



U.S. Department of the Interior
BUREAU OF LAND MANAGEMENT

Workshop on Management and Conservation of Pinyon and Juniper Woodlands

Workshop Summary Report



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Bureau of Land Management

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The Bureau of Land Management's mission is to sustain the health, diversity, and productivity of public lands for the use and enjoyment of present and future generations.

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A	Workshop Meeting Materials
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ACRONYMS AND ABBREVIATIONS

Acronym or Abbreviation

Full Phrase

BIA	United States Department of the Interior, Bureau of Indian Affairs
BLM	United States Department of the Interior, Bureau of Land Management
EO	Executive Order
US	United States
USGS	United States Geological Survey

Chapter I. Introduction

I.1 PROJECT BACKGROUND

The Bureau of Land Management (BLM) manages more than 19 million acres of pinyon and juniper woodlands, comprising over half of the agency's forested lands. The BLM manages pinyon and juniper woodlands for forest health, wildlife habitat, outdoor recreation, grazing, and other multiple uses. Pinyon and juniper woodlands have significant values to Tribes, both as sacred sites and sources of pinyon nuts, fuelwood, and traditional uses.

Climate change is already impacting pinyon-juniper ecosystems, and is expected to continue having significant impacts on the health and distribution of woodlands and the species that inhabit them. Related stressors include insect and disease outbreaks, wildfire, and the expansion of invasive annual grasses. The BLM actively manages pinyon and juniper to improve rangeland conditions and habitat for sagebrush-dependent species such as the greater sage-grouse.

In light of these various impacts on pinyon and juniper woodlands, the BLM recognizes the need to manage them for increased landscape health and ecosystem resilience. The BLM is endeavoring to build scientific knowledge, including Tribal perspectives, of this resource on the public lands to inform policy and management considerations. The BLM and Forest Service hosted a public workshop and associated public comment period to seek information on the array of existing ecosystem science and knowledge, management trends, social and cultural values, existing and potential threats, and climate resilience of pinyon and juniper woodlands.

Further contributing to the BLM's understanding of its forest resources, on April 22, 2022, President Biden signed Executive Order (EO) 14072, Strengthening the Nation's Forests, Communities, and Local Economies, which sets forth the Administration's policy to conserve America's mature and old-growth forests on federal lands and directs the BLM and Forest Service to define and inventory those forests, analyze threats to them, and develop policies to institutionalize climate-smart management and conservation strategies, with robust opportunity for public comment. The BLM and Forest Service completed the initial inventory of mature and old-growth forests in April 2023. The initial inventory identified 24 million acres of mature and old-growth pinyon and juniper woodlands on federal lands, making the pinyon-juniper group the most abundant old-growth forest type on public lands managed by the agencies.

This report summarizes the components of the one-and-a-half-day, in-person and live-streamed workshop that occurred in Reno, Nevada on May 8–9, 2024, and details the results and findings from the workshop components, which included continued opportunities for public engagement after the workshop concluded.

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Chapter 2. Workshop Objectives, Presentation, and Panel Summaries

2.1 WORKSHOP OBJECTIVES

The objective of the workshop was to create a venue for information sharing amongst federal agencies and other land managers, tribes, nongovernmental organizations, stakeholders, public land users, state and local governments, and other interested entities on the range of ecosystem science and knowledge management trends, social and cultural values, existing and potential threats, and the climate resilience of pinyon and juniper woodlands, particularly mature and old-growth forests. The workshop meeting agenda and other materials provided to attendees are available in **Appendix A** and on the project website.¹

2.2 WORKSHOP PARTICIPANTS

During the public workshop meetings, a total of 187 in-person participants and 326 virtual participants attended.² Attendees included staff members of federal agencies such as the BLM, Forest Service, and US Geological Survey (USGS); state and local governments, academic institutions, various organizations; tribal entities; and the general public. A list of specific agencies, institutions, and organizations who participated in the workshop meetings is provided in **Appendix B**.

2.3 DAY I TOPICS AND PRESENTATIONS

The BLM and Forest Service hosted and facilitated the workshop on May 8–9, 2024, in meeting room space organized at the Nugget Casino Resort in Sparks, Nevada. Day I of the workshop was from 1:00 to 5:00 p.m.

2.3.1 Welcome and Introductions

Val Stanson with the consultant group AECOM assisted with facilitation of the workshop in between presenters, opened the meeting, and welcomed participants to the workshop. Her opening greeting was followed by introductions from Nada Culver, principal deputy director of the BLM, and Troy Heithecker, Associate Deputy Chief, National Forest System, USDA Forest Service.

Ms. Culver spoke about the importance of engaging multiple stakeholders in a collaborative effort to discuss pinyon and juniper management on the federal, state, and local levels while emphasizing the BLM and Forest Service's directive under EO 14072.

Mr. Heithecker spoke about how the Forest Service is defining old growth to conduct an inventory then draft a threat analysis, and to guide management decisions on both BLM- and Forest Service-administered lands.

¹ <https://www.blm.gov/workshop-management-and-conservation-pinyon-and-juniper-woodlands>

² Numbers include people who attended at least one day of the workshop meetings.

2.3.2 Presentation: Mature and Old-Growth Forests

Dr. Aaron Kamoske, ecological analyst with the Forest Service, spoke about mature and old-growth forests on BLM- and Forest Service-administered lands. Key takeaways from this presentation include the following:

1. Pinyon-juniper woodlands occur on more than 35 million acres of lands managed by the Forest Service and BLM, with over 9 million acres of old growth and 14 million acres of mature forest.
2. On Forest Service- and BLM-managed lands there is estimated to be more than 35 million acres of pinyon-juniper, of which 25 percent is in passive management land allocations (e.g., wilderness, roadless land, and so forth) and 75 percent is in active management land allocations.
3. In a 10-year period between 2000 and 2020, all pinyon-juniper woodlands experienced the following:
 - Tree cutting (1 percent)
 - Fire (2 percent)
 - Effects from insects and disease (5 percent)

2.3.3 Question and Answer Session

Following each presentation, a question-and-answer session was held where workshop attendees could ask questions verbally or submit them using the Mentimeter interactive presentation software. These sessions were time-limited, but if time permitted, participants could ask more than one question. The questions submitted for each presentation are available in **Appendix C**. Additionally, each slideshow presentation is available on the project website.

2.3.4 Presentation: Pinyon-Juniper Ecology

Dr. Peter Weisberg, professor of landscape ecology, and Dr. Miranda Redmond, assistant professor of forest science and climate change, gave dual presentations on pinyon-juniper ecology.

Pinyon-Juniper Woodland Dynamics: Past, Present, and Future

Key takeaways from this presentation include the following:

- I. Introduction to pinyon-juniper woodlands
 - Pinyon-juniper ecosystems span regions with different climatic conditions, which helps foster a diverse species composition. Pinyon-juniper can be found on mesa tops and in canyon bottoms and valleys, shallow soils with exposed bedrock, areas with limited understory vegetation, and biological soil crusts. Woodlands can occur on productive, high fertile areas; areas with sagebrush; or areas with high historical burn rates.
 - Pinyon-juniper woodlands contain various species, which are concentrated in the southwestern United States. Two-needle pinyon pine (*Pinus edulis*) is dominant in the Four Corners area, while single-leaf pinyon pine (*Pinus monophylla*) is dominant in the Great Basin.
 - Three primary types of pinyon-juniper woodlands are based on the three broad categories called savanna, persistent woodlands, and wooded shrublands. Persistent woodlands are common in the Colorado Plateau, savanna woodlands are common in eastern New Mexico, and wooded shrublands are common in the Great Basin.

2. Past pinyon-juniper woodlands

- Pinyon-juniper woodlands are dynamic and influenced by climatic shifts and human activity. Cool, wet conditions in the early 1900s promoted tree establishment, while dry, hot periods in the mid-1900s and early 2000s led to declines. As the climate warms, pinyon-juniper habitats have migrated north. Human activities, including indigenous land management, mass harvesting in the 19th century, fire suppression, grazing, and tree removal treatments, have also significantly impacted these woodlands.
- Cooler, wetter periods have historically led to pinyon-juniper expansion, while drier, warmer climates have historically led to pinyon-juniper population reduction. Hot conditions make pinyon-juniper woodlands more vulnerable; however, this is not always the case.
- Between 1950 and 2003, pinyon-juniper removal treatments occurred on 247,000 hectares of BLM-administered lands, a total corresponding to 6.6 percent of pinyon-juniper woodlands within the BLM's administrative boundaries. Many of these treatments occurred in the 1950s and 1960s, but they continue to have an impact on pinyon-juniper woodlands.

3. Present pinyon-juniper woodlands

- Woodlands exhibit diverse structures and compositions, with recent drought conditions and insect infestations causing tree mortality, particularly in pinyon pine.
- Following the 2018 drought, additional tree die-offs and declines in seed cone production and growth have occurred, driven by higher temperatures, warmer conditions, and reduced precipitation.
- These changes are not uniform; some woodlands are experiencing population and density increases due to variations in genetic adaptations, soil characteristics, stand structure, and insect and disease dynamics.

4. Future pinyon-juniper woodlands

- Juniper is more drought-tolerant and is commonly found in drier, low-elevation sites, while pinyon mortality has increased since the mid-1990s, leading to a loss of woodland density.
- Junipers establish more readily after disturbances, potentially making woodlands more juniper dominant.
- Significant regeneration follows drought-related die-offs in some areas, but there is limited new seedling establishment in dry areas, with pinyon pine's low seed viability further limiting its establishment.

Old-Growth Pinyon and Juniper Woodlands: Ecological Characteristics, Values, and Considerations for Conservation

Key takeaways from this presentation include the following:

- I. Old-growth pinyon-juniper can take many forms. Pinyons and junipers are classified by their tree size characteristics, morphological indices (size, crown diminishment, and stubbiness), dead wood in canopy and exposed polished wood, and additional juniper-specific characteristics. Pinyons and junipers show distinct characteristics based on their ages. At 61 years, they have a symmetrical

full green crown with a small diameter. At 140 years, they feature a forked stem, thickened lower branches, and a large diameter. Around 286 years old, they exhibit crown dieback, diminished canopy volume, thick lower branches, crown asymmetry, and sinuous branching. And at 307 years, they have extensive crown dieback, diminished canopy, thick lower branches, and a short but stubby growth form.

2. Old-growth pinyon-juniper is about more than just old trees. Other important characteristics to consider for determining old-growth pinyon-juniper woodlands are uneven-aged, diverse age structure in main stems and limbs, structural complexity both vertically and horizontally, the presence of snags and logs, the populations of plant and animal communities, and anthropogenic factors.
3. The current distribution of old growth is the outcome of historical events. Historical logging and forest clearing can be helpful for determining old-growth pinyon-juniper woodlands today. Environmental controls (fire-safe sites, soil moisture, soils, and elevation) on old-growth distribution are strong in some areas, weak in other areas. These controls help determine old-growth distribution.
4. Old-growth pinyon-juniper woodlands, forests, and savannas are ecologically and culturally important. Old-growth pinyon-juniper woodlands with partial canopy mortality and thinning crowns provide a mosaic of sunlight and shared microsites and understory plants. They also provide increased habitat heterogeneity that benefits many birds, small mammals, and reptile species and provides tree-dwelling habitats and breeding habitats for cavity nesters. Old-growth forests also provide carbon sequestration and furrowed bark, which helps insects and arthropods. Old-growth forests also provide important recreational, spiritual, and cultural values.
5. Old-growth pinyon-juniper woodlands face numerous threats. Contemporary land management practices, combined with larger and more severe wildfires, are being exacerbated by increasingly hotter and drier climate conditions, leading to longer fire seasons. Dense and homogeneous woodlands contribute to the continuity of canopy fuels, making them more susceptible to fires. Additionally, biotic disturbances such as insect pests and drought-related tree mortality further weaken forest resilience. The presence of exotic annual grasses also fuels the grass-fire cycle, creating a feedback loop that perpetuates the risk and intensity of wildfires.
6. Pinyon-juniper woodlands have large regional variation, and generalizations cannot always be assumed to be true for specific regions or areas of woodlands.

2.3.5 Panel: Native American Perspectives, Knowledge, and History on Pinyon-Juniper Ecological Stewardship

Shoshone-Paiute Tribes of the Duck Valley Indian Reservation (Chairman Brian Mason)

Chairman Brian Mason shared his cultural insights and environmental concerns during his presentation. He recounted his childhood memories of harvesting pine nuts, emphasizing the importance of rabbit brush turning yellow as a sign for the harvest season. He highlighted the significance of pine nut trees in the creation stories and religious beliefs of Great Basin tribes. He raised concerns about the environmental impact of mining and clear-cutting practices, noting how these activities have impacted traditional harvesting areas like Horse Canyon and how ongoing tribal consultation needs to be improved and occur early in federal decision-making processes.

Washoe Tribe of Nevada and California (Chairman Serrell Smokey)

Chairman Serrell Smokey's perspective emphasized the vital role of pinyon pine nuts in Washoe culture, illustrating how these nuts served as both a staple food source and a cornerstone of traditional practices. Historically, Washoe leaders fought diligently to protect their lands and resources, reflecting the tribe's profound connection to their ancestral areas. Despite enduring significant hardships and forced displacement, the Washoe people persistently strived to preserve their cultural heritage. Modern challenges, such as beetle infestations and fires, further threatened their harvesting regions, leading the tribe to explore reforestation efforts, even though the benefits may not be realized within their lifetimes.

Chairman Smokey's perspective highlighted ongoing conflicts with federal agencies like the BLM and Bureau of Indian Affairs (BIA) over detrimental land management practices. Policies such as clear-cutting trees damage ecosystems and hinder the Washoe people's ability to maintain their traditions. In response to these issues, the Washoe tribe declared a state of emergency for the pinyon pine, allocating resources to reforestation and cultural preservation.

Tübatulabals of Kern (Chairman Robert Gomez)

Chairman Robert Gomez emphasized the need for genuine consultation and collaboration between government agencies and Native American tribes. Effective consultation requires agencies to actively listen to tribes and respect tribal cultural values, which have been often neglected despite claims of collaboration. Criticizing the lack of tribal consultation in extensive reports, Chairman Gomez pointed out the absence of references to tribal input. To highlight the historic and ongoing disregard for tribal perspectives in land management and decision-making processes, he used the example of the Walker Pass area and its pinyon trees, which have been affected by environmental changes. Recounting the shared use of traditional lands among tribes, he lamented the placement of campgrounds on cultural sites, which signified a lack of respect for tribal heritage. Chairman Gomez called for equitable funding and the direct involvement of tribes in initial consultations and research, arguing that their traditional ecological knowledge is invaluable. Concluding the presentation, he urged government agencies to genuinely listen to and incorporate tribal input in decision-making to ensure their cultural values and landscapes are preserved and respected.

Duckwater Shoshone Tribe (Tribal Historic Preservation Officer Warren Graham)

Mr. Warren discussed various issues related to land management and conservation efforts, particularly focusing on the impact on Western Shoshone tribal lands in Nevada. Concerns about the destruction of traditional pinyon pine picking areas and sacred trees by practices like clear-cutting and the spread of beetle infestations were highlighted. Mr. Warren emphasized the need for effective consultation and collaboration between government agencies and tribes. He pointed out the usage of juniper trees for medicinal and ceremonial purposes. He also suggested that current collaboration efforts needed improvement, urging better recognition and protection of tribal cultural resources. Overall, this perspective underscored the importance of respecting tribal sovereignty and involving Native American communities in decisions that affect their ancestral lands and cultural heritage.

Walker River Paiute Tribe (Tribal Administrator Crystal Miller, representing Chairwoman Andrea Martinez)

Ms. Miller, an advocate for the Walker River Paiute Tribe, emphasized the deep cultural and spiritual connections tribes had with pinyon pine and juniper trees, rooted in their creation story and holistic lifestyle. She discussed how these trees taught her community principles of respect, integrity, and sacred worldviews. She raised concerns about the environmental impact of clear-cutting practices and inadequate

consultation with tribes through decades of improper government-to-government consultation. Improper government consultation can lead to distrust and the creation of management plans that are confusing or that use old or irrelevant data. Often, projects will go through a variety of steps to ensure that they meet the “checkboxes” of federal law, but formal consultation is not occurring. In future management discussions, management plans should be shifted toward individualized, sovereign-based approaches that respect each tribe's unique needs and rights. Other important considerations include the following:

1. Meaningful government-to-government consultation and the development of long-term, resilient management plans that incorporate and carry out tribal management actions and perspectives.
2. Enhancement of government-to-government consultation efforts by involving tribal entities and perspectives from the development stage of actions, alternatives, and management actions, rather than after the plan has already been developed. Engaging tribes earlier could develop stronger and more robust management actions.

Bridgeport Indian Colony (Council Member Joseph Lent, representing Chairman John Glazier)

Mr. Lent spoke about the deep cultural and spiritual significance of the Paiute homeland. He emphasized the Paiute belief in a balanced creation, managed traditionally with gratitude and respect for nature, contrasting it with modern practices that often ignore these spiritual components, leading to environmental imbalance. He pointed out that traditional Paiute culture valued genuine actions over superficial expressions, maintaining ecological harmony through proper use of resources and heartfelt gratitude. Criticizing the often-superficial nature of current tribal consultations, he called for meaningful engagement and respect for tribal knowledge in land management decisions. Ultimately, he advocated for a holistic approach that integrates spiritual values and respects both people and the earth to restore balance and harmony.

2.4 DAY 2 TOPICS AND PRESENTATIONS

2.4.1 Presentation: Trends and Threats in Pinyon-Juniper Populations in the Intermountain West

Dr. Bob Shriver, assistant professor of plant ecology and population biology at the University of Nevada, Reno, presented on the status, trends, and future projections for pinyon-juniper woodlands in the Intermountain West, highlighting the significant threats from climate change, particularly rising temperatures and drought. These factors have led to widespread declines in tree populations, with the two-needle pinyon pine being the most affected. Historical data shows a long-term decline in establishment rates, which are now at their lowest in centuries. The geographic vulnerability varies, with the Four Corners region being the most susceptible. The future of these woodlands under climate change remains uncertain, necessitating the use of multiple predictive models to better understand potential outcomes.

Some key takeaways from the presentation on threats facing pinyon-juniper woodlands include the following:

- I. What is the status of pinyon-juniper populations across the Intermountain West?
 - Pinyon-juniper woodlands in the Intermountain West are facing significant threats from rising temperatures, drought, and wildfires.
 - Major wildfire events have caused extensive damage, with limited regeneration of new trees.

- Warm, dry conditions are associated with increasing population vulnerability.
 - Population density is increasing, with greater concentrations in areas with cooler, wetter conditions.
 - *Pinus edulis* is currently experiencing the most widespread declines. Other species, such as single-leaf pinyon pine and various junipers, also show declines, but to a lesser extent.
2. What are the long-term trends in pinyon-juniper populations?
- Establishment rates have likely been declining since the 1920s and are currently at their lowest levels since at least 1600. Historical data show that warmer temperatures correlate with decreased establishment rates and periods with cooler temperatures correlate with increased establishment rates. Not all pinyon-juniper woodlands have experienced a similar fate, however, with geographic vulnerability contributing to pinyon-juniper population differences.
 - Increasing fire severity and frequency threaten recent pinyon-juniper woodland expansions and cause future contractions.
 - Increasing frequency of droughts, warmer conditions, and less precipitation in certain geographic areas could reduce pinyon-juniper woodlands.
3. What does the future look like for pinyon-juniper woodlands with regard to climate change?
- No species is likely to see improvements in population health in most of their current range.
 - Differences between pinyon-juniper populations will continue to expand and become more pronounced as certain geographic areas experience harsher effects of climate change.
 - Magnitudes and extent of declines are likely to vary by species.
 - There is the potential for migration to offset range losses in some species.

Ecological and Cultural Impacts of Fire in Pinyon-Juniper Woodlands

The presentation by Dr. Alexandra (Ali) Urza, a Forest Service research ecologist, and Rhiana Jones, director of the Washoe Tribe of Nevada and California, highlighted the historical and recent fire trends in pinyon-juniper ecosystems. Historically, fires in these areas were infrequent and of high severity, creating a dynamic mosaic of woodlands and shrublands with slow post-fire recovery. Recent decades have seen a significant increase in fire size and frequency, driven by factors such as climate change, invasive species like cheatgrass (*Bromus tectorum*), and changes in fuel dynamics. The Pine Nut Mountains serve as a case study, illustrating the severe impact of repeated fires facilitated by cheatgrass on local ecosystems and Washoe tribal lands. These trends underscore the complex interplay of climate, vegetation, and land use in shaping fire regimes and their ecological and cultural consequences.

Some key takeaways include the following:

- I. Fire trends in pinyon-juniper woodlands
 - Historical fire trends
 - Pinyon and juniper trees typically do not produce fire scars and rarely survive fires, making fire history studies challenging.

- Fires in these ecosystems were historically infrequent, occurring every few centuries, and were often high-severity but patchy.
 - Post-fire recovery is slow, taking decades or centuries, leading to dynamic mosaics of woodlands and shrublands.
 - Recent fire trends
 - Large fires from increasing temperature, increasing severity and frequency of drought, and longer fire seasons are associated with anthropogenic climate changes.
 - There is a clear upward trend in the size and frequency of large fires in pinyon-juniper woodlands.
 - Increased fire probability is linked to the presence of invasive annual grasses like cheatgrass, which create continuous fine fuels that facilitate fire spread.
 - There is a clear upward trend in the size and frequency of large fires in pinyon-juniper woodlands.
 - Demographic changes, a legacy of historical harvest, fire suppression, and removal of people from the landscape have all led to the landscape's loss of heterogeneity and increased susceptibility to large, continuous fire impacts.
2. Pine Nut Mountains case study
- This region has seen a significant increase in fire activity over the past decade, largely driven by the interaction of repeated fires and cheatgrass invasion.
 - Historical land use, such as mining-era harvests, has contributed to the current fuel structure, leading to extensive areas of young second-growth woodlands.
 - Recent fires have had a substantial impact on Washoe tribal lands, with around 45 percent of their land base burning over the past 30 years.
3. Environmental protection and stewardship (Washoe Tribe)
- Pinyon pines are vital for tribal cultural practices, ceremonies, and connection to the land. They have been long used by native people, with historical references dating back centuries.
 - The Washoe Tribe has declared a state of emergency for pinyon pine to make aware to land management agencies, partners, and legislative bodies that pinyon pine conservation and protection is vital to the conservation and protection of Washoe culture and lifeways, and to highlight the need in communities to boost conservation and protection efforts.
 - The Washoe Tribe is taking proactive measures to conserve and mitigate wildfire, drought, and disease threats facing pinyon pine species on tribally administered lands. One measure involves propagating and planting pinyon trees in collaboration with the University of Nevada, Reno and the Rocky Mountain Research Station.
 - The Washoe Tribe is working with multiple collaborators to improve growth conditions, expand habitat resilience and longevity, and assist with the growth of pinyon pine populations across jurisdictional boundaries.

2.4.2 Presentation: Pinyon Jays and Pinyon-Juniper Woodlands

Dr. John Boone works with the Great Basin Bird Observatory in Reno, Nevada. Dr. Boone's presentation focused on pinyon jays (*Gymnorhinus cyanocephalus*) and their habitat in pinyon-juniper woodlands. Pinyon jays are notable for their year-round flocking behavior and complex social structure. They play a crucial role in dispersing pinyon pine seeds, which helps both the birds and the trees survive. The pinyon jay's habitat preferences are specific, favoring ecotones and transitional areas between sagebrush and pinyon-juniper woodlands. Unfortunately, their populations have been declining, likely due to landscape simplification and changes in habitat quality rather than total habitat loss. Conservation efforts are underway, including specific survey protocols and potential listing under the Endangered Species Act.

Key takeaways include the following:

1. Background
 - Pinyon-juniper woodlands are not just habitats but also homes to various terrestrial species, including birds, mammals, reptiles, and insects.
 - Pinyon jays have a mutualistic relationship with pinyon pine seeds, which are critical for their survival, especially during winters.
2. Distribution and habitat
 - Pinyon jays' home ranges are large and vary seasonally. They include different areas used for caching, retrieving caches, nesting, foraging, and roosting.
 - The species is distributed across much of the Intermountain West. Around 90 percent of pinyon jays live primarily in Nevada and New Mexico, with smaller populations in Arizona, Utah, and Colorado.
 - They prefer habitats with diverse tree densities and structures, which are essential for nesting and foraging.
3. Trends
 - Pinyon jays have been experiencing a population decline (about 2–3 percent annually) across their range. Reasons for decline include landscape simplification, changes in habitat structure, and potentially reduced pine seed availability. However, conservation and management efforts, such as developing survey protocols, studying habitat requirements, and conducting rangeland treatments are being evaluated for their impact on pinyon jays and their habitat.
 - Community science efforts are helping gather data on the pinyon jay's habitat use and behavior to better understand habitat requirements and identify suitable management practices.

2.4.3 Panel: Managing for Wildlife Habitat

Greater Sage-Grouse and Pinyon-Juniper: Overview of Science and Decision Support Applications (Peter Coates)

Dr. Peter Coates, a wildlife biologist with the USGS, presented on the impacts of pinyon and juniper expansion on sagebrush ecosystems and greater sage-grouse (*Centrocercus urophasianus*), highlighting findings from multiple studies. It was demonstrated that the expansion of pinyon and juniper into sagebrush ecosystems, particularly areas with less than 10 percent canopy cover, has led to detrimental effects such

as reduced survival rates and changes in habitat suitability for sage-grouse. These effects include decreased grasses, forbs, and shrub communities; increased wildfire vulnerability due to changes in fuel load and structure; and reduced soil nutrients and water availability. The presentation emphasized the importance of considering landscape-level approaches in management strategies to mitigate these impacts, using high-resolution data to pinpoint ecological traps where management interventions can be most effective in supporting sage-grouse populations and preserving sagebrush habitat integrity.

Some key take ways include the following:

1. Background

- Managers face challenges and complexity when making decisions aimed at preserving existing woodlands while reducing the adverse impacts of expansion.
- Expansion adversely affects sagebrush ecosystem function (e.g., water availability, soil nutrients, carbon cycles, and vegetation composition).
- Sage-grouse are a bellwether for sagebrush ecosystems, and conifer expansion reduces habitat quality and adversely affect movements, demographic rates, and population growth.
- Sage-grouse populations have declined 80 percent since the 1960s, due to a variety of impacts.
- Removal of early-stage trees in expansion areas has been shown to improve sage-grouse population performance.
- Quantitative conifer planning tools can help inform decisions that balance preservation and restoration of both sagebrush and pinyon-juniper ecosystems.

2. Changes in pinyon-juniper landscape

- Approximately two-thirds of pinyon-juniper cover falls into early age classes, indicating that many woodlands are newer.
- Expansion of pinyon-juniper woodlands has mainly occurred within sagebrush ecosystems, which predominately impact grassland environments.
- Historic overgrazing and suppressed wildfires contribute to pinyon-juniper expansion.

3. Implications for sagebrush ecosystems and management

- Increased tree cover leads to a reduction in grasses, forbs, and shrub communities, which are key sage-grouse habitat. Increased tree cover also can increase the number of predators in an area if the area can support it, leading to higher predation rates among sage-grouse populations.
- Woodland expansion changes fuel load, structure, and continuity and reduces grasses, forbs, and shrubs. Altered fuel load structure increases vulnerability to wildfires and decreases survivability of sage-grouse.
- Woodland expansion also reduces water availability, water retention, and soil nutrients. It can increase soil erosion, runoff, and vulnerability to invasive species.
- Expansion of pinyon-juniper woodlands converts sage-grouse core habitat areas to potential rangeland habitats. The loss of habitat further reduces the potential area for sage-grouse populations to expand or grow.

- Removal of pinyon-juniper can increase sage-grouse nest survival rates and female survival rates and thus can help increase overall population growth rates.
- Sage-grouse use different sagebrush ecosystem components for life stages. They will stay in flatter, valley areas in the fall/winter and move to higher elevations in the summertime.

Pinyon-Juniper Management and Mule Deer (Jackson Miller)

In his presentation, Jackson Miller from the Mule Deer Foundation discussed the expanding pinyon-juniper ecosystems and their ecological impacts on wildlife and habitats. Highlighting the growing presence of pinyon and juniper, Jackson explored how this expansion affects native grasses, forbs, and water availability. He addressed the consequences for mule deer populations, noting reduced forage and increased energy expenditure during migration. Jackson proposed collaborative management strategies, including selective thinning techniques, to mitigate these impacts while preserving pinyon-juniper habitat and enhancing ecosystem health. His presentation underscored the importance of informed management decisions and ongoing research to achieve positive outcomes for both wildlife and the environment.

Some key takeaways include the following:

1. Pinyon-juniper ecosystems are expanding into areas where historically they did not occur, primarily at lower elevations and into sagebrush and grasslands.
2. The expansion of pinyon and juniper is altering these ecosystems by increasing canopy density, shading out native grasses and forbs, and reducing water availability.
3. Mule deer populations are particularly affected, as the changes reduce their forage availability, increase the energy costs of movement during migration, and affect their recruitment rates.
4. Management should include collaborative efforts involving federal partners, tribes, and state wildlife agencies to selectively thin pinyon-juniper stands using methods like hand thinning or mastication.
5. Properly managed treatments can benefit wildlife by restoring historical habitats, improving fire regimes, and increasing water availability and forage without completely removing pinyon and juniper trees.
6. It is essential to continue researching different management techniques and their impacts on pinyon-juniper ecosystems and wildlife, as well as to educate contractors and stakeholders on effective management practices.

2.4.4 Presentation: Pinyon-Juniper Genetics Project

Carla Roybal, a plant ecologist at the USGS Southwest Biological Science Center, presented on the pinyon-juniper genetics project. She emphasized the recent attention to pinyon and juniper ecosystems following the Biden administration's initiative to protect old growth, specifically mentioning these species. Ms. Roybal highlighted the cultural significance of pinyon and juniper, noting their uses in food, medicine, and building materials across various cultures. She described them as foundation species that provide habitat for numerous wildlife species, including threatened bird species. The focus of her research is a landscape-level genetic analysis to understand population-level differences and hybridization dynamics. Ms. Roybal encouraged conference participants to contribute by collecting leaf tissue samples, detailing a straightforward collection process using silica powder in zip-lock bags. She provided contact information for those interested in contributing to the project.

2.4.5 Panel: Managing for Woodland Values and Resilience

Woodland Management for the Hualapai Tribe (Raven Honga)

In this presentation, Raven Honga included information on the Hualapai Tribe's history, land management, and forestry practices. Since the tribe's self-management of their forest and fire programs began in the 1980s and 2019, significant developments have evolved in their programs since it began in the 1950s. The tribe has undertaken projects like creating a pinyon orchard to aid elderly and mobility-challenged members and managing a woodlands enterprise to provide resources while maintaining ecological balance. Fire management strategies, including fuel breaks and commercial permits for tree harvesting, aim to protect the tribe's lands and resources. The tribe emphasizes education on sustainable practices to ensure effective management and preservation of their environment.

Key points include the following:

1. Fire management strategies include creating fuel breaks to prevent fire spreads, offering commercial permits for tree harvesting with guidelines to protect key areas, and reviewing historical fires to prevent and mitigate future incidents, especially near tribal boundaries.
2. The community emphasizes educating tribe members about sustainable practices, with importance given to traditional uses and cultural preservation, in land management decisions. Their efforts to balance ecological health with resource needs are ongoing.
3. The tribe's future goals and next steps include continued monitoring and active management of orchards and woodlands in collaboration with external entities like the BLM and the Forest Service for boundary protection. Ultimately, their goal is to sustain the woodlands enterprise and ensure no significant fire incidents cross boundaries.

Learning to Manage Pinyon Woodlands (Heather Stone)

Heather Stone drew on her more than 20 years of experience in the Eastern Sierra Western Great Basin to discuss collaborative land management efforts between the Forest Service, BLM Bishop Field Office, and local tribes. She emphasized the importance of incorporating traditional tribal knowledge and methods with Western science to manage pinyon-juniper woodlands more effectively. The presentation highlighted the evolution of land management practices, moving from uniform fuel reduction projects to more holistic and site-specific approaches. Key themes included building trust with tribes, integrating woodland health goals, mitigating threats like fire and climate change, and ensuring diverse, healthy ecosystems. The speaker also shared examples of successful co-stewardship projects and emphasized the importance of involving tribal members, particularly youth, in ongoing land care and monitoring efforts.

Key points of this presentation include the following:

1. Land managers should work together with tribes to develop trusting, long-lasting, meaningful engagement and blend traditional methods and knowledge with Western forestry.
2. Land managers should incorporate pinyon woodland health as a goal in all projects near woodlands to mitigate fire, climate change, drought, and disease threats.
3. Land managers should utilize site-specific plans based on available site data and work with research to learn more about treatments and wildlife use.
4. Historically, pinyon projects aimed to reduce fuel loads and restore sagebrush restoration goals and were developed using a relatively uniform prescription derived from forestry methods in

other forest types. Tribal involvement was limited, and most tribes were not included in the development process. As a solution, the BLM and Forest Service have begun engaging tribal perspectives for a deeper understanding of managing pinyon-juniper woodlands.

5. Projects like the community wildfire protection treatment in Antelope Valley and sagebrush restoration in the Bodie Hills highlight both successes and areas for improvement.
6. There has been development of multiple field tools and best practices to follow in pinyon-juniper woodlands based on tribal engagement and collaboration.

Bishop Paiute Tribe Natural Resources (Thomas Gustie)

In his presentation for the Bishop Paiute Tribe, Thomas Gustie highlighted key points about the tribe's environmental management efforts and collaborations. Since 2005, the tribe has been actively engaged with the Environmental Management Office, focusing on a variety of initiatives including water leak testing, invasive weed abatement, and salt waste programs. Over the years, they have expanded their efforts through collaborations with agencies like the BIA, BLM, and Forest Service, securing grants and partnerships to enhance their environmental stewardship. Notably, their recent accomplishments include reintroducing the Owens Valley pupfish into their wetlands, showcasing their commitment to biodiversity conservation. They are also the first tribe in California to have a scientific collection permit with the California Department of Fish and Wildlife, underscoring their dedication to protecting their cultural and natural resources.

BIA Forestry (Orvie Danzuka)

Orvie Danzuka, a timber sales forester with the BIA Central Office, began by acknowledging the local native community and expressed gratitude for their hospitality at the workshop. He highlighted the importance of collaboration between agencies and tribes in forestry management, citing outdated information on the Division of Forestry web page as an example of updates being made. Mr. Danzuka emphasized the impact of infrastructure changes on tribal timber management, including the closure of local mills affecting economic viability. He discussed the Indian Forest Management Assessment Team's efforts to improve forestry management by identifying shortcomings and enhancing collaboration with tribes. Mr. Danzuka shared how tribes are increasingly focusing on managing nontimber forest products and adapting to changes in timber markets. He illustrated the historical and contemporary uses of Western juniper, including its role in traditional crafts and modern applications like essential oils and Christmas wreaths. Mr. Danzuka concluded with a personal success story involving collaborative agreements between a Northern California tribe and federal agencies, highlighting the benefits of consultation and shared resources in forest management.

2.4.6 Presentation: Managing for Woodland Values and Resilience

Managing for Woodland Values and Resilience (Ali Urza)

The Masonic Mountain Pinyon-Juniper Shared Stewardship project is a collaborative effort involving multiple organizations, including the Humboldt-Toiyabe National Forest, Forest Service, Rocky Mountain Research Station, various tribes, and academic institutions such as the University of California, Berkeley, and Stanford University. The group received initial funding from the Sierra Nevada Conservancy for a three-year planning grant, aiming to manage an 18,000-acre area in the Bridgeport district.

The site includes diverse ecosystems ranging from sagebrush at higher elevations to pinyon-juniper woodlands covering most of the acreage. Despite historical mining impacts, the region retains significant

old-growth woodlands, evidence of historic fires, and a mix of younger and older trees. However, more recently, tree dieback has been occurring. The area holds cultural significance for multiple tribes, emphasizing the importance of collaboration from the project's inception.

The project has been planned collaboratively since its inception, with all partners involved in decision-making and funded participation. Challenges include the complexity of managing such a varied landscape and the slow pace necessitated by the collaborative nature of the effort. Community engagement and science are integral to the project, which involves organizations like the Great Basin Bird Observatory in data collection and analysis.

The project has developed a set of guiding principles for pinyon-juniper landscape management, with a focus on enhancing ecosystem resilience in diverse and complex landscapes. These principles aim to provide a framework that can inform similar projects in other regions, acknowledging the uniqueness and complexity of local ecosystems and situations. The presentation concluded by highlighting the project's intent to share its findings and approach with other regions facing similar challenges, aiming to influence broader conservation and management efforts.

Managing for Woodland Values and Resilience (Peter Weisberg)

The presentation outlined guiding principles for managing woodland ecosystems, emphasizing a bottom-up, collaborative approach. Key points included the recognition of indigenous cultural values and the importance of considering woodlands within a broader mosaic of various vegetation types.

Takeaways from this presentation included the following:

1. Woodlands are composed of various vegetation types, including pinyon-juniper, aspen, shrubs, grasses, wetland vegetation, and other tree species. Management of woodlands should be tailored to the plethora of vegetation species that occur in any given landscape while contextualizing national changes in vegetation communities.
2. Management of woodlands should involve a diverse and collaborative approach from tribal perspectives, involving those who have centuries of experience managing woodlands.
3. Woodlands should be treated as mosaics of different ages and structures; woodlands vary by geography, topography, and climate. Management should be adaptable to landscape dynamics and uncertainty, with a focus on adaptive management and site-specific management that utilizes the best available data and resilient management actions.
4. Management of woodlands should consider historical data, trends, and inventories on woodland expansion and contraction for effective management. Management actions should be based on specific objectives considering historical legacies, current composition, and future climate suitability. Balancing habitat and resource values is crucial, with no-treatment options being a valid alternative.
5. Climate change is causing changes to woodland ecosystems, amplifying and worsening existing threats, such as drought, fires, and beetles. Management should consider shifts due to climate change and provide adaptive, resilient strategies to protect and mitigate threats to woodland ecosystems.
6. More complex tree stands in a woodland ecosystem can increase resistance to pests and pathogens. Diverse tree stands are made of structures, snags, logs, gaps, and clumps. Uneven-aged

silviculture can help mitigate fire risk by creating heterogeneous fuel arrangements. Experimental studies are needed to validate these management practices.

7. Land managers should consider previous projects and disturbances to maintain overall landscape health.

2.5 COMMENT PERIOD

Prior to the interactive marketplace, the workshop facilitator reviewed information on how participants could submit public comments. There was also a table with a QR code, physical comment cards, and a BLM and Forest Service staff member available to answer any questions regarding comments. The information below was communicated to workshop participants.

The BLM is accepting public comments about the management and conservation of pinyon and juniper ecosystems through May 20, 2024. Although late submissions will be accepted and considered, those received by May 20 will be most useful for a comment summary report being produced by the BLM. The BLM is specifically interested in information regarding the following topics:

- Classifying different types of pinyon-juniper ecosystems and identifying appropriate management actions
- Assessing the condition of pinyon and juniper woodlands
- Values associated with old-growth pinyon and juniper woodlands
- Identifying threats to pinyon-juniper ecosystems and management methods to increase their resiliency
- Planning for a diversity of ecosystems and conditions
- Data and information gaps
- Incorporating indigenous knowledge to improve our understanding and management of pinyon and juniper woodlands.

2.6 INTERACTIVE MARKETPLACE

Following the Woodland Values and Resilience question and answer session, the BLM and Forest Service hosted an interactive “marketplace.” In this setting, meeting participants had the opportunity to engage with speakers in one-on-one or group settings to ask questions, network, and discuss pinyon-juniper management. Tables were set up around the room for speakers to station themselves and engage with participants.

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Appendix A

Workshop Meeting Materials

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Management and Conservation of Pinyon and Juniper Woodlands

Public Workshop Hosted by the Bureau of Land Management and Forest Service

Agenda

May 8 (*half day*), 1:00 – 5:00 p.m. PDT

May 9, 9:00 a.m. – 5:00 p.m. PDT

Nugget Casino Resort

1100 Nugget Ave, Sparks, NV, 89431

Cascade 1 and 2 Meeting Room

Virtual Attendance Option Link: https://empsi.zoom.us/webinar/register/WN_VybVJfzkSA6A1bXZ11chJQ#/registration

Question and answer sessions

Access via [menti.com](https://www.menti.com) and enter the **8-digit code shown at the top of the presentation**

Access by scanning the QR code:



Project website

Access via <https://www.blm.gov/workshop-management-and-conservation-pinyon-and-juniper-woodlands>



Workshop Objective: Create a venue for sharing information among federal agencies, other land managers, Tribes, public land users, academic researchers, NGOs, state and local governments and other interested entities on the range of ecosystem science and knowledge, management trends, social and cultural values, existing and potential threats, and climate resilience of pinyon and juniper woodlands, particularly mature and old-growth woodlands.

Note: Agenda and Confirmed Presenters are subject to change.



Day I (Half-day)

Time	Agenda Item	Facilitator(s)/Presenter(s)
Day I – May 8		
1:00 – 1:30 p.m.	Welcome and Introductions <ul style="list-style-type: none"> Workshop objectives and introduction Opening remarks from agency leadership 	<ul style="list-style-type: none"> Val Stanson, AECOM Nada Culver, Principal Deputy Director, Bureau of Land Management Troy Heithecker, Associate Deputy Chief, National Forest Systems, USDA Forest Service
1:30 – 2:00 p.m.	Presentation: Mature and Old-Growth Forests <ul style="list-style-type: none"> Executive Order 14072 Inventory and Threat Analysis, focused on pinyon and juniper woodlands Question & Answer 	<ul style="list-style-type: none"> Aaron Kamoske, Ecological Analyst, USDA Forest Service
2:00 – 3:10 p.m.	Presentation: Pinyon Juniper Ecology <ul style="list-style-type: none"> What is the historical context and distribution of the various types of pinyon-juniper systems? What are the values associated with old-growth pinyon and juniper woodlands we should seek to conserve and preserve? Question & Answer 	<ul style="list-style-type: none"> Peter Weisberg, Professor, Landscape Ecology Miranda Redmond, Assistant Professor, Forest Science and Climate Change
3:10 – 3:30 p.m.	BREAK	
3:30 – 5:00 p.m.	Native American Perspectives, Knowledge and History on Pinyon Juniper Ecological Stewardship <ul style="list-style-type: none"> Welcome by Jon Raby, BLM Nevada State Director Panel discussion by Tribal leaders on the relationship between humans and the pinyon-juniper woodlands cultural and spiritual responsibilities, and how we can best preserve pinyon-juniper and achieve sustainable outcomes by working together. Question & Answer 	<ul style="list-style-type: none"> Chairman Brian Mason, Shoshone-Paiute Tribes of the Duck Valley Indian Reservation Chairman Serrell Smokey, Washoe Tribe of Nevada and California Chairman Robert Gomez, Tubatulabals of Kern Warren Graham (representing Chairman O’ Neil), Duckwater Shoshone Tribe - Tribal Historic Preservation Officer Crystal Miller (representing Chairwoman Andrea Martinez), Walker River Paiute Tribal Administrator Joseph Lent (representing Chairman Sam) Bridgeport Indian Colony Council Member
5:00 – 5:05 p.m.	Closing Remarks & Comment Period <ul style="list-style-type: none"> Discuss how to submit comments and other details concerning the comment period. Day 2 program overview 	<ul style="list-style-type: none"> Val Stanson, AECOM



Day 2

Time	Agenda Item	Facilitator(s)/Presenter(s)
Day 2 – May 9		
9:00 – 9:15 a.m.	Welcome and Introductions	<ul style="list-style-type: none"> • Val Stanson, AECOM
9:15 – 10:30 a.m.	Presentation: Trends and Threats <ul style="list-style-type: none"> • What are the current trends (e.g., contracting/expanding, future conditions), including both geographic and population dynamics? • What are the biggest threats to pinyon-juniper ecosystems? How do we determine which threats are most urgent in specific areas? How do we apply social values to our understanding of threats? • Question & Answer 	<ul style="list-style-type: none"> • Bob Shriver, Assistant Professor, Plant Ecology & Population Biology • Ali Urza, Research Ecologist, Rocky Mountain Research Station • Rhiana Jones, Washoe Tribe of Nevada and California
10:30 – 10:45 a.m.	BREAK	
10:45-11:30 a.m.	Presentation: Pinyon Jay <ul style="list-style-type: none"> • Pinyon Jay and woodland habitat • Question & Answer 	<ul style="list-style-type: none"> • John Boone, Great Basin Bird Observatory
11:30 a.m. – 12:15 p.m.	Panel: Managing for Wildlife Habitat <ul style="list-style-type: none"> • Managing woodlands for big game and sage-grouse • Question & Answer 	<ul style="list-style-type: none"> • Steve Belinda, Mule Deer Foundation • Pete Coates, USGS
12:15 p.m.	Lunch Dismissal	<ul style="list-style-type: none"> • Val Stanson, AECOM
12:15 – 1:30 p.m.	LUNCH	
1:30 – 1:45 p.m.	Pinyon Juniper Genetics Project <ul style="list-style-type: none"> • Opportunity to contribute to genetic research by collecting leaf tissue samples. 	<ul style="list-style-type: none"> • Carla Roybal, USGS
1:45 – 3:00 p.m.	Panel: Managing for woodland values and resilience <ul style="list-style-type: none"> • Woodland values, historical context, learning through experience, and current management approaches • Partnerships and youth engagement • Bureau of Indian Affairs forestry and funding programs • Question & Answer 	<ul style="list-style-type: none"> • Raven Honga, Hualapai Tribal Forestry • Heather Stone, Bureau of Land Management • Thomas Gustie, Bishop Paiute Tribe • Orvie Danzuka, Bureau of Indian Affairs and Confederated Tribes of Warm Springs



Time	Agenda Item	Facilitator(s)/Presenter(s)
Day 2 – May 9		
3:00 – 4:00 p.m.	Presentation: Managing for woodland values and resilience <ul style="list-style-type: none"> • How do we plan for a diversity of ecosystems and conditions? • Are there potential management methods for increasing climate resiliency of pinyon-juniper systems? What are the data and information gaps preventing us from more effectively managing pinyon-juniper for increased resiliency? • Question & Answer 	<ul style="list-style-type: none"> • Ali Urza, Research Ecologist, Rocky Mountain Research Station • Peter Weisberg, Professor, Landscape Ecology
4:00 – 4:15 p.m.	BREAK	
4:15 – 5:00 p.m.	Interactive Marketplace <ul style="list-style-type: none"> • Workshop participants can visit with available speakers and presenters at stations inside the venue. 	



Workshop Presenters

Aaron Kamoske

Ecological Analyst, U.S. Department of Agriculture Forest Service

B.S., 2015, University of Montana (Natural Resource Conservation)

M.S., 2018, Michigan State University (Spatial Ecology)

PhD, 2021, Michigan State University (Geography, Environment, and Spatial Sciences)

Dr. Aaron Kamoske is an ecological analyst at the U.S. Department of Agriculture Forest Service. With a background in conservation and field ecology, Dr. Kamoske focuses on finding management solutions for our nation's natural resources. Aaron also earned a PhD in Geography, Environment, and Spatial Sciences from Michigan State University.

Miranda Redmond

Assistant Professor, Forest Science and Climate Change

<https://ourenvironment.berkeley.edu/users/255705>

B.S., 2009, University of California, Berkeley (Environmental Science, Minor Forestry)

Ph.D. 2015, University of Colorado, Boulder (Ecology and Evolutionary Biology)

Dr. Miranda Redmond is an assistant professor in the Environmental Science, Policy, and Management at University of California, Berkeley. With a PhD from the Department of Ecology and Evolutionary Biology at the University of Colorado, Boulder, Dr. Redmond focuses on understanding the effect of climate and disturbances on forest dynamics as a way of informing land management decisions. Specifically, Dr. Redmond identifies strategies to enhance forest resilience to global change and to meet diverse management objectives.

Peter Weisberg

Professor, Landscape Ecology

<https://www.unr.edu/eecb/people/peter-weisberg>

B.S., 1992, SUNY College of Env. Science and Forestry (Forest Biology)

M.S., 1994, University of Wyoming (Biogeography)

PhD, 1998 Oregon State University (Forest Ecology)

Head of the Weisberg lab at the University of Nevada, Reno, Dr. Peter Weisberg leads the way in researching landscape dynamics for the overall goal of understanding the support needed for sound natural resource management. Dr. Weisberg's research spans across many concentrations, notably focusing on fire-climate-vegetation interactions and forest mortality and ecosystem resilience. Dr. Weisberg works internationally but has a special geographical focus on the landscapes of the Great Basin and eastern Sierras.

Chairman Brian Mason

Shoshone-Paiute Tribes of the Duck Valley Indian Reservation

Chairman Brian Mason is an enrolled member of the Shoshone-Paiute Tribes of the Duck Valley Indian Reservation. He served in the United States Marine Corps for over twenty years in various leadership positions and deployed to foreign duties on seven separate occasions. After retiring from the Marine Corps, he worked in Wildland Fire suppression as a Senior Fire Fighter with the US Forrest Service in Great Basin and Pacific Northwest, he then worked for the Bureau of Land Management in Fuels and Fire management. In 2020 Mason was elected to the Shoshone-Paiute Tribes Business council where he served as Council Member, Vice Chairman and Tribal Chairman. Mason was re-elected to a second term as Chairman in April of 2023.

Chairman Mason holds two degrees in Marketing Management and Business Management. Further, Chairman Mason was an International Relations Minor and a Morris K. Udall Native American Congressional Intern, interning for the Assistant Secretary of the Interior in Washington, D.C. He also possesses many military decorations and personal awards which include the Navy Commendation Medal, the Combat Action Ribbon, The United Nations Certificate in addition to other foreign and service awards.



Chairman Serrell Smokey
Washoe Tribe

Washoe Tribe Chairman, Serrell Smokey, was elected to office in 2018. Chairman Smokey was nominated as the President of the Inter-Tribal Council of Nevada in 2019 and was appointed as an alternate member of the Department of Interior's Secretary's Tribal Advisory Committee in 2023. As a graduate of the University of Nevada, Reno, Chairman Smokey has an educational background in Psychology, Business, and Tribal Law. Chairman Smokey is a Veteran, serving in the United States Army and the Nevada National Guard, and he actively utilizes the leadership skills acquired in the military to progressively lead the Washoe People. His goals include working towards better economic development opportunities, stable administrative functions, and giving Tribes a bigger voice in the Federal Government. "For too long have Tribes been left out, and the government neglected their trust responsibilities," says Chairman Smokey. He also plays an integral part in the fight against local racism, with a victory of changing the name of the "squaw" valley resort and fighting the Minden, NV sundowner siren.

Chairman Robert Gomez
Tubatulabal of Kern

Robert Gomez is Chairman for the Tubatulabal Tribe of the Kern River Valley, Kern County CA. Mr. Gomez has been involved in Indian Country affairs for the past 40 years, with regards to Cultural Resources Management and has earned a master's degrees in public administration from the California State University, Bakersfield. He has been actively safeguarding his tribe's cultural heritage in the Kern River Valley and surrounding traditional cultural lands. Furthermore, he is a speaker of his tribal language, (Pahka'anil) and seeks opportunities to give lessons to tribal members and family. He has been a member of the BiState Tribal Natural Resources Committee for several years.

Crystal Miller (Representing Chairwoman Andrea Martinez)
Tribal Administrator, Walker River Paiute Tribe

Crystal Miller is a citizen of the Walker River Paiute Tribe and a PhD candidate in American Indian Studies at the University of Arizona. Miller focuses her studies on the Federal Indian Policies that govern and provide both the guidelines and restrictions on Native Nations ability to assert their own sovereignty. She has invested in the protection of tribal lands, resources and continues to fight legally and politically to ensure that the tribe's interests are included in regard to lands directly impacted by outside agencies. Her commitment to understanding and disseminating knowledge to Native Nations is a high priority that is evidenced in the work she has done and continues to do. Crystal always returns back to the traditional knowledge that the land is inherently tied into our holistic being and the protection of it is an inherent responsibility to ensure balance in life remains.

Joseph Lent (Representing Chairman Sam)
Council Member, Bridgeport Indian Colony

Joseph Lent is the Secretary and Treasurer of the Bridgeport Indian Colony. He identifies as dweller of Numu Diipu, the Paiute Homeland, member of the Pogai-duka'a Band of the Numu, also known as the Northern Paiute Nation. Mr. Lent is active in the cultural preservation of Numu history, lifeways, and traditions. Additionally, he is active in the management, use, and propagation of resources within creation, especially those within the Northern Paiute Homeland.

Robert Shriver
Assistant Professor, Plant Ecology & Population Biology

<https://www.unr.edu/nres/shriver-robert>

B.S. University of Wyoming, 2011

Ph.D. Duke University, 2017

Quantitative ecologist, Dr. Robert Shriver, is an assistant professor of Plant Ecology and Population Biology at the University of Nevada, Reno. Dr. Shriver's research concentrates on the mechanisms that drive plant population and ecosystem dynamics ranging all the way from plots to landscapes. Overall, Dr. Shriver aims to use his research to anticipate and predict the impacts of environmental change in basic and applied settings.



Ali Urza

Research Ecologist, Rocky Mountain Research Station

<https://www.fs.usda.gov/research/about/people/aurza#education-tab>

B.A. Reed College, 2006 (International Policy Studies)

M.S. Colorado State University, 2012 (Ecology)

Ph.D. University of Nevada-Reno (Ecology, Evolution, and Conservation Biology)

Dr. Alexandra Urza is a research ecologist with the Maintaining Resilient Dryland Ecosystems Science Program of the Rocky Mountain Research Station in the U.S. Department of Agriculture Forest Service. Dr. Urza has a background in understanding the multi-scale drivers of vegetation dynamics at the woodland-shrubland interface in the Great Basin, climate effects on post-fire mixed conifer forest recovery in the Northern Rockies, and aspen responses to management efforts in Wyoming. With this experience, Dr. Urza looks at the ways plant communities respond to various disturbances to analyze the threats that dryland ecosystems in the west are facing.

John Boone

Great Basin Bird Observatory

<https://www.gbbo.org/gbbo-staff-gallery/john-boone>

B.S. George Washington University, 1985 (Biology)

M.S. Idaho State University, 1990 (Biology/Biological Statistics)

Ph.D. University of Colorado at Boulder, 1995 (Biology/Biological Statistics)

Dr. John Boone is the Great Basin Bird Observatory's Research Director. By heading up projects like radiotelemetry studies of Pinyon Jays and Greater Sage-Grouse, nest monitoring of Golden Eagles, and research to improve methods of monitoring Elf Owls along the Lower Colorado River, Dr. Boone provides conservation science and planning service to land management agencies and other entities.

Steve Belinda

Chief Conservation Officer, Mule Deer Foundation

<https://muledeer.org/steve-belinda/>

B.S. Pennsylvania State University, 1992 (Wildlife and Fisheries Science)

M.S. University of Wyoming, 1998 (Environmental Policy)

Steve Belinda provides the Mule Deer Foundation leadership on all things related to mule and black-tailed deer conservation as the Chief Conservation Officer with the Mule Deer Foundation and is a Fellow of the Wildlife Society and the National Conservation Leadership Institute. Steve's experience in federal agencies, the private sector, and non-profit conservation worlds, provide a unique skill set with over 25 years of experience in successfully working towards the conservation of natural resources and the professional management of fish and wildlife and their habitats.

Pete Coates

Research Wildlife Biologist, USGS Western Ecological Research Center

<https://www.usgs.gov/staff-profiles/peter-coates>

B.S. University of Nevada Reno, 1998 (Conservation Biology)

M.S. University of Nevada Reno, 2001 (Biology)

Ph.D. Idaho State University, 2007 (Biology)

Dr. Pete Coates is a Wildlife Biologist with the U.S. Geological Survey's Western Ecological Research Center. Dr. Coates is interested in sound science and management practices aimed at restoring wildlife communities and their habitats and is committed to progressive, scientifically defensible conservation actions in the face of increasing human population size and individual consumption. Specifically, Dr. Coates is interested in investigating the links between nesting habitat, predator composition, and incubation behavior and success of birds. Dr. Coates seeks to develop a broader understanding of how human-caused landscape changes affect communities and aim to identify restoration practices that preserve natural ecological processes. He is also interested in behavioral traits of grouse that affect population establishment and persistence in the face of environmental challenges.



Carla Roybal

Plant Ecologist, Southwest Biological Science Center

<https://www.usgs.gov/index.php/staff-profiles/carla-m-roybal>

B.A. Prescott College, 2012 (Environmental Studies)

M.S. Northern Arizona University, Flagstaff (Biology with Distinction)

Carla Roybal is a plant ecologist with the USGS Southwest Biological Science Center. Carla studies plants in the context of ecological restoration in western dryland ecosystems. Carla is interested in basic and applied ecological research within the context of land stewardship, conservation, and restoration. Presently, her research is focused on testing the suitability of native plant materials commonly used in restoration projects across the western U.S. Carla also has a background in education, and seeks to incorporate this skillset into outreach efforts. Carla is a lifelong resident of the Four Corners states, with heritage tied to land stewardship in northern New Mexico reaching back many generations, and is honored to work on behalf of land conservation and restoration in the western U.S.

Raven Honga

Hualapai Tribe, Forestry and Wildland Fire Management Department

B.S. Northern Arizona University, 2018

M.F.R. University of Georgia, 2022

Mr. Honga began his career as an Administratively Determined (AD) fire fighter for the Bureau of Indian Affairs (BIA). He continued his fire career while going to school and once he completed school he made the switch from Federal to Tribal, becoming a Forest Technician for the Hualapai Tribe. After pursuing that for a few years, he received the opportunity to obtain his Master's Degree in Forest Resources from the University of Georgia. In 2022 he returned to the Hualapai Tribe to become their Timber Forester, helping the Tribe to obtain and get a portable mill before finally becoming the Director of Hualapai Forestry and Wildland Fire Management.

Heather Stone

Supervisory Fuels Specialist/Assistant Field Manager, Bishop Field Office, BLM

B.A. Amherst College, 1994 (Chemistry and Biology)

M.S. University of California, Berkeley, 2004 (Range Management)

Heather has been working on management and restoration of Great Basin ecosystems for 25 years. Most of her career has been spent in the Eastern Sierra and the western side of the Great Basin working for the Bishop Field Office of the Bureau of Land Management and the Inyo National Forest as a range manager, fuels specialist, and now as a supervisor of a varied group of specialists. She works on projects to improve resilience in sagebrush, pinyon, meadows, and other ecosystems as well as protecting communities from severe wildfire. In the last decade, she has been working collaboratively with local Tribes on how to better incorporate Tribal concerns and knowledge into the management of both pinyon woodlands and sagebrush ecosystems.

Tom Gustie, III

Natural Resources Coordinator, Bishop Paiute Tribe Environmental Management Office (EMO)

Tom has been with the Bishop Paiute Tribe's EMO department since 2005 he started out with water loss survey of structures within the Bishop Tribe and then went to Noxious Weed and Solid Waste abatement Programs. He now oversees vegetation management for a 25 Acre wetland and a crew of 3 for Hazardous Fuels Reduction Program and what was once a summer Internship for 5 young adults is now a year round program for the Bishop Paiute Tribe Conservation Corps Crew. With the vegetation management experience and he has collaborated with U.S. Forest Service, BLM, and California Department of Fish and Wildlife on management projects that help protect tribal historic homelands.



Pinyon-Juniper Woodlands

The Bureau of Land Management manages 19 million acres of pinyon and juniper woodlands, mostly in Utah, Nevada, Colorado, New Mexico, Oregon, Arizona and California. There are many different types of pinyon-juniper ecosystems, with multiple pinyon and juniper species growing in the West. While different types of pinyon-juniper ecosystems have many characteristics in common, there are some distinctions that can have implications for management strategies.

Climate change is already impacting pinyon-juniper ecosystems, and is expected to continue having significant impacts on the health and distribution of woodlands and the species that inhabit them. Related stressors include insect and disease outbreaks, wildfire, and the expansion of invasive annual grasses. The BLM is working to manage pinyon and juniper woodlands for increased landscape health and ecosystem resilience, including by building scientific knowledge of this resource on the public lands.

How does the BLM manage pinyon and juniper woodlands?

The BLM manages pinyon and juniper woodlands for forest health, wildlife habitat, recreation, grazing and other multiple uses. Outdoor recreation activities are popular in pinyon and juniper woodlands such as hunting, mountain biking and camping. Uses that are most common in pinyon and juniper woodlands include firewood collection, fence posts and rails, pinyon nut harvesting and Christmas tree harvesting. Pinyon and juniper woodlands are generally not suitable for harvest for dimension lumber.

In some areas on public lands, pinyon and juniper woodlands are expanding due to factors such as climate change and altered fire regimes. BLM actively manages pinyon and juniper to improve rangeland conditions and habitat for sagebrush dependent species such as greater sage-grouse. Natural fire regimes in some pinyon and juniper woodlands have been disrupted, leading to increasingly dense forests that can be at risk to catastrophic fire. BLM conducts fuels reduction projects in pinyon and juniper woodlands as necessary to reduce the risk of severe wildfire where appropriate.

How do pinyon and juniper woodlands fit into EO 14072?

Pinyon and juniper woodlands are the most abundant forest type in the federal inventory of mature and old-growth forests, with 9 million acres of old-growth pinyon-juniper across BLM and Forest Service lands and an additional 14 million acres of mature pinyon-juniper.

Old-growth pinyon and juniper woodlands have distinct characteristics that develop over centuries. Intervals between stand-replacement events in some woodlands can be hundreds of years, allowing for development of old-growth characteristics. Some juniper species can exceed ages of 1,500 years, and pinyon species over 900 years. The oldest known western juniper is nearly 1,650 years old. The working definitions developed by BLM and the Forest Service in response to EO 14072 define old-growth pinyon-juniper woodlands to be 150-250 years old, depending on site productivity, the geographic location, and other factors.

Unlike old-growth forest, “mature forest” as outlined in EO 14072 is a relatively new concept for the Forest Service and BLM. It is expected that a continual adaptive management process integrating new

science, local conversations, and social processes will refine mature forest definitions over time, just as old-growth forest definitions have evolved over the past three decades.

What role do pinyon and juniper woodlands play in wildlife habitats?

A multitude of species are found in pinyon and juniper woodlands, including some sensitive and at-risk species. These ecosystems provide habitat for ferruginous hawk, juniper titmouse, mountain bluebird, American kestrel, blackthroated gray warbler, dusky flycatcher, fringed myotis, pallid bat, white-tailed antelope squirrels, Apache pocket mice, desert woodrats, kit foxes, ringtails, white-backed hog-nosed skunks, northern sagebrush lizard and dozens more. Additionally, pinyon and juniper woodlands are important habitat for many big game species, including mule deer, elk, pronghorn and white-tailed deer. Low elevation forests such as pinyon and juniper woodlands provide critical habitat connectivity that supports seasonal migration patterns of big game species.

Pinyon Jays live in pinyon trees year-round and can facilitate dispersal of seeds for pinyon pine regeneration. Long-term drought, climate change, and habitat loss pose a significant threat to Pinyon Jay populations.

What are the cultural and social values of pinyon and juniper woodlands?

Pinyon and juniper woodlands have significant values to Tribes, both as sacred sites and sources of pinyon nuts. There is evidence that pinyon nuts have been a staple food source for Native Americans for thousands of years. Pinyon and juniper woodlands have and continue to sustain human communities with wood for fuel and development.

Additionally, pinyon and juniper woodlands store carbon in live and dead biomass and soils. While woodland carbon is lower than other forest types, pinyon and juniper woodlands cover a vast geography, making their contribution to carbon storage considerable.

How are the BLM and the USDA Forest Service going to manage pinyon-juniper ecosystems for climate resiliency?

This summer, the Forest Service and the BLM will be co-hosting public workshops focused on sustaining resilient pinyon-juniper ecosystems. The workshops are intended to ensure robust public engagement and scientific expertise and knowledge are underpinning the approaches taken to fulfill EO 14072 and other management strategies for ensuring healthy, resilient pinyon and juniper woodlands. Through a series of workshops in western locations, the Forest Service and the BLM will engage with science and knowledge experts, Tribes, land managers, stakeholders, and the public in informed discussion around management issues, threats, trends and opportunities for climate-smart management and conservation of pinyon-juniper ecosystems on federal lands.



Management and Conservation of Pinyon and Juniper Woodlands Public Workshop Hosted by the Bureau of Land Management and Forest Service

These definitions are being provided to support information sharing at the workshop by defining key terms and concepts that will be discussed. These definitions are borrowed from existing agency regulations, policies, and management documents.

Aboveground biomass: The total mass of living organisms (such as trees, shrubs, and herbs) present above the soil surface in a given area, often expressed in terms of weight per unit area. ([BLM, Forest Service, 2023](#))

Adaptive management: Adaptive management is the general framework encompassing the three phases of planning: assessment, plan development, and monitoring. This framework supports decision-making that meets management objectives while simultaneously accruing information to improve future management by adjusting the plan or plan implementation. ([Forest Service, 2012](#))

Climate resilience: The ability of an ecosystem and its component parts to absorb, or recover from, the effects of climate-related disturbances and chronic stress through preservation, restoration, or improvement of its essential structures and functions and redundancy of ecological patterns across the landscape. ([BLM, Forest Service, 2023](#))

Climate-informed interventions: Management actions designed to address climate-related risks and disturbances in forest ecosystems, informed by scientific understanding of climate change impacts. ([BLM, Forest Service, 2023](#))

Common stand exam: A standard field protocol used by resource managers to assess forest stand conditions. ([BLM, Forest Service, 2023](#))

Connectivity. Ecological conditions that exist at several spatial and temporal scales that provide landscape linkages that permit the exchange of flow, sediments, and nutrients; the daily and seasonal movements of animals within home ranges; the dispersal and genetic interchange between populations; and the long-distance range shifts of species, such as in response to climate change. ([36 CFR 219.19](#))

Desired condition framework: A management approach that aims to restore or maintain ecosystems in a desired state or condition, often based on ecological principles, historical reference conditions, and stakeholder input. ([BLM, Forest Service, 2023](#))

Ecological Integrity: The quality or condition of an ecosystem when its dominant ecological characteristics (for example, composition, structure, function, connectivity, and species composition and diversity) occur within the natural range of variation and can withstand and recover from most perturbations imposed by natural environmental dynamics or human influence. ([36 CFR § 219.19](#))

Ecological Site: A conceptual division of the landscape that is defined as a distinctive kind of land based on recurring soil, landform, geological, and climate characteristics that differs from other kinds of land in its ability to produce distinctive kinds and amounts of vegetation and in its ability to respond similarly to management actions and natural disturbances. ([USGS, 2009](#))

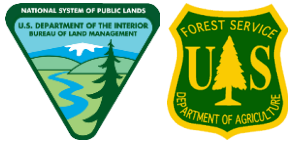
Ecological, social, and economic sustainability: Ecological sustainability refers to the capability of ecosystems to maintain ecological integrity; economic sustainability refers to the capability of society to produce and consume or otherwise benefit from goods and services including contributions to jobs and market and nonmarket benefits; and social sustainability refers to the capability of society to support the network of relationships, traditions, culture, and activities that connect people to the land and to one another, and support vibrant communities. ([36 CFR 219.19](#))

Ecosystem services: The benefits that ecosystems provide to humans, including provisioning services (such as food and water), regulating services (such as climate and disease control), cultural services (such as recreational and spiritual benefits), and supporting services (such as nutrient cycling and soil formation). ([36 CFR 219.19](#))

Estimation methods: The initial inventory relied on the Forest Inventory and Analysis (FIA) program, a systematic sampling protocol covering all ownerships in the United States. Data from the most recent FIA cycle for each state were used. Estimates were computed using standard FIA estimation procedures. ([BLM, Forest Service, 2023](#))

Forest Inventory and Analysis (FIA): A program that collects, analyzes, and reports data on the status and trends of forests in the United States, including information on forest extent, composition, and health. ([BLM, Forest Service, 2023](#))

Indigenous Knowledge: Indigenous Knowledge is a body of observations, oral and written knowledge, innovations, technologies, practices, and beliefs developed by Indigenous Peoples through interaction and experience with the environment. It is applied to phenomena across biological, physical, social, cultural, and spiritual systems. IK can be developed over millennia, continues to develop, and includes understanding based on evidence acquired through direct contact with the environment and long-term experiences, as well as



extensive observations, lessons, and skills passed from generation to generation. IK is developed, held, and stewarded by Indigenous Peoples and is often intrinsic within Indigenous legal traditions, including customary law or traditional governance structures and decision-making processes. Other terms such as Traditional Knowledge(s), Traditional Ecological Knowledge, Genetic Resources associated with Traditional Knowledge, Traditional Cultural Expression, Tribal Ecological Knowledge, Native Science, Indigenous Applied Science, Indigenous Science, and others, are sometimes used to describe this knowledge system. ([DOI Departmental Manual 301 DM 7](#))

Late successional: A stage in ecological succession characterized by relatively stable and diverse ecosystems dominated by mature or old-growth vegetation. ([BLM, Forest Service, 2023](#))

Management unit: An area of land defined by boundaries where a management strategy is to be applied. The land area may be composed of one or more ecological sites, and the entire area may or may not be treated. ([USGS, 2009](#))

Mature forest: Forests that have progressed beyond the early stages of succession but have not yet reached the advanced characteristics of old-growth forests. ([BLM, Forest Service, 2023](#))

Multicohort: A forest stand composed of multiple age classes or cohorts of trees, reflecting a range of ages and sizes resulting from past disturbance events and regeneration processes. ([BLM, Forest Service, 2023](#))

Old-growth: Forests that have reached an advanced stage of ecological succession characterized by large trees, complex canopy structure, and high biodiversity, often exhibiting natural patterns of disturbance and regeneration. ([BLM, Forest Service, 2023](#))

Self-thinning: The natural process by which trees within a forest stand compete for resources (such as sunlight, water, and nutrients), leading to the death or suppression of some individuals and the overall reduction in tree density. ([BLM, Forest Service, 2023](#))

Seral: A stage in ecological succession representing the transitional phase between one community of organisms and another, typically following a disturbance event such as fire or logging. ([BLM, Forest Service, 2023](#))

Species of concern: Species that require special consideration in restoration. These include species that may increase following treatment (that is, noxious weeds) or species that are declining or appear to need concentrated conservation actions, including State Endangered, State Threatened, State Sensitive, or State Candidate species. ([USGS, 2009](#))

Stand initiation: The initial stage of forest stand development following a disturbance event, characterized by the establishment of new tree seedlings and the formation of a young, dense canopy. ([BLM, Forest Service, 2023](#))

Stem exclusion: The phase of forest stand development where competition for light leads to the growth of dominant trees, resulting in the suppression and mortality of understory vegetation. ([BLM, Forest Service, 2023](#))

Stocking: Fully stocked site is one with enough trees that does or will eventually fully occupy a site (that is, at maturity, interspecific competition limits the expansion or addition of new leaf canopy). Stocking density varies across ecological sites and with tree size. ([USGS, 2009](#))

Stressors: Factors that may directly or indirectly degrade or impair ecosystem composition, structure or ecological process in a manner that may impair its ecological integrity, such as an invasive species, loss of connectivity, or the disruption of a natural disturbance regime. ([36 CFR 219.19](#))

Structural characteristics approach: A method for defining old-growth and mature forests based on measurable structural attributes such as tree size, presence of snags, canopy cover, and distribution of vegetation layers. ([BLM, Forest Service, 2023](#))

Understory reinitiation: The stage of forest stand development where suppressed understory vegetation begins to regenerate due to increased light availability resulting from canopy gaps or thinning of the overstory. ([BLM, Forest Service, 2023](#))

Woodland: An area of smaller statured trees usually with canopy cover >10%; open 10-20%, intermediate 20-40%, dense >40%. ([USGS, 2009](#))

For further reading, and to obtain reference material cited in each definition used in this handout, please visit the websites at the URLs below to access the reference material.

(36 CFR 219.19): <https://www.ecfr.gov/current/title-36/chapter-II/part-219/subpart-A/section-219.19>

(BLM, Forest Service, 2023): <https://www.fs.usda.gov/sites/default/files/mature-and-old-growth-forests-tech.pdf>

(DOI 2023): <https://www.doi.gov/document-library/departmental-manual/301-dm-7-departmental-responsibilities-consideration-and>

(Forest Service, 2012): https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5409973.pdf

(USGS, 2009): <https://pubs.usgs.gov/circ/1335/circ1335.pdf>



Management and Conservation of Pinyon and Juniper Woodlands **Public Workshop Hosted by the Bureau of Land Management and Forest Service** **Annotated Literature and Websites**

[BLM. 2020. Interpreting Indicators of Rangeland Health, Version 5. Tech Ref I734-6. Denver, CO: U.S. Department of the Interior, Bureau of Land Management, National Operations Center.](#)

This handbook explores the evolution of concepts and protocols for assessing rangeland health, emphasizing the transition from “range condition” to the term "health" and the subsequent development of qualitative assessments. The handbook also describes the qualitative assessment protocol known as the Interpreting Indicators of Rangeland Health (IIRH), detailing its development process and successive versions. Lastly, it discusses the ongoing revisions to the IIRH protocol based on feedback from users and peer reviewers, reflecting the dynamic nature of rangeland assessment practices.

[BLM, Forest Service. 2023. Mature and Old Growth Forests: Definition, Identification, and Initial Inventory on Lands Managed by the Forest Service and Bureau of Land Management.](#)

This report provides a discussion regarding the national inventory of old-growth and mature forests on lands managed by the Forest Service and the BLM. This report addresses the lack of consistent definitions and previous inventory efforts for old-growth and mature forests on these lands. This report presents narrative frameworks and working definitions for these forest types, along with initial estimates of their extent. This report emphasizes the importance of these forests in providing ecological, social, Tribal, and economic values, as well as their vulnerability to climate change and associated stressors. Finally, the authors also discuss the challenges in defining and inventorying old-growth and mature forests, highlighting the need for consistent definitions and ongoing adaptive management processes.

[BLM, Forest Service. 2023. Pinyon-Juniper Woodlands. Internet website: <https://www.fs.usda.gov/sites/default/files/pinyon-juniper-fact-sheet.pdf>.](#)

This publication provides an overview of pinyon-juniper woodlands managed by the Bureau of Land Management (BLM) across several states. This fact sheet discusses the impacts of climate change on these ecosystems and outlines the BLM's management strategies, including conservation for forest health, wildlife habitat, recreation, and multiple uses. Additionally, the fact sheet addresses the ecological significance of these woodlands, their importance for wildlife habitats, and their cultural and social values to indigenous communities.

[DellaSala, Dominick A., B. Mackey, P. Norman, C. Campbell, P. J. Comer, C. F. Kormos, H. Keith, B. Rogers. 2022. Mature and Old-Growth Forests Contribute to Large-Scale Conservation Targets in the Conterminous United States. *Frontiers in Forests and Global Change*, 1-20.](#)

This publication provides a comprehensive assessment of mature and old-growth forests (MOG) across the conterminous United States, highlighting their significant decline due to logging and development. Utilizing three structural development measures, the authors identify MOG distribution by forest types, land ownerships, and conservation status, emphasizing their importance for biodiversity and carbon sequestration. Despite the concentration of MOG on federal lands, they fall short of conservation targets, with the majority vulnerable to logging. The



paper recommends enhanced protection measures, including elevating the conservation status of federal MOG, to mitigate CO₂ emissions and align with climate agreements and executive orders.

[DOI. 2023. 301 DM 7 Departmental Responsibilities for Consideration and Inclusion of Indigenous Knowledge in Departmental Actions and Scientific Research. Washington DC: DOI.](#)

This Department of Interior Manual emphasizes the significance of Indigenous Knowledge (IK) and its integration into decision-making processes within the DOI, defining IK as knowledge passed down through generations within Indigenous communities, derived from systematic methodologies, cultural ceremonies, and relationships with the environment. The manual underscores the importance of understanding the diversity among Indigenous Peoples and their unique knowledge systems and stresses the need for equitable and respectful engagement with Indigenous Peoples and their knowledge systems, acknowledging past injustices and upholding Tribal treaty and reserved rights. The manual outlines steps for engaging with Indigenous communities to identify respected knowledge holders and obtain Free, Prior, and Informed Consent (FPIC) before incorporating IK into Departmental actions. Finally, the DOI emphasizes the use of preferred terminology and descriptions of IK as determined by the Indigenous group being consulted.

[Eisenberg, C., S. Prichard, M. P. Nelson, P. Hessburg. 2024. Braiding Indigenous Knowledge and Western Science for Climate-Adapted Forests. University of Washington.](#)

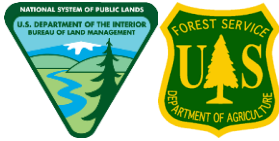
This publication synthesizes Indigenous Knowledge (IK) and Western Science (WS) to develop climate and wildfire adaptation strategies for forest landscapes, aligning with federal directives to integrate these knowledge systems. Recommendations focus on proactive stewardship, recognizing Tribal Sovereignty, providing flexibility in landscape management, grounding policies in ethics of reciprocity, and catalyzing innovative approaches to forest stewardship. The report emphasizes the need for adaptive strategies to address escalating threats to North American forests, including extreme wildfires, pathogen outbreaks, and climate change impacts. These recommendations aim to restore resilience to forests while respecting cultural values and fostering sustainable management practices.

[Executive Office of the President. \(27 Apr 2022\). Strengthening the Nation's Forests, Communities, and Local Economies. Federal Register 87\(24851\), 24851-24855.](#)

Executive Order 14072 emphasizes the critical role of mature and old-growth forests on Federal lands in promoting community health, resilience, and prosperity, particularly in addressing catastrophic wildfires. The policy aims to pursue science-based, sustainable forest management, conserve old-growth forests, and support Indigenous traditional ecological knowledge, while promoting collaborative, locally led conservation solutions. Specific actions include conducting an inventory of old-growth and mature forests, coordinating conservation efforts, and promoting community-led economic development in the sustainable forest product sector. The order also commits to global efforts to combat international deforestation and calls for greater deployment of nature-based solutions to tackle climate change and enhance resilience.

[Forest Service. 2013. Forest Service Handbook 1909.12-Land Management Planning Handbook.](#)

This publication establishes procedures and responsibilities for implementing the National Forest System land management planning regulations, providing consistent overall guidance to Forest



Service Line Officers and Agency Employees in developing, amending, or revising land management plans for units within the national Forest System. The handbook also offers comprehensive policy direction and instructions for sustainable ecosystem management, forest restoration, and conservation, aligning with the National Forest Management Act.

[Forest Service. 2024. Mature and Old-Growth Forests. Retrieved from Forest Service Climate Risk Viewer: https://storymaps.arcgis.com/collections/87744e6b06c74e82916b9b11da218d28?item=8.](https://storymaps.arcgis.com/collections/87744e6b06c74e82916b9b11da218d28?item=8)

This tool provides an overview of the ecological significance of mature and old-growth forests, highlighting their diverse values and susceptibility to climate change. The tool references recent reports from the Forest Service and the BLM, specifically focusing on an initial Inventory Report and a forthcoming threat analysis report. Additionally, it examines historical trends in timber harvest rates and shifts in harvesting methods, underscoring the evolving management approaches aimed at conserving old-growth attributes. Finally, a map tool is provided to show how widespread threats to old growth forests are.

[Gray, Andrew N., K. Pelz, G. D. Hayward, T. Schuler, W. Salverson, M. Palmer, C. Schumacher, C. W. Woodall. 2023. Perspectives: The wicked problem of defining and inventorying mature and old-growth forests 546 \(2023\) 121350. *Forest Ecology and Management*, 1-11.](#)

Mature and old-growth forests are valued for their biodiversity, cultural significance, and ecological functions. This publication aims to define and inventory these forests across the United States, a task complicated by diverse perspectives and challenges in measurement and classification. While various criteria exist to identify old growth, practical limitations and the need for interdisciplinary approaches persist. This paper synthesizes key concepts, explores classification methods, discusses inventory techniques, and highlights ongoing challenges in managing these critical forest ecosystems.

[Noel, A. R., R. K. Shriver, S. D. Crausbay, J. B. Bradford. 2022. Where can managers effectively resist climate-driven ecological transformation in pinyon–juniper woodlands of the US Southwest?. *Global Change Biology*, 4327-4341.](#)

This publication investigates the potential impact of climate change on five species of Pinyon–juniper (PJ) woodlands in the US West, employing demographic models to assess population dynamics. Findings suggest that two species, *Pinus edulis* and *Juniperus monosperma*, are likely to experience population declines due to increasing mortality and decreasing recruitment rates. Management strategies aimed at reducing tree density may mitigate some impacts, but ecological transformation in warmer and drier PJ communities is projected for a significant portion of sites. The study emphasizes the need for proactive adaptation measures to address these changes and suggests a portfolio design approach for managing PJ woodlands across their geographic range.

[National Park Service. 2024. Series: Pinyon-Juniper Woodlands. Internet website: https://www.nps.gov/articles/series.htm?id=0216D798-933C-2108-EB4384D97499E89A.](https://www.nps.gov/articles/series.htm?id=0216D798-933C-2108-EB4384D97499E89A)

This is a 5-part series written by the National Park Service, with articles providing background on key aspects of pinyon juniper woodland management. These include distribution, species composition and classification, ecosystem drivers, disturbance processes and succession, anthropogenic use and post settlement stressors, and challenges related to climate change.



[Redmond, M. D., A. K. Urza, P. Weisberg. 2022. Managing for ecological resilience of pinyon–juniper ecosystems during an era of woodland contraction. *Macrosystems Ecology*, 1-16.](#)

This publication addresses the urgent need for managing future drought resilience in semiarid pinyon–juniper woodlands, which have experienced extensive tree mortality and expansion in recent decades. The authors propose a landscape prioritization framework to guide management practices based on historical woodland structure, current vegetation composition, future climate suitability, and habitat value. Emphasizing the importance of adaptive management strategies, the paper highlights critical knowledge gaps and calls for improved management of these ecosystems undergoing substantial changes due to land use, biological invasions, and climate change.

[Shriver, R. K., C.B. Yackulic, D.M. Bell, J.B. Bradford. 2022. Dry forest decline is driven by both declining recruitment and increasing mortality in response to warm, dry conditions. *Global Ecology and Biogeography*, 2259-2269.](#)

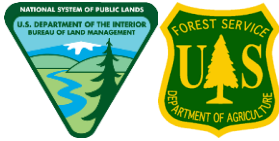
This publication addresses the challenge of predicting range shifts in response to climate change for dry forest tree species, focusing on pinyon pine and juniper in the Western United States. By developing range-wide demographic models, the authors assess both mortality and recruitment rates to understand where species range contractions are occurring. They find that four out of five species are declining in parts of their range, with *Pinus edulis* showing the highest vulnerability, particularly in warmer and drier conditions. The paper underscores the importance of considering both mortality and recruitment in assessing population trends and highlights the urgent need for management actions to mitigate the impacts of increasing temperatures and drought on these species' long-term viability.

[USGS. 2009. Piñon and Juniper Field Guide: Asking the Right Questions to Select Appropriate Management Actions. Reston, VA: DOI.](#)

This publication discusses the importance of piñon-juniper woodlands in the Great Basin and the challenges they face due to tree infilling and changing fire regimes. The publication highlights the goals of woodland management, focusing on restoring ecosystem functionality and resilience through balanced plant communities. The USGS introduces a management guide designed to assist field biologists, land managers, and other stakeholders in conducting rapid, qualitative assessments of woodland sites to inform decision-making and treatment prioritization. Additionally, this report underscores the importance of interdisciplinary collaboration and local knowledge in achieving successful management outcomes.

[USGS. 2023. Ecological Effects of Pinyon-Juniper Removal in the Western United States—A Synthesis of Scientific Research, January 2014–March 2021. Department of the Interior.](#)

This publication discusses the impact of increasing density and expansion of pinyon-juniper woodlands on ecosystem function and wildlife habitat in the western United States. This literature review highlights the BLM's establishment and subsequent discontinuation of the Pinyon-Juniper Management Categorical Exclusion (PJCX) for expediting tree removal projects. The publication describes a review conducted to understand the ecological effects of tree removal techniques permitted by the PJCX on vegetation, soils, abiotic resources, and wildlife communities. The review focuses on studies from 2014 onward and identifies both positive and negative responses of various ecological variables to pinyon-juniper removal treatments. This publication underscores



the importance of integrating factors like climate change and grazing into future research to address key knowledge gaps and improve restoration outcomes.

[Woodall, C., A. Kamoske, G. Hayward, T. Schuler, C. Hiemstra, M. Palmer, A. Grey. 2023. Classifying mature federal forests in the United States: The forest inventory. *Forest Ecology and Management*, 1-14.](#)

This publication emphasizes the importance of mature and old-growth (MOG) forests by directing U.S. Federal agencies to define and inventory these resources on USFS and BLM lands. In response, the proposal suggests implementing a flexible and robust mature forest classification system known as the Forest Inventory Growth Stage System (FIGSS). The proposed approach estimates that approximately 45 percent of all USFS/BLM forests are mature, offering a foundation for future iterations that may integrate cultural values, emerging technologies, and traditional ecological knowledge for enhanced accuracy and relevance.

Tissue collection for Colorado Plateau restoration and plant conservation

Purpose: Genetic research contributes crucial knowledge for successful restoration and conservation outcomes. The Southwest Biological research Center-Genetics for Western Restoration and Conservation (SBSC-GWRC) group researches species of conservation concern and for common species regarded as the workhorses for restoration of degraded lands across the western United States. Genetic information offers insights such as how species or populations are related to each other, and how species have responded to past climatic changes.

Contributing to genetic research is as simple as providing a leaf tissue sample, which can be easily collected in the course of other or routine field work.

Tissue kit assembly

Materials:

- > Silica ([buy from a craft store or online](#)), such as Wisdry silica gel crystals. Do not use pre-packaged silica baggies (as you would find in food packaging, for example).
- > [Zippered snack baggies](#) (size 6.5" X 3.25")
- > Spoon
- > Permanent markers

*****Silica dust should not be inhaled, assemble outside or in a well-ventilated area!*****

Prior to collection efforts in the field, scoop approximately 3 tablespoons of silica into the zippered baggie. Seal firmly. It's often nice to store multiple filled bags in a gallon-sized bag, to keep consolidated and organized in the field.

Tissue collection

- Target young, healthy leaves from 1- stem on 1 individual and place inside zippered baggie with silica. Do not collect from a plant if vegetation is dying.
- Collect 1 individual per silica baggie.
- Collect 3-10 leaves, or as many as it takes to cover your index finger. **Don't go overboard or they won't dry appropriately.** It's okay to err on the side of less tissue than shown in the picture.
- Collect tissue from 15-20 individuals of a target species at a locality.
- Maximize the distance between sampled plants. Optimally, plants would be spaced at least 10 meters apart, though this may not always be possible.
- Either mark baggies with a permanent marker with relevant information, (species name, latitude, longitude, date, etc.), or, ideally, write relevant information on a slip of paper that can be stored inside the baggie or taped onto it.
- Store tissues in a cool, dark location until shipping (room temperature is fine, do not refrigerate or freeze). Standard shipping is fine.



Tissue collection kits ready to be used in the field.



Example of the MAXIMUM amount of tissue.

Species Name: _____
Population ID: (If collecting more than 1 population of a species) _____
Latitude: _____
Longitude: _____

Example of an identifier tag that could be included in the bag as labeling.

Contact: Carla Roybal, Ecologist

croybal@usgs.gov

928-556-7011

Ship to: Carla Roybal

2255 N Gemini Rd

Flagstaff, AZ 86001

Partnership and funding:

- The BLM's [Colorado Plateau Native Plant Program](#) (CPNPP) is SBSC-GWRC's primary research partner, providing funding, guidance, and opportunities for outreach and collaboration. To learn more about CPNPP, contact Adrienne Pilmanis (apilmani@blm.gov).



Preferred data collection with CPNPP-USGS tissue samples*:

Scientific species name (per [USDA Plants Database](#))-

Location coordinates -

Date of Collection - _____ Collector name - _____

Notes about the population (not required, but rough estimates appreciated: May include items such as extent, density, maturity, disturbance factors, vegetative status (seeding, flowering, etc):

Directions or access notes –

Land ownership (include written permission if other than federal land) -

Helpful Site description (not required, but appreciated). May include items such as:
vegetation community -

associated species –

elevation -

aspect -

landform -

geology -

soil description or type -

Ecological Site Description –

*Alternately, or required if also a seed collection site, fill in relevant fields on a [Seeds for Success data form](#).

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Appendix B

Workshop Participants

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Appendix B. Workshop Participants

Below in **Table B-1** is a list of the agencies, institutions, and organizations who participated in the workshop meetings which occurred on May 8 and 9, 2024.

Table B-1: Workshop Participants

Agency, Institution, or Organization	
Bishop Paiute Tribe	Nevada Rural Electric Association
Bridgeport Indian Colony	Oregon Wild
California Department of Fish and Wildlife	Shoshone-Paiute Tribes of Duck Valley Indian Reservation
Californians for Western Wilderness	Summit Lake Paiute Tribe
Center for Biological Diversity	The Great Basin Institute
Colorado Plateau Native Plant Program	The Wilderness Society
Colorado State Forest Service	Tüübatulabal Tribe
Defenders of Wildlife	United States Department of Agriculture, Forest Service
Division of Resource Management & Protection, Mescalero Apache Tribe	United States Department of Agriculture, Natural Resources Conservation Service
Ecological Restoration Institute	United States Department of the Interior, Bureau of Indian Affairs
Ely Shoshone Tribe	United States Department of the Interior, Bureau of Land Management
Friends of Nevada Wilderness	United States Department of the Interior, Fish and Wildlife Service
Friends of the Inyo	United States Department of the Interior, National Park Service
Grand Canyon Trust	United States Department of the Interior, U.S. Geological Survey
Great Basin Bird Observatory	University of California, Berkeley
Hualapai Tribe	University of Colorado, Boulder
Idaho State Department of Agriculture	University of Nevada, Reno
Kern Valley Indian Community	Utah Geological Society
Lincoln County, Nevada	Walker River Paiute Tribe
Modoc County, California	Washoe Tribe of Nevada and California
Mountain Planning Service Group	Western Governors' Association
Mule Deer Foundation	Western Landowners Alliance
Nevada Department of Agriculture	Western Watersheds Project
Nevada Division of Forestry	WildLands Defense

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Appendix C

Questions Submitted during Presentations and Panels

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Appendix C. Questions Submitted during Presentations and Panels

Meeting attendees, both in-person and through the live-streamed webinar, were provided the opportunity to ask questions live or via the Mentimeter software during question and answer sessions following each presentation. Participants who asked questions verbally were asked to keep their questions brief but were allowed to ask multiple questions if time allowed. **Table C-1**, below, contains all the questions submitted during the workshop.

Table C-1: Questions Submitted During Day 1 & 2 of the Workshop

Question	Submission Method
Day 1: Presentation: Mature and Old-Growth Forests Question and Answer Session (Dr. Aaron Kamoske, Ecological Analyst, USDA Forest Service)	-
How do you plan on monitoring old-growth forest?	Live
In terms of threats, how significant is the threat of federal agency putting a chain between two bulldozers and dragging of the juniper? Does that light up on the inventory as a threat, and how much?	Live
In the monitoring framework that you are designing, are you going to be looking at focal species, in addition to the FIA plot information?	Live
How many acres of P-J woodlands were removed by the H-T Forest in NV and also by the BLM in NV in the last 10 years?	Mentimeter
How does one balance fuel and forage management, habitat, and Pinyon - juniper ecosystem conservation?	Mentimeter
Comment for presenter - it seems inaccurate to state that inventoried roadless areas doesn't allow active management. IRA should not be purely lumped with wilderness.	Mentimeter
Do you think the 12" DBH is an accurate cutoff for a "large tree" in PJ woodlands?	Mentimeter
Do agencies consider P-J removal projects a threat to old growth P-J forests and ecosystems? also mature and young forests?	Mentimeter
The initial threat analysis figure showed a lot of green. Is that very low risk of insects and disease in those areas?	Mentimeter
How was the fire risk threat data analyzed?	Mentimeter
How many plant and animal species are dependent on pinyon juniper woodlands? Eg 350 spp in sagebrush ecosystem... what are these species? How many are TES species? What are they?	Mentimeter
What activities count as "tree cutting," in the threats analysis? All vegetation removal, or just logging/ woodland products?	Mentimeter
Why doesn't the April 18th public land rule mention tribes?	Mentimeter
Did you analyze if the extent and range of PJ woodlands are changing?	Mentimeter
How do current OG and mature forest estimates compare with percentages measured when FIA began? Or much further back (depending on available dendrochronology, Indigenous Knowledge, or other sources)?	Mentimeter
Are BLM/FS fuels management projects and other non-commercial vegetation treatments included in the "tree cutting" category?	Mentimeter
The understory species will likely determine ecosystem resilience. How is that being evaluated?	Mentimeter
Will there be an opportunity to get a copy of PowerPoints?	Mentimeter
As you likely know, invasive annual grasses are one of the main factors influencing unnatural fire behavior in the Great Basin. How does threat analysis take this into account?	Mentimeter
How were the definitions for old growth and mature PJ decided.	Mentimeter
What is stand density index?	Mentimeter
What was the most interesting scientific takeaway you had from the inventory about mature and old growth P-J woodlands?	Mentimeter
Are non-commercial Forest Service and BLM vegetation treatments (e.g. fuels reduction) considered "tree cutting"?	Mentimeter
Do you think there needs to be an updated definition of old growth for PJ?	Mentimeter
What are the estimated threats for the release of federal lands for green energy infrastructure and green energy mining?	Mentimeter
Will the presentation be shared with in person audience members?	Mentimeter
How much faith do you have in the age/size class relationships that old growth designation relies upon	Mentimeter
How will you address monitoring?	Mentimeter
Will the National old growth amendment that Troy mentioned provide more consistency in OG definitions across regions?	Mentimeter
How do you count or estimate how many trees are on an acre? How many trees per acre do you consider a healthy population or environment?	Mentimeter
Will the presentation and references be available after the workshop?	Mentimeter
Are data collected about the capacity of M or OG vs. non-MOG PJ-stands to retain water, store carbon, and have good soil health or support wildlife?	Mentimeter
As you likely know, invasive annual grasses are one of the main factors influencing unnatural fire behavior in the Great Basin. Does the Forest Service's threat analysis take this into account?	Mentimeter
Will the full threat analysis look at to what extent threats are resulting in the mortality of MOG forests, rather than only experiencing a threat to a lesser degree?	Mentimeter
How did you scale up the FIA plot analysis to the entire landscape? Were the FIA samples assumed to be representative of the ecosystem as a whole, or were the data scaled up statistically?	Mentimeter
Are areas undergoing "pinyon juniper expansion" considered pinyon juniper habitat for this analysis, or are they considered some other ecosystem type (for instance, sagebrush)?	Mentimeter
Are you going to monitor focal species as part of the monitoring framework?	Mentimeter
Are cultural monitors used when the BLM/USFS crews go out to do these threat evaluations?	Mentimeter
What are the criteria for moving from mature P J to the Old Growth category?	Mentimeter
Were you able to identify causal factors of increased pest and disease?	Mentimeter
What attempts are in the works to accurately map MOG since FIA plots are good for answering inventory questions--not so much for maps?	Mentimeter
Is there any threat component that accounts for over stocked woodlands as relates to fire and disease?	Mentimeter
What efforts are you making to assess causal factors for threats	Mentimeter
9 million of 35 million acres of PJ classified as old growth seems high. Did I mishear you?	Mentimeter
"How was burn probability taken into account in the threat analysis?	Mentimeter
Will you monitor focal species as part of the monitoring framework?	Mentimeter
Would complete stand removal, whether commercial or non-commercial, count as an "adverse" outcome in the FIA analysis?	Mentimeter
Is there a concern with the same forest characteristics leading to ID of MOG in one state and not just across a political boundary	Mentimeter
What indicators do FIA plots collect and are there indicators that are not included that should be?	Mentimeter
Were you able to identify causal factors of increased mortality from pests and disease, particularly on the Colorado Plateau?	Mentimeter
Has there been discussions of adding more FIA plots to increase it to more than 1 plot per 6,000 acres? Dial it in a little bit?	Mentimeter
Will the threats analysis look at threats resulting in mortality of MOG stands, rather than just experiencing threats to a lesser degree?	Mentimeter
How does the modeling account for infill and expansion?	Mentimeter

Question	Submission Method
How will BLM manage the Solar Farming being considered along the Owens Valley eastern sierras	Mentimeter
Are commercial harvesting permits considers threats	Mentimeter
What if protecting maturing forests actually causes a threat to adjacent growth forest?	Mentimeter
What attempts are in the works to accurately map MOG since FIA plots are good for answering inventory questions--not so much for maps?	Mentimeter
Day 1: Presentation: Pinyon Juniper Ecology Question and Answer Session (Peter Weisberg, Professor, Landscape Ecology; Miranda Redmond, Assistant Professor, Forest Science and Climate Change)	-
Given what you are saying about old-growth and the relationships between diameter and age, not always being so robust, and other factors playing into that. We saw the designations given to old-growth and mature forests in the report, how sure of those are we?	Live
I submitted a question but it cut me off on characters so you may not be able to understand the question so I'm on the fish lake National Forest and doing a lot of stuff in PJ either management wise or just data collection wise one of the questions that one of my civil culturalist brought up to me was well how do we age pinion and juniper and so you know we went through the process of coloring there's the to cut sections out of the tree in in ages that way the next question I got was is well how accurate are the ages and so I talked to a researcher I don't remember his name now from Utah State that used to work at the Rocky Mountain research station and there seems to be some questions about the ages or the accuracy of coloring and tree particularly pinion and juniper as it relates to drought umm the research paper I write tended to indicate that it would either put up a bold ring or no ring at all so in the data that you presented here with the ages and the all the talk about coring how did you address that for your ages for your trees?	Live
I would like some more information about the woodland contraction so the threat analysis at the beginning show you know this is a very extensive ecosystem type and some areas are at risk and some areas aren't so I'm I was trying to understand the whole picture in my head of OK so we have these um different responses across its range right we have some areas where there's die off somewhere where there's insect mortality some areas where there's fire some areas where there's treatments right so we have this very heterogeneous set of things happening on the landscape which is potentially good right because you want to have a variety of stance structures over the landscape to build a resilience to change in the future so where is it contracting is it contracting on the edges is it contracting in these different kind of in the core in the different kind of ecosystem areas which is kind of trying to paint that picture	Live
Peter Thatcher slide you showed that burn scar coming up the valley and where the first stop is so important because our growth is so closely tied to topography and soils and often with that limited fuel and there's been a lot of studies on that um one on the spike early in the 1920s at Randy show is I call it the perfect storm what happened is we see a dramatic decline in fire in the 1880s it's same time large numbers of livestock are populating the whole western US the we saw that dramatic and I think it's really proven it's been closely tied until I stock Melissa savage was Tom sweating in the 19 found that that drop of fire actually started as early as 1850 and the chestnuts in New Mexico because the Native Americans are bringing in large numbers of sheep into that area and they saw that drop so I call it the perfect storm because you have this dramatic drop in fire then you get that global. That Brandon talked about 1905 to 1917 and what was unusual about that. It was where from the border of Mexico all the way up into Canada a very wet period so we saw this real is Miranda mentioned Co crops could establishment but the other thing that's missing the error is that there's been a lot of evidence showing that big fire years occur or often preceded by wet years because of these dry systems wet years you get fuel buildups and recently in the 2000s you look center big record fires in Utah and Idaho and Oregon and they were all proceeded by wet years and of course cheat grass is completely now so I think again these systems they weren't really the old growth wasn't affected by livestock grazing because there wasn't a lot of fuel there to begin with studies done down South Bryce on two big Masons one never that we know grazed it was no access except by a few ghosts possibly in one year and in an area that had been grazed it was they were old trees there was no difference very little fire if the ground herbaceous ground cover was about 5% and so where you see the impact where the move trees moved in with the reduction of fire our systems that produce enough fuel that they could periodically burn and I know Robin and I were up in the Virginia mountains just yesterday and we looked at some of the new fires up there there's some really old trees up there by the way I'd say well over 1000 years old and you can look at the old burn scars and they're burning through the deeper soils and they stop we saw one nice line right along where you had some very old trees and right clear to break in the aspect and a real change in soils and being a retired professor we go along with it but I'll give you	Live
Why do lower tree lines support increased carbon sequestration?	Mentimeter
Do pinon or juniper trees that are undergoing stress conditions (e.g. drought, etc) increase their seed production during this period?	Mentimeter
What is the current understanding of pinyon and juniper species-to-species interactions? With increasing research regarding fungal supported resource sharing, how does the P-J relationship fit in?	Mentimeter
Will ties be made with the amount of decline of the pinon jays?	Mentimeter
Should we also have a definition for expansion woodlands where trees are expanding into shrublands and grasslands?	Mentimeter
Can you please walk through the figure showing different PJ community types. Without the axis titles I had hard time fully understanding	Mentimeter
The history of frequent low-severity fires in savannas aligns with oral history of new mexico pueblos. Are there lines of research you see pursuing informed and guided by IK, as Tribes desire?	Mentimeter
Wooded shrublands are often subject to complete tree removal, including old-growth. How would you recommend identifying these areas, as distinct from persistent woodlands and pure shrublands?	Mentimeter
How does removal correspond with expansion?	Mentimeter
Do you have a historical map (1850's) of pinion for the northern Nevada area? North and south of Interstate 80? The area is bare of pine trees now which haven't recovered.	Mentimeter
Can you explain what these chaining events are?	Mentimeter
Are old photos evidence of encroachment/ expansion, or evidence of a historically cleared/ treated area revegetating? Is there a specific date range cutoff to tell the difference?	Mentimeter
The legacy of complex human use, land management, die-off, etc has resulted in a heterogeneous landscape. Don't we want a variety of stand structures to be more resilient?	Mentimeter
The understory species will have a strong effect on ecosystem recovery. Don't we need to consider both?	Mentimeter
You mentioned the need for active management to restore woodlands following catastrophic fire. Is there a roll for proactive management prior to fire?	Mentimeter
It appears that from the threat analysis that these woodlands are actually currently doing quite well. Are your examples more site specific? What type of trends can you speak to a larger scale?	Mentimeter
Do you have any information about regeneration after wildfire versus dieoff events?	Mentimeter
Have you seen any mortality differences between P and J trees that are coexisting in clumps vs. P and J that are standing more isolated from each other?	Mentimeter
Have you noticed any dendrochronologic patterns in the trees that die or survive a drought or insect induced die off? Are trees that put on larger rings more likely to die?	Mentimeter
What was the reason for clear cutting that took place in the Sweetwater are of northern Nevada? Is this practice still being considered or used?	Mentimeter
Are woodlands contracting though? It seems like it's a huge ecosystem type. Largest veg type that BLM and USFS manages! Can you help us understand how it's contracting?	Mentimeter
Where are they contracting? On the edge? Within the core?	Mentimeter
Are there long term data sets that test impacts of treatments on resilience in PJ? It seems that this would be critical for avoiding reactionary changes in management with changing priorities	Mentimeter
There is a need to manage PJ resilience to drought, what does that actually look like, in practice?	Mentimeter

Question	Submission Method
The Romme et al. 2009 paper said, at the time, there was not a lot of evidence for frequent, low severity fire in P-J savannah. Have papers been released since that confirm frequent fire in P-J savannah	Mentimeter
What are some of your general recommendations or guidelines for managing for resilience?	Mentimeter
How exactly has livestock grazing contributed to what you characterize as a "gloomy outlook" on the resilience of P/J woodlands?	Mentimeter
How does a forked stem become a characteristic of an older tree (140yr), how does that happen?	Mentimeter
Where are we on updating old growth definitions used by the BLM or USFS? Currently, the USFS uses Hamilton (1993) as regional definitions and Popp et al (1992) for SW Utah when it comes to PJ	Mentimeter
Can you discuss the relationship between contemporary land management, specifically grazing, in terms of increased mortality from wildfire, pests, and disease?	Mentimeter
Is there any data analysis on the human threats of BLM selling commercial harvest permits for pinenuts and the damage and over harvesting of these trees?	Mentimeter
For Miranda: Can you discuss some of your recommendations on how to manage PJ systems for greater resilience?	Mentimeter
Do you have concerns that large scale vegetation treatments of PJ for fuels reduction during this period of woodland contraction is a threat to old growth PJ forests and ecosystem resilience?	Mentimeter
Are young trees one of the biggest threats to old growth, and how do we account for that in designing management strategies?	Mentimeter
Can land management practices lead to homogenous PJ stands that are more fire-prone? If so, how?	Mentimeter
Can you explain chaining and purpose	Mentimeter
You referenced earlier distinctions between threats to PJ including actively treated areas versus fire v insects. Is it appropriate to make these distinctions? Aren't they related?	Mentimeter
What kind of management would work best to regenerate PJ? Are the nurseries growing PJ stock that is more drought and/or insect disease resistant?	Mentimeter
Did you see any difference in tree mortality between P+J trees that grow in clumps vs those that do not grow in clumps? E.g., research is discovering the mycorrhizal support relationships in clumps.	Mentimeter
Dr. Redmond, did you notice any patterns in the tree rings of the trees that died vs survived mass drought induced die off? We're the trees that died consistently putting on larger rings?	Mentimeter
Is there any potential to develop a rapid genetic field test to determine age of PJ?	Mentimeter
Is the benefit of nurse plants for seedling establishment offset by water stress when planting seedlings in a reforestation effort?	Mentimeter
Since mountain mahogany occur intermittently with pinyon/juniper and also in homogenous stands, will the BLM or FS be considering conservation of OG mountain mahogany as part of the EO implementation?	Mentimeter
There is research that indicate aging PJ is difficult. The research I read recently indicated PJ, especially in drought years, tended to forego growth rings or put on false rings.	Mentimeter
Can you speak to fire frequency in OG PJ by different elevation bands, when fire is beneficial or detrimental? How is fire tied to regen events?	Mentimeter
Do you subscribe to theories that PJ forests have been encroaching into I lowering grasslands or rather is this more likely natural reproduction from historic tree removals?	Mentimeter
Are the examples of morphological characteristics to determine old trees regionally specific? Are those characteristics known across the range, or mostly in specific areas (ie western Great Basin)?	Mentimeter
How important are individual old trees? Should land managers prioritize the retention of individual old trees during treatments, even if the project isn't considered to be in an old growth stand?	Mentimeter
Would you determine that the inventoried old growth PJ also be at climax state? Can we keep PJ ecosystems at climax or do we need to focus more on management for transition states	Mentimeter
What is the oldest tree you came across	Mentimeter
Do we have data on the relationship of annual grass invasion in treated areas and regeneration success of native understory and trees in treated areas?	Mentimeter
Do you anticipate that fuels treatments intended to safeguard these mature and old-growth forests will unintentionally result in the removal of some trees in order to preserve the overall system?	Mentimeter
A paper on the effects of different fire thinning treatments on PJ and recovery of PJ post-fire integrity can be found here: https://onlinelibrary.wiley.com/doi/10.1111/gcb.17149	Mentimeter
In management of piñon and juniper woodlands, is old growth juniper more important to focus conservation efforts on than say younger aged PJ trees?	Mentimeter
Can trees be aged by genetic mutation rates like some animals can?	Mentimeter
There is a current trend to remove the lower limbs from pinons/junipers to decrease the fuel load. Have any studies looked at the effects of this on seedling viability, soil moisture, wind impacts?	Mentimeter
What is the oldest tree you have found	Mentimeter
Will the presenters slides be available online after the workshop? That would be extremely beneficial for knowledge sharing.	Mentimeter
Do you anticipate that fuels treatments intended to safeguard MOG PJ forests will result in the necessary removal of some trees in order to preserve the overall system from wildfire and pests?	Mentimeter
Are trees/forests growing on cliffs being considered in the calculation for total acres of old growth/mature forests? These trees can be atypical, but long lived do to minimal disturbance.	Mentimeter
Are the benefits of nurse plants offset by competition for water when planting seedlings if there is no natural regeneration post a stand replacing disturbance?	Mentimeter
What do you recommend for management if the goal is greater resilience? How does this differ from the status quo?	Mentimeter
How important is it, for long-term conservation of PJ habitat, of maintaining genetic diversity of tree stands, as well as age diversity?	Mentimeter
crystal you mentioned that most tribes are starting to develop their own Co management and Co stewardship plans and that Walker river paiute tribe is also doing that and I'm just curious if you could share a little bit more about what is what is included in that Co management and stewardship him and if there's any other tribes on the panel that have Co management and stewardship plans I'm curious if you're also considering developing those and then how are you planning to share those with the agencies and implement them?	Live

Question	Submission Method
My name is Laurie Tom I'm a member of the Yerington Pierre tribe I've had the distinct honor of serving my people of the Walker river paiute tribes chairman and the Yerington paiute tribes chairman I agree with crystal when we talk about tribes may have maybe 20 minutes apart but their needs are completely different we did discuss yesterday too that one of the things that I noticed today is your definitions none of it includes informed prior consent that's what tribes need one of the things that we did discuss is when this executive order came out how many tribes were consulted that's the beginning that's the train stopped before it even leaves and leaves on the tracks tribes are always told after the fact that these executive orders so when we're looking at public land use this executive order should have had these tribes involved from the beginning for decades our tribes have been showing beneficial use of plants land water and we still have no say we sit at these meetings for decades telling you what's going on what are ceremonial uses why we need these plants my name sake for my tribe doesn't exist anymore state of Nevada federal government did not take that plant it does not exist anymore that's what's happening to our payments that's what's happening to these pine nut trees I want my grandchildren and their grandchildren to understand that when the rabbit press turns yellow that's when we go and harvest so we're already behind the curve when it comes to we're going to check the box and make sure the tribes are here at the listening sessions but we should have been consulted at the time they did the public rule and it never stops that letter is never enough and I applaud Idaho if that means that they can't move a rock because they're saying that that's a sacred site God bless because here in Nevada doesn't exist we've got 8,000,000 acres that are going to be released about BLM land so this here to me is a distraction so you're not gonna watch for that bill to go through with the 8,000,000 acres that are gonna be released for green energy for those solar programs for those solar systems that they're gonna put up but they have to mine all those minerals first to get these solar panels up right here is a distraction look over here get involved check the box but don't watch us when we release that 8,000,000 acres of BLM land that's what's really happening here guys and applaud tribes for continuing to act and like I said we've been telling you guys for decades we need change we need informed prior consent federally I wanna ask the tribe do you the MOA is actually gonna get us what we need is it time for the 27 tribes of Nevada to actually stand up to these federal agency you get this done collectively and I appreciate all of you guys for your time and I appreciate everybody here thank you	Live
sure so there there's a lot of things that collectively the tribes are about to have to do alpha vision Adam it's just got gripping great base after long of the column river	Live
Honored you be here to share in your stories thank you I'd be curious to hear what the tribes think of juniper we've heard so much about the importance of pinion pine nuts in the last few minutes if you could share about juniper	Live
For Chair Smokey: with Bison and Tamarak Fires as hindsight. What could we have done better before the fires to prevent the scale of the fires and loss of pinyon?	Mentimeter
In your opinion and cultural tradition, is there ever a time where full clearing, mastication, major human-initiated disturbance, etc is appropriate forest management?	Mentimeter
I feel deeply honored to hear your stories. Pardon my ignorance, but I would like to hear from the panel on their views specifically for Juniper.	Mentimeter
With the government political appointees being "acres driven" how do we permanently require that meaningful consultation is deliberate and not slow as viewed by anglos?	Mentimeter
No Question, but just thank you! I learned a lot listening	Mentimeter
How can we help you with tribal restoration efforts?	Mentimeter
With dramatic changes from cheatgrass, a relatively recent invasive species, how has that influenced your outlook on management approaches that may be acceptable to maintain healthy PJ forests?	Mentimeter
How does the panel feel about the coming of Solar Farms across the Owens Valley and the State of Nevada	Mentimeter
With the future risks to pinyon juniper woodlands identified in presentations today(wildland fire, insects, and disease). Could you give a perspective on how you would like to see those mitigated/mana	Mentimeter
How do/did tribes traditionally manage PJ woodlands that federal land managers can implement on the ground to preserve and manage PJ woodland	Mentimeter
Day 2: Trends and Threats Question and Answer Session (Bob Shriver, Assistant Professor, Plant Ecology & Population Biology; Ali Urza, Research Ecologist, Rocky Mountain Research Station; Rhiana Jones, Washoe Tribe of Nevada and California)	-
so various speakers talked about pushing the range of pinyon pine into other spaces where maybe they weren't before but it would be better in the future for the species how much support are folks seeing for that on the ground instead of say Jeffrey pine or ponderosa pine throwing in some of these what are considered lower elevation or drier land species?	Live
Bob, you talked about kind of in your part one you discussed how there is a sensitivity with <i>pinus edulis</i> in the driest part of its range right so that's where you were saying about half of the population, they should in the driest part of the range how much of the range is that of the whole <i>pinus edulis</i> range across like how much of it is occurring in those driest soil environments?	Live
On the plans that the Washoe Tribe seed in the pine nut hills, is there a percentage on mortality rates that you all have for that or are they all successful?	Live
Important for everybody in here to fully realize when we say we're learning it because and even incorporating traditionally with ecological knowledge because this is new for us our people have been stewards of the labs for thousands of years but they maintain the forest we've never had a point to where our people were out planting trees so this is this is brand new to us as well we're learning how to do this because of all these man made and human made things that are happening within our lands and it's also important when we talk about we're trying to do this on tribal land because we can do that but I think it's very important to remember that tribal lands are some of the worst lands out there we were not given nice prime areas with water flowing stuff like that we were giving sides of mountains that are cliffs and so that that's the all throughout the country that's what the government deemed as land suitable for tribal people to live on and so we're working in some of the worst conditions possible and so I think it's important to keep that in mind as we're doing IT projects we're learning it's in the roughest conditions and we need those partnerships we need the help we need more land to try things on because otherwise we're going to have constantly being a failure but we're going to keep trying so I think just wanted to point those things out as important to remember when we're talking about these projects	Live
Is there any work on restoration associated with juniper or the other suite of species that have been impacted from these fires as part of this work?	Live
So what work is being done to kind of safeguard the areas in the pine nuts that haven't burned yet but you know just kind of what are the plans that you guys have in place to kind of build resilience into those ecosystems?	Live
my question kind of evolves from the thought that all of our ecosystems are vulnerable now it's not just pinyon pine finding our systems it's everything that's being subjected to climate change, and based on your work Bob you know we can see that there's contraction but there's also large areas of expansion and so we also know that to maintain resilient ecosystems we really have to focus on those understory species and maintaining the species that are going to recover following a fire when following any kind of dial so I guess my question to all of you is how can we better integrate our understanding of what's happening within the whole ecosystem and kind of pull it all together it's great that we're focusing on opinion and Jennifer because it has been neglected but I think we have to keep a holistic perspective as we move forward	Live
the map at the beginning showed no juniper in Oregon. Did this study exclude western Juniper? if so, why?	Mentimeter
Question for Bob Shriver. Do you think the FIA dataset is representative of PIMO and JUOS status given that these systems are abundant on BLM lands, which tend to be at lower elevations than USFS.	Mentimeter
There is research out there that states, since 2000, 1.1 million acres have transitioned from shrubland to woodland. How is that being accounted for in your research?	Mentimeter
Do you think introduction of widespread grazing has played a role in the lowest establishment rates in recent centuries?	Mentimeter
The information on fire in PJ was only from the 1980s. We know this is a really short timeframe for natural resources. How do you account for that?	Mentimeter
No audio on the video clip	Mentimeter

Question	Submission Method
Is the BLM , USFS and Tribes addressing invasive annual grass expansion as this seems to be one of the biggest threats to PJ species by increasing the fire probability.	Mentimeter
Are nurseries growing drought and/or disease resistant pinyon-juniper stock? What is the best way to regenerate PJ?	Mentimeter
Some species are producing sterile seeds as a result of increasing climate change factors. Has this been observed with pinon and juniper species?	Mentimeter
Is the Washoe Tribe utilizing Nevada tree nursery in growing their tree seedlings? How much pinyon pine seed does the Washoe Tribe and fed agencies have in their seed bank and plan to plant?	Mentimeter
There has been some observed increase in pine seedling survival by keeping the seeds, seedlings, and plantings oriented in the same N-E-S-W direction that the seed was sprouted in.	Mentimeter
Has the Pine Nut Hill project implemented any spray, fallow and plant projects to minimize cheatgrass competition or planted adapted species to help suppress BRTE?	Mentimeter
Does the Washoe tribe have a plan for removal of diseased trees, and/or tree thinning?	Mentimeter
What is known about traditional Indigenous fire use in tending the pinyon pine community?	Mentimeter
Indigenous people continue to be the forefront of adapting to human driven change, what other areas of opportunity do you see for us to consider as we move forward?	Mentimeter
PJ encroachment has degraded shrubland that is critical habitat for listed or candidate species. Is treatment of PJ in these shrublands now going to be prohibited or limited?	Mentimeter
We're all the fires started by lightning or human caused?	Mentimeter
For Rhiana...I am glad you are collecting data on pinyon restoration. It'll be a huge contribution to the knowledge. Are you accounting for on-going land uses on success, such as livestock grazing?	Mentimeter
Has the role of grazing in cheatgrass invasion in pinyon-juniper been closely examined, both before and after fire?	Mentimeter
Bob's presentation focused on a number of juniper species, but not western juniper. Is this because it is not associated with Pinyon Pine?	Mentimeter
Day 2: Pinyon Jay and Managing for Wildlife Question and Answer Session (John Boone, Great Basin Bird Observatory; Steve Belinda, Mule Deer Foundation; Pete Coates, USGS)	-
hey I think this this applies most to John but I think he might also want to chime in so I do appreciate it I do a lot of work with another ecotonal species saw highly reliant on that transition area for nest between sagebrush and pinon juniper umm and I know this workshop is focusing on mature and old growth forests but I think it and this is just kind of a thought that it has been bringing in my head for a number of years is this transition a healthy transition or ecotonal area seems to be it's very important for the overall system and I think also important and it's an indicator or can be highly important for overall healthy natural growth system with pigeon juniper I guess one of my thoughts too and I was wondering if you could speak to this is when you think about treatment opinion juniper habitat or in some cases renewable energy projects solar things like that they're like up and up on the landscape in kind of that middle elevational range a lot of those tend to drive up your opinion juniper Woodlands a little further elevation So what I'm trying to wrap my head around as far as multi species benefits and whether or not we can maintain some of the quality for various species is when you see those transition areas create that higher on says slopes and up into elevation what impacts do you think how my opinion Jay is respond to that and whether or not a change in elevation if it's done in a situation where you can maintain a good healthy ecotone what might be some results.	Live
This is another question for John apologies to others I'm curious if there's data showing if Jays use or prefer the ecotone up against very expansive or dense PJ woodland or if they'll be in a certain density ecotone sort of diverse stand class with the openness sort of the edge habitats sort of regardless of the density or the acreage of the adjacent or adjoining forest like do you ever see these islands of what it's functionally ecotone by itself or does it depend on the density of the forest that's you know going up the mountain the hillside or what it is even if they don't actually use those denser areas?	Live
Excellent presentation on the on the PGA or the so they're very entertaining very colorful birds one and also the sage grouse but have you studied the effects of the Ravens and the crows on those because you know there's so many pros and Ravens out there now and they fake their opportunistic and so you know have you studied more Ravens come into a nesting area during you know breeding season and then as far as the clear cutting and safe grass restoration I know three sites and I'm from here I'm from this area so I I clear cut was juniper of Pyramid Lake one was down Sweetwater down South in Bridgeport and the other of course chairman Smokey said yesterday and we were just talking that maybe it was about 20 years ago somebody forgot to tell the sage grouse to move over there because they're still not there anyway the question was have you studied the impact of the Ravens and crows?	Live
not so much a question but a comment is that appreciate the numbers the data person myself and that it did the correlation is true and it's what I've observed throughout my life you know seeing that in more open areas that you're going to see more of the same girl seeing them below and then moving up high it's something I've always witnessed through the whole way but one question that the that I bring up to think about is that you when we talk about having more open areas being their habitat more sagebrush food protection open areas there are existing open areas out in the mountain ranges now why aren't the help by using those areas that are already existing and the stead of us trying to create more destruction further into the mountain ranges and one thing I thought I think about when I think about it is that part of the data that's missing is the huge increase in recreation as well as residencies so for us in the pilot mountain range you have houses out in the middle of nowhere and right in the middle of trouble allotment lands as well because for many tribes the allotment lands fall under trust of the federal government but they're under public domain which means they have to be open and accessed and so you that means non washer trouble members have to be able to go to the roads and go out those areas so there's huge increases in that within recent years and that's something that's not being put into the data we're looking at how do we create more destruction turn more treats out to recreate these areas that already exist so I think that's something to really think about as we're looking at this data there's a missing piece.	Live
Pinyon jays show substantial differences between different ecoregions. Can you touch on similarities and differences between Central Basin and Range flocks and other (esp range of P edulis)	Mentimeter
Are there plans for Pinyon Jay surveys in New Mexico and if not, what are the barriers to doing surveys there?	Mentimeter
Are there correlations between pinyon jay demographics and understory vegetation? And are there studies that look at how changes in understory vegetation post treatment affect jay populations?	Mentimeter
GBBO data suggests ecotones and secondary growth that includes a transitional zone between sagebrush and open woodland is important. Will management address/preserve these zones in the future?	Mentimeter
Many areas where trees are removed see recolonization within a decade or two. How might current management be driving continued tree expansion?	Mentimeter
You mentioned, mechanical treatments and unnatural edge. In fires you see both a hard and feathered edges. Mechanical treatments can mimic this. Do you have a recommended size of feathering?	Mentimeter
How do sage grouse trends reflect changing condition of wet meadows and riparian areas? Are pinyon jays observed using riparian areas? If so, when?	Mentimeter
How are tribal values being incorporated to Pete Coates tool for strategically identifying areas for sage grouse?	Mentimeter
For Mule deer foundation, can you cite the studies you reference showing that pinyon and juniper use water in excess in a harmful way on the broader ecosystem?	Mentimeter
Curious about the role of pj woodland in heavy winters, specifically where there were mule deer die offs in Colorado where pj woodlands had been removed in winter of 2022-2023?	Mentimeter
Cattle grazing can hugely limit understory vegetation yet the talk on mule deer was focused on removing pinyon-juniper trees. Is limiting cattle in the areas of mule deer concern an approach used?	Mentimeter
Do Pinyon Jays target other species other than Pine Nuts for forage? Do they have any known nest predators?	Mentimeter
Is it possible to get clarification on whether PJ woodlands are expanding or contracting?	Mentimeter

Question	Submission Method
Has there been any research into management techniques (e.g., grazing management) to improve lower-elevation riparian areas for sage-grouse?	Mentimeter
Do Mule Deer target pockets of PJ within treatment polygons for winter thermal cover?	Mentimeter
PJ removal is not new. It's been going on for decades. Have the impacts of these past treatments been studied to inform present-day management?	Mentimeter
@ jaxon miller and Pete Coates, when you refer to "historical" sagebrush habitat vs "historical" PJ woodland, what is the age of the data you are referring to?	Mentimeter
How important is juniper to the pinyon jay?	Mentimeter
Has there been any research on sight recognition of sage grouse and implications associated with birds returning to a lek where a P/J treatment occurred? Do grouse not recognize the lek and disappear?	Mentimeter
Here on the Fishlake NF-Fremont River Ranger District we found old (1940) flight photos in a file drawer. We digitized them to create a 1940 Google Earth image and compared that with today. 47% ++	Mentimeter
Day 2: Pinyon Juniper Genetics Project Question and Answer Session (Carla Roybal, USGS)	-
I am just wondering if you were already aware of the juniper genetic study that has already been done in the Great Basin Nevada and Southern Oregon? I was part of a study where we put in two transects in the spring mountains in Southern Nevada that the blue bounds by burns OR and the West to east from Sonora pass your Great Basin National Park these mountain ranges along those two locations to sample pinyon for every 200 meters in elevation to gather genetic studies and produce two papers that were published.	Live
Day 2: Managing for Woodland Values and Resilience Question and Answer Session (Raven Honga, Hualapai Tribal Forestry; Heather Stone, Bureau of Land Management; Thomas Gustie, Bishop Paiute Tribe; Orvie Danzuka, Bureau of Indian Affairs and Confederated Tribes of Warm Springs)	-
We have quite a few members live in the annual county area Bishop lone pine do you do you incorporate those members into your program as well so just Bishop only?	Live
I notice will be getting clouded move say tribes are included that funding the rural tribes most like most of your tribes here in state in Nevada and are non-revenue tribes and when we have to compete for that type of funding it's usually against the gaming tribes or the tribes that have a large capacity and when we have to compete with them we won't even bother because we already know we're going to lose that so when it comes to funding from the state and federal level we nearly need a language in our stating that that funding needs to go to rural tribes who actually need the fund who don't have that capacity to compete with our with our relatives who are doing who are doing well so we just want to make sure that that type of funding is actually coming towards us maybe first	Live
Are you able to uh or have you guys been able to provide a yearly harvest off of that or is it cyclical	Live
Has a secretary of the interior Deb Holland ever expressed any interest in coming out or has she been invited?	Live
Pine nut commercial picking - it's been a huge problem with the tribes we actually run into these guys out here in the forest and to be carrying weapons and flashing things out and such but the commercial pine nut picking is a huge issue here though they're collecting all the pine nuts out here and vast quantities and they collect them by the time and they're right now ohh i'm not sure what the current rate for pinus is going this year but last year it went all the up to \$40 a pound so that's a huge commercial issue here and for the tribes of pine nuts are extremely important to us and the fact that we have to deal with that on top of everything else I could do the trees are getting cut down and we have to deal with the commercial pickers as well and have the possibility of being shot so I just want to make sure you guys understand that that's also another issue that we deal with that	Live
Question for Heather from a former wildland firefighter: What's your advice to BLM/FS districts where PJ clear cutting and woodland eradication are still standard practices?	Mentimeter
In my view, the Bishop example that was just discussed is a model to follow. How would you pitch it to places where tribal interests aren't seriously considered?	Mentimeter
Question from former firefighter: There's no such thing as 100% fire suppression. Some fires inevitably get away. Has anyone studied the effectiveness of fire suppression?	Mentimeter
Great proceedings! Question is for Heather. Slide on Rancheria Gulch 1940 vs 2018. You neglected to mention that Bodie Hills/ RG were clear cut for lime production/ Bodie mines. This is regrowth.	Mentimeter
For Heather. Great talk. Bodie Hills--you said, "we HAVE to figure out how to manage". Why? Bodie Hills is where bi-state are hanging in there. Could we leave some forest unmanaged.	Mentimeter
For Heather or Tom--please update us on Dr Barows work with Bridgeport tribe and Bodie Hills. Thanks.	Mentimeter
For Peter--Masonic Mtn talk (very good! Thx) --is this collaboration funded by Sierra Nevada Conservancy. If not, then by whom.	Mentimeter
For Peter--Masonic Mountain project--Was this area clear cut for lime production for Bodie Mines? What part is now old growth?	Mentimeter
Day 2: Managing for Woodland Values and Resilience Question and Answer Session (Ali Urza, Research Ecologist, Rocky Mountain Research Station; Peter Weisberg, Professor, Landscape Ecology)	-
I read an article here about maybe a month ago regarding the governor here say in Nevada and a conversation he had with a company out of Denmark regarding biofuel and I can't remember the details are but around a million acres of land our traditional land questioning land just north of Vegas that they're talking about clear cutting and her vital fuel and his comment on there was a in quotes was this is a match made and they had and he never spoke to the tribes he never spoke to that one tribe regarding any of that and I just wanted to make that point clear that I personally do not like the idea of biofuel and I think it's gonna be a huge issue here to stay in about	Live
Because we have so many limited areas and they talked about it yesterday when you find an area where pine nuts are good you don't share it and they're getting scarcer and scarcer and the really meaty ones. I'm really concerned that we're it's going to create issues we already have issue this last year where what the tribe was kind of infringing on another tribes gathering area and the proper asks were not done and I can I really see that being an issue coming into the next decade or decades where tribes were their historical lands are used and they're gathering areas use other tribes because there's nothing around their area may kind of infringe on their areas I'm not saying like because when you hear tribe you hear the government I'm saying members of the tribe may go to those areas and this can create problems Travis Stork reservation options not all them agree on certain areas and so this creates division and so when you're collaborating with tribes that's going to be an issue the background also with cultural monitoring regarding a lot of mining so there's going to be these things were resentment and contention between tribes and a lot of this could be related to the planets and I just wanted to make that comment	Live
throughout this conference I haven't heard much about what I would characterize as the 800 LB bovine in the room we talk about soil crust and how important they are and we talk about how bad invasive species like cheat grass are and there's an occasional reference to overgrazing which suggests there's such a thing as benign grazing or good grazing we never talk about over logging or over mining or over development so what is the seem to me to be a driver of these ecosystems in terms of press until we allude to these values but we're not talking about the impact of domestic livestock raising which is pervasive land use throughout pinyon juniper county. Why not?	Live
This is kind of a technical question for Peter so I heard you mentioning that you know there was still a lot of uncertainty around managing for density levels for resiliency I work at civic culture in the southwest in Arizona New Mexico and we use stand density index values that have been published and so you know there are published values in terms of managing for stand resiliency or managing for maximum mass production and things of that nature and I was just kind of wondering have or anything in terms of your project	Live
These diverse and hyper-targeted treatments like Masonic mtn are sadly still far from norm, and clear cutting still prevalent on so many public lands- how to help incentivize spatially aware management?	Mentimeter
Suggest adding genomic projects to list Learn how the building block variability helps us understand traits & responses such as which genetic markers are associated with high seed production	Mentimeter
How do you ensure that collaborative processes include those who have traditionally been excluded (for example, tribes)?	Mentimeter