

Managing Pinyon-Juniper Ecosystems for Pinyon Nut Production



Colorado pinyon seeds
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Partners:

Bureau of Land Management (Colorado State Office) - Colorado Wood Utilization and Marketing Program - Institute for Culture and Ecology - Goods from the Woods

The Pinyon Nut Management Project is part of a larger endeavor called *Beyond Firewood and Fence Posts: Exploring and Expanding the Commercial Potential of Colorado's Pinyon-Juniper Woodlands*.

Beyond Firewood and Fence Posts is a partnership between the Bureau of Land Management (BLM) and the Colorado Wood Utilization and Marketing Program (CO Wood) to search for enhanced and increased commercial opportunities for woodland products. Learn more about the efforts and outcomes of this partnership at www.colostate.edu/program/cowood.

Photos in this report by Penny Frazier unless otherwise noted.

Pinyon Trees — Foundation Species for Pinyon-Juniper Ecosystems

Pinyon trees are the dominant overstory species on more than 53 million acres of land in the southwestern United States. These short, twisted trees with large branching crowns live in association with more than 1000 species of microbes, plants, insects, birds, and mammals.

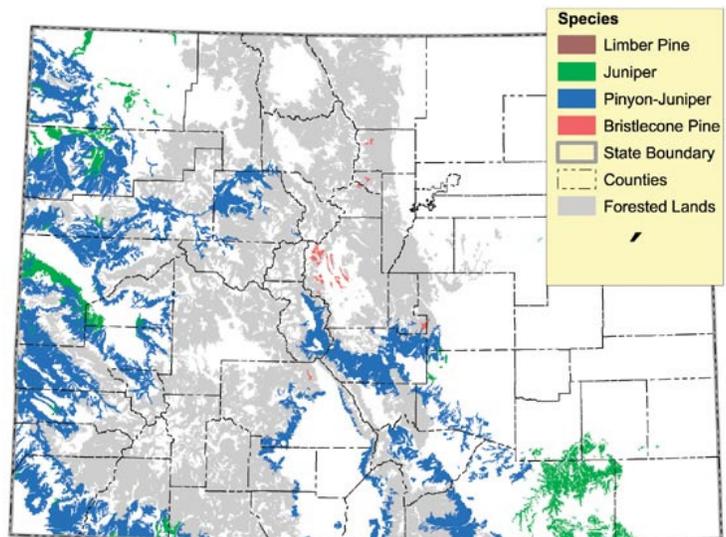
The two most abundant species of pinyon are the Colorado pinyon (*Pinus edulis*), found in New Mexico, Arizona, Colorado, and eastern Utah, and the singleleaf pinyon (*Pinus monophylla*) which grows primarily in Nevada and western Utah. Colorado pinyon trees are widely distributed throughout Colorado, where pinyon-juniper woodlands cover more than 4.8 million acres.

Once considered weeds by rangeland ecologists and removed by the millions from the best growing sites in the Southwest between 1950 and 1980, pinyons are now recognized as foundation species in pinyon-juniper ecosystems.

Foundation species provide core ecological structures and functions, stabilizing local environmental conditions in ways that permit numerous other species to thrive. The removal or death of a large percentage of a foundation species population leads to rapid loss of biodiversity and serious negative impacts on the ecosystem's overall health.

A century of fire suppression and overgrazing created abnormally dense thickets of pinyon trees on sites that were unaffected by mid-20th century pinyon clearing programs. The 1990s drought increased the vulnerability of these trees to insect attacks, leading to the death of large numbers of pinyon trees in Colorado, New Mexico, and Arizona during the early 2000s. These dead trees, as well as the remaining stands of live pinyon trees, are now at extreme risk from wildfires.

Management approaches that facilitate the restoration of healthy pinyon stands in the face of global warming are badly needed. One approach that a few scientists have suggested for decades, but which federal land management agencies have yet to explore, is managing pinyon-juniper ecosystems as nut groves rather than as grazing lands. This report briefly lays out what a pinyon nut-focused management system might look like.



Source: Colorado State Forest Service. 2002.

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Pinyon Nuts — The Forest's Pulse



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Female pinyon cones

“With the pinyon crop you can see the pulse of the forest. The year after the pinyon, you should see the mice. Then the coyotes. Then the raptors. It comes in a huge pulse, and it all goes back to the pinyon.” (Pinyon nut gatherer)

Pinyon nuts, which botanically are seeds rather than nuts, are the means by which pinyon trees reproduce themselves. Because their seeds are too heavy for the wind to carry, pinyon trees depend on vertebrates, such as jays, rodents, and humans, for seed dispersal. Seed predators avidly seek out pinyon nuts, which are extremely rich in proteins, carbohydrates, and fats.

Corvids, such as the pinyon jay and Clark’s nutcracker, disperse the vast majority of each year’s seed crop, caching the seeds in numerous surface sites over a large area. Packrats, squirrels, and other rodents, which cache pinyon seeds deeper underground, play a lesser, but still important, role in pinyon reproduction. The seed production cycle for Colorado pinyon varies from 4 to 10 years, depending on climatic conditions. In practice, this means that very large seed crops occur about every 7 years.

People and Pinyon — A Longstanding Positive Relationship

Pinyon nuts, which are also known as pine nuts, have a complete complement of proteins, and will store for years in the Southwest’s dry climate. For millennia, sedentary agriculturalists of the Colorado Plateau and hunters and gatherers in the Great Basin depended upon pinyon nuts for survival.

Pinyon trees and pinyon nuts are sacred to all of the indigenous societies of the southwestern United States and are an integral part of Hispano cultural traditions. For millennia, indigenous peoples of the Southwest likely managed the pinyon-juniper woodlands for pinyon nut production by pruning the lower branches to stimulate nut production, selectively removing trees with poorer nut crops, and clearing understory vegetation to reduce the risk of fire.



Colorado pinyon nuts

The Pine Nut Industry — A Thriving 21st Century Business

Humans have traded pinyon nuts for centuries, if not millennia, and a thriving trade in pinyon nuts still exists throughout the Southwest. In national and international markets, pinyon nuts struggle to compete with cheaper pine nuts imported from China (*Pinus koreaiensis* and *Pinus sibirica*) and the Mediterranean (*Pinus pinea*).

Demand for imported pine nuts increased steadily from 1989 to 2006, and it is likely to continue rising as more Americans become familiar with pine nuts. Demand for pinyon nuts has also increased during the past two decades. Pinyon brokers in northern New Mexico, the heart of the Colorado pinyon harvest, note that yearly demand always exceeds available supplies. Lack of labor is the key challenge to expanding the pinyon nut market. Picking pinyon is hard, sticky work, and a decade of drought and small nut crops has decreased the number of people who are willing to pick commercially.



Source: USDA-Foreign Agricultural Service imports database.
www.fas.usda.gov/ustrade

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Allocating Access to Pinyon Nut Harvesting Sites (BLM and US Forest Service)

The BLM and the U.S. Forest Service assign pinyon nut harvesting activities to one of three categories according to the amounts harvested and whether and how much of the product is harvested for commercial exchange.



Pinyon cones

Incidental use: Incidental use is the harvesting of pinyon nuts for personal consumption that day. No permits are required for incidental use.

Personal use: Personal use is the harvesting of small amounts of pinyon nuts for non-commercial purposes. The BLM and the U.S. Forest Service generally do not require harvesters to obtain a permit for personal use pinyon nut harvesting. Personal use limits vary from 25 pounds per year on BLM and Forest Service lands in Nevada and western Utah to 75 pounds per year on most BLM and Forest Service lands in Colorado and northern New Mexico.

Commercial use: Commercial use permits are required for amounts exceeding the personal use limit even if the nuts are not intended for commercial exchange. Permit prices vary from 20 to 25 cents per pound. In Nevada and western Utah, the BLM and the U.S. Forest Service allocate access to pinyon nut harvesting sites through a combination of sealed bid leases and standard commercial permits. Leases are used in areas where intense competition exists for commercial harvest and where a competitive bid system will result in higher revenues for the agencies. An important change since the mid-1990s is that the BLM in Nevada has closed some areas to commercial harvest at the request of Native American groups with traditional claims to those sites.

Best Management Practices for Nut Production

The simplest approach to managing pinyon-juniper ecosystems for pinyon nut production is to incorporate nut production enhancement activities into on-going management of wild pinyon stands. A list of recommended best management practices is provided below. All these activities are compatible with fuels reduction objectives.

1) Selective thinning—Pinyon trees will produce more and bigger nuts if they are not spaced too closely together. When selectively thinning for nut production, the objective is to leave the best nut producers — generally those trees with large spreading crowns and lots of old cones on the ground.

2) Pruning — Pruning the pinyon tree's lower branches increases nut size and the percentage of viable seeds. Pruning should be done after female cones are set. Pinyon nut harvesters and overnight hikers could accomplish some of this pruning in the course of their work or leisure activities.

3) Weeding — Removing shrubs from around the base of the pinyon tree increases the moisture available to the tree, and enhances nut production. Weeding has the side benefit of reducing fuels around the trees, thus decreasing the likelihood of a canopy fire.



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Candidates for more active management

Creative land managers could work with forest users, such as pinyon harvesters, hunters, and overnight hikers, who already spend considerable time in the woods to accomplish some of this work as part of their harvesting or camp preparation activities.

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Next Steps—Building Capacity for Pinyon Nut Management

Integrating local and traditional ecological knowledge with scientific management — A first step in understanding how to manage for healthy pinyon-juniper ecosystems is to develop partnerships with Native American societies and contemporary pinyon nut harvesters and brokers likely to have ecological knowledge useful for producing and maintaining healthy pinyon groves.



Sorting pinyon seeds

Regional pinyon nut crop forecasting — From 1938 to 1948, the U.S. Forest Service distributed yearly pinyon crop forecasts to traders throughout the Southwest. Today's land managers could establish a regional web-based crop forecasting system. Eventually the website could include other landowners, such as state land offices and private landowners.

Participatory inventory and monitoring — Many pinyon nut pickers and dealers have difficulty obtaining information from land managers about the location of nut bearing trees and their age and yield characteristics. Land managers lack information about the extent and impacts of pinyon harvesting on the lands they administer. Participatory inventory and monitoring systems involving partnerships between land management agencies, harvesters, and other interested stakeholders could help fill these information gaps.

Gathering and disseminating this information will improve the viability of both the household consumption and commercial pinyon nut sectors. It will also provide land managers with a much better understanding of the overall reproductive health of pinyon populations. Putting into place such a tracking system will help all interested stakeholders better measure the pulse of pinyon-juniper forests.

References

Aldron, E. F. and D.W. Shaw, editors. 1993. *Managing pinyon-juniper ecosystems for sustainability and social needs: Proceedings of the symposium, Santa Fe, NM, April 26-30*. General Technical Report RM-236. USDA Forest Service, Fort Collins, Colorado.

Anderson, M.D. 2002. *Pinus edulis*. In: *Fire effects information system* [Online database]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory. Available: <http://www.fs.fed.us/database/feis/> [Accessed April 14, 2007].

Colorado State Forest Service. 2002. 2001 Report on the Condition of Colorado's Forests. Page 6. <http://csfs.colostate.edu/library/pdfs/fhr/01fhr.pdf>

Floyd, M.L. (editor) and D.D. Hanna, W.H. Romme, and M. Colyer (technical editors). 2003. *Ancient pinon-juniper woodlands: A natural history of Mesa Verde country*. University Press of Colorado: Boulder, Colorado.

Lanner, R.M. 1981. *The Pinon pine: A natural and cultural history*. University of Nevada Press: Reno, Nevada.

Nabhan, GP., M. Coder, and S.J. Smith. 2004. *Woodlands in crisis: A legacy of lost biodiversity on the Colorado Plateau*. Bilby Research Center Occasional Papers Number 2. Northern Arizona University: Flagstaff, Arizona.

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