large numbers of birds were found dead at White Sands Missile Range and at the White Sands National Monument in what was thought to be an isolated incident, Desmond said.

After that, however, came reports of birds behaving strangely and dying in numerous locations in Doña Ana County, Jemez Pueblo, Roswell, Socorro and other locations statewide.

The affected birds have included warblers, sparrows, swallows, blackbirds, flycatchers, and the western wood pewee.

"A number of these species are already in trouble," Desmond said. "They are already experiencing huge population declines and then to have a traumatic event like this is – it's devastating."

On Saturday, Desmond was joined by Trish Cutler, a wildlife biologist at WSMR, and two NMSU students for an initial evaluation of the carcasses.

Desmond said her team also began catching and evaluating living specimens on Friday as residents find birds behaving strangely and gathering in large groups before dying.

"People have been reporting that the birds look sleepy ... they're just really lethargic," Cutler said. "One thing we're not seeing is our resident birds mixed in with these dead birds. We have resident birds that live here, some of them migrate and some of them don't, but we're not getting birds like roadrunners or quail or doves."

On the other hand, numerous migratory species are dying rapidly and it is not immediately clear why, although the cause appears to be recent. Desmond said the birds had moulted, replacing their feathers in preparation for their flight south, "and you have to be healthy to do that; but somewhere after that, as they initiated their migratory route, they got in trouble."

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The biologists guessed the cause might involve the wildfires ravaging the western U.S. and dry conditions in New Mexico.

"They may have been pushed out before they were ready to migrate," Desmond said. "They have to put on a certain amount of fat for them to be able to survive the migration. These birds migrate at night and they get up in the jet stream, and they might migrate for three nights in succession, they'll come down and they'll feed like crazy, put on more fat and go again."

The biologists noted that the majority of the dying birds are insectivores, but that seed eaters were sickening and dying as well.

The birds will be sent to the U.S. Fish and Wildlife Service Forensics Laboratory in Ashland, Ore. for further analysis. Desmond it could be weeks before results come back, and the findings could bear serious ecological implications.

"Over 3 billion birds have died since 1970. Insect populations are crashing, and this is just an unprecedented mortality," she said. "Climate change is affecting the abundance of insects, it's affecting the volatility of the fires, and the scary thing is this may be an indication of the future."

Algernon D'Ammassa can be reached at 575-541-5451, adammassa@lcsun-news.com or @AlgernonWrites on Twitter.

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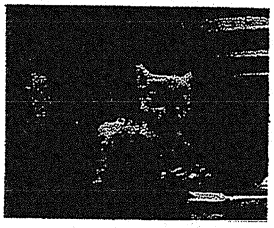

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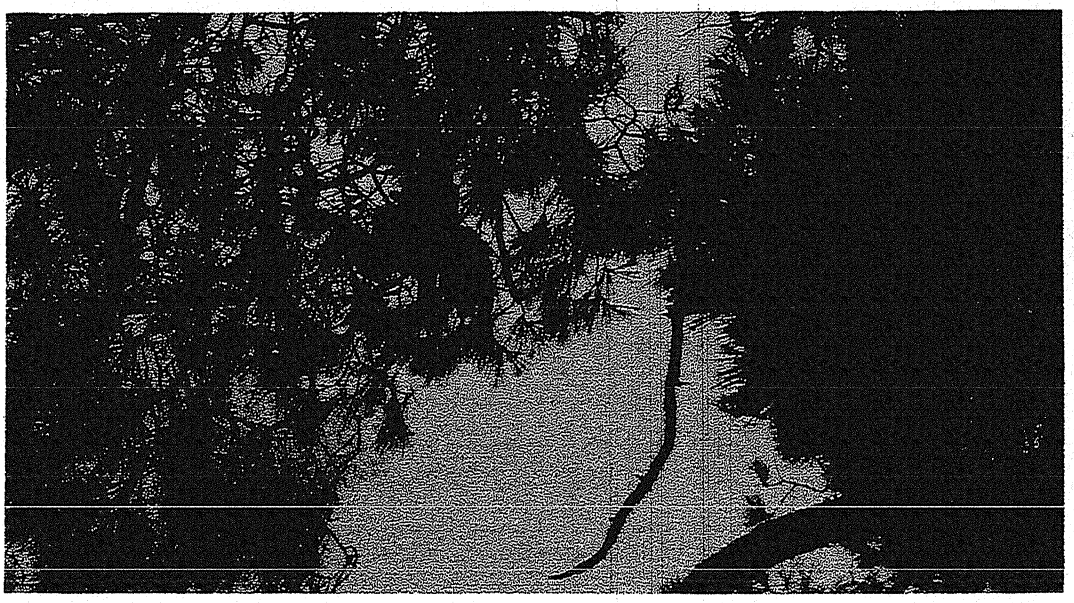

Bald eagle chick, dead in nest tree after Cal Fire control burn next to the nest in 2021. Cal Fire has not committed to stop burning by the nest this year. Who would think it would be a problem for public agencies to adhere to laws that protect wildlife?

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Climate change impacts have been worsening for years, raising temperatures and exacerbating fire danger in California and the world. In many cases though, trees and other plants are being treated as enemies to be annihilated, rather than as the ecosystems that enable life on earth to exist.

In California, both Cal Fire and PG&E are being given exemptions from any environmental review for their "fuel reduction" or "vegetation management" programs. In this time when thousands of scientists worldwide are screaming and waving red flags about biodiversity and climate catastrophe, the impacts of these projects are being ignored, particularly to wildlife and habitat.

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