

Position Statement on Stewardship of Old Forests & Trees

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Background

Why are we writing this?

The area of old forests is now far below historical levels. In some regions, studies suggest that the current extent of old growth is a small fraction of what it would be in the absence of industrial management and land use change following colonization (Wimberly and others 2000; Pelz and others 2023). This position statement aims to aid Forest Stewards Guild members and others with the intellectual and practical challenges of maintaining and expanding the acreage, ecological functions, societal benefits, and cultural values of old forests and trees. This position statement will also serve the Guild's engagement in national, state, and local policy discussions about old forests and trees.

The Guild has been involved in discussions of old forests since its founding in 1995 (for example the [Silviculture for Natural Forests Policy Statement](#)). In April of 2022, we welcomed the federal [Executive Order 14072 on Strengthening the Nation's Forests, Communities, and Local Economies](#). We worked closely with partners and federal agencies over the next two and a half years to advance conservation and stewardship of old forests including participation in the [Mature and Old Growth Science Summit](#) and the [National Old Growth Amendment](#). With the withdrawal of the amendment in January 2025, the Guild's focus on practical, on-the-ground work to protect and foster old forests is even more important. Part of this effort is encouraging constructive dialogue on stewarding old forests around the country, including Telephone Gap at the Green Mountain National Forest in Vermont, the Encino Vista Project in New Mexico, and the general topic of "legacy forests" in the Pacific Northwest.

Stewardship means reciprocal care, investment, mutual support, and long-term commitment. Forest stewardship could include protection, harvesting of forest products, recreation, restoration, or other actions. In our experience, even strict protection or 'letting nature take its course' is a choice that requires actions such as managing visitors or trails, responding to uncharacteristic wildfires, or removal of invasive species. For the Guild, stewardship is not a simple binary choice between preservation or utilization, but rather a wide range of potential actions that intentionally foster robust, resilient forests.

The stewardship of forests, and old forests specifically, requires an understanding of the unique landscape, local ecological dynamics, cultural history, social pressures, and community needs and resources (see the Guild position statement on [Full Spectrum of Forest Management](#)).

Indigenous stewardship has often been excluded from this context, but is an important part of the discussion of old forests. Much of 20th Century conservation involved separating humans from the places targeted for preservation which resulted in many instances of the forced removal of Indigenous peoples from their traditional lands (Kantor 2007). The concept of old-growth forests has historically been predicated on the absence of human disturbances (Hunter and White, 1997),



which fails to reckon with Indigenous presence in these forests since time immemorial. Alternatively, acknowledging the reality that Indigenous stewardship had extensive and significant effects on forests signifies that people and old-growth forests can be compatible.

Local support is a critical component of successful, long-term efforts to maintain and enhance the extent of old forests and trees. Efforts to protect, conserve, and steward old forests should consider the people that value forestland and reach out proactively to work with a broad coalition of interested parties. A shared goal such as more old forests and trees and the increased dignity of all who depend upon them can help facilitate connections and build partnerships.

Old-Growth Forests

The basic definition of an old-growth forest is one dominated by big, old trees, both live and dead, standing and fallen, and horizontal and vertical complexity (NCSSF, 2008). However, scientific literature and management plans define old-growth forests in many ways. Central to many definitions of old-growth forests are structures including live trees, multilayered canopies, snags, and coarse woody material (Helms, 1998). Old growth is often associated with high levels of biological diversity (Thomas and others, 1988). While many definitions of old-growth forests have focused on the stand level, recent science emphasizes the importance of individual large, old trees for their contributions to ecological function and climate regulation (Lutz et al., 2018; Lindenmayer and Laurance 2017; Lindenmayer and others, 2012).

Old-growth forests look different in different ecosystems where productivity, species, and disturbances drive differences in stand development (NCSSF, 2008). Monitoring old growth requires a measurable and mappable definition like the ‘old-growth structure index’ used to monitor the Northwest Forest Plan (Davis and others, 2015). However, even the process of defining old-growth forests in terms of static attributes or conditions may be at odds with the dynamic nature of forests (Hemstrom and others, 1998). Definitions may be too narrow (which could mean no forests can qualify) or too broad (which could leave conservation efforts without a focus) (Hunter and White, 1997).

Primary, Mature, and Legacy Forests

Mature forests have characteristics and structural elements that are lacking in earlier stages of forest development, but do not yet have all the attributes of old-growth forests. The term has come to prominence since it was highlighted in the 2022 Executive Order 14072. The US Forest Service definition of mature forests is “the stage of forest development immediately before old growth” (USDA Forest Service 2023). This has resulted in an active dialogue on the topic of “mature and old growth” forests. Other related terms such as ‘primary forest’ or ‘legacy forest’ have also become important in policy discussions about old forests. For example, the UN Food and Agriculture Organization defines ‘primary forest’ as having “no clearly visible indications of



human activities” (FAO and UNEP 2020). The distinction between these terms is often based on previous interventions or the time since the last disturbance. The nuances of these definitions can be problematic because they ignore the long history of Indigenous stewardship. It is also crucial to recognize that even forests that have been logged can still serve many of the functions and provide many of the processes of old-growth forests.

The phrase ‘legacy forest’ was coined in Washington state as part of a campaign to protect naturally regenerated forests that preserve the biological, functional, and structural legacies of the old forests they replaced (Giles 2024). Insofar as mature or legacy forests contribute ecological function and cultural values that are similar to old forests, they are important to this conversation and hence are included in the discussion below.

The Value of Old Forests

Old-growth forests are scarce and, just like a rare gem, that scarcity makes them particularly valuable. They play important roles in hydrological regimes, nutrient cycles, and numerous other ecological processes (Lindenmayer and Laurance, 2017; Watson and others, 1999; Wirth, 2009). Old-growth forests have structures (e.g., large trees, large downed logs, snags, epiphytic plants, and trees with large limbs and broken tops) and species that are rare or absent in young or maturing forests (Donato and others, 2012; Burrascano and others, 2013).

These unique attributes provide habitat for plant and animal species not found in other forest types (Feller, 2003; Marcot and others, 2018). A few examples include old-growth forests on the Olympic Peninsula in Washington state that support 1.5 times more small mammals and greater small mammal biomass than managed forests (Carey and Johnson, 1995); bats in the Oregon Coast Range that prefer the more open conditions found in old-growth stands (Humes and others, 1999); understory herb communities species richness and individual abundance is greater in old growth compared to previously logged forests in the Southern Appalachians (Wyatt and Silman, 2010); and the Rocky Mountains old-growth forests that have the greatest richness and abundance of lichens (Lesica and others 1991).

Old forests play a critical role in mitigation and adaptation to a changing climate, as emphasized in the Guild’s policy statement on [Climate Change](#) and position statement on [Climate Smart Forestry](#). Not only do old forests tend to hold more carbon than younger forests (Fredeen and others, 2005; Harmon and others, 1990; Harmon and others, 2004), they continue to sequester carbon as they age (Luyssaert and others, 2008; Sillett and others, 2010).

Old-growth forests and trees have also been, for thousands of years, a highly valued resource for tribal communities, who rely on them for sustenance and both spiritual and cultural identity (Owen and others, 2009; Eisenberg and others, 2024). They are also repositories and places of learning for the preservation and teaching of traditional ecological knowledge (TEK).



The Value of Old Trees

While old forests provide habitat and other values at the landscape level, individual old trees can be critically important components in all forests. Old trees can be iconic, from the redwoods of the west to the white pines of the east. These old trees are known as legacy trees, because of the links they provide to historic forests that have been replaced. Many of these old trees are associated with naturally reforested grazing lands, where trees that once acted as shade trees and exhibit open-grown form and may now be surrounded by a dense forest of younger trees. Though they are rare in intensively managed forest lands, legacy trees may have been retained during past harvest operations and may have lived much of their life in the old-growth forest that predated logging. Even if old trees exist within a matrix of younger forest, they provide important benefits such as wildlife habitat, cultural values, and historical perspective. These trees can also be important for preserving locally adapted genetic resources. Even retaining and protecting a few individual large, old trees per acre within intensively managed forests can add important ecological functions (Keeton and Franklin, 2005; Kramer and others, 2020). For example, at least a thousand bird species worldwide depend on large old trees for nesting, roosting, and shelter (Holland and others, 2024). New Mexico's restoration principles are an example of conservationists, timber industry, and forestry agencies crafting common sense guidelines that include protection of old and large trees (TNC and others 2006). Overall, even outside the desire for more old-growth forests, old trees matter.

Threats to Old Forests

Old forests face many of the same threats as other forests and natural ecosystems including natural and human disturbances from fire, insects, diseases, storms, and conversion to non-forest land uses. In fact, old forests have never existed in a static state but have always been impacted by disturbances, sometimes replacing them across large areas with younger forests. These processes will continue to affect old forests, but because of past extractive practices and new pressures like climate change, old forests in many parts of the country may be at a 'tipping point' where the amount of old forests on the landscape is at risk of falling below critical levels to support essential ecological, social, and cultural functions and they are not being replaced fast enough to keep pace with the loss. Evidence of this trend is the number of old forest obligate species, like the northern spotted owl, that are threatened or endangered.

From coast to coast, old trees have been under harvesting pressure for well over a hundred years, subject to high-grading for forest products ranging from ship masts to plywood and tightly grained lumber. For instance, older forests only made up less than a quarter of the 50 million acres of the Northwest Forest Plan in 2012, and that area declined by nearly three percent between 1993 and 2012 (Davis and others, 2015). Old-growth forests are particularly threatened recently by the warming and drying of recent decades (McDowell and Allen, 2015; van Mantgem and others, 2009).



Researchers used federal Forest Inventory and Analysis (FIA) data to determine that since the year 2000, we have lost 712,000 acres of old-growth forest to wildfire, 182,000 acres to insects and disease, and 9,000 acres to tree cutting on lands managed by the Forest Service and Bureau of Land Management in the lower 48 states (USDA Forest Service 2024). Even more worrisome is the prediction that by the end of the century, 90 percent of old-growth forests will be at very high exposure to wildfire-caused mortality and nearly 60 percent will be exposed to drought.

The decline in old forests has negative consequences for many species adapted to the environment they provide and for the many ecosystem functions they support. Further, the very nature of old forests means their development can take centuries, so replacing even a small portion of lost old forests may not be feasible during a human lifespan.

Remaining old forests continue to be vulnerable to changes in public policy, as pressures from development and logging on public and private lands threaten to erode existing measures intended to value and protect them. For example, a transportation project on highway 101 in California called Last Chance Grade, is slated to cut old redwood trees in Richardson Grove, the gateway to the redwoods.

Stewardship for Old Forests

The Guild advocates for the protection and conservation of the remaining old-growth forests and old trees and we also recognize the need for restoring old forests. The rarity of remaining old forests and their critical functions should be valued and considered when weighing management alternatives. For some healthy old forests, protection without intrusive human intervention is likely appropriate. Long-term conservation planning is a critical priority, including designation of public lands as wilderness, roadless areas, or late seral reserves. Intentionally managing private land for the maintenance of old forests with protection through conservation easements or other types of financial support may also play a role. Protection of individual old trees is more complicated because they may be hard to identify and keep track of over time, but where possible they should be retained.

Stewardship to protect old forests

Though old forests have survived many changes, they now face a new set of stressors such as uncharacteristic wildfires, a rapidly changing climate, non-native pests, pathogens, and plants. Because humans are driving these changes, we also bear responsibility for mitigating the threats they pose to old forests and trees. The best recipe for stewarding old forests may be to both safeguard old forest habitats and maintain, enhance, or restore the values they provide from further decline through active intervention.



As with any discussion of forest stewardship, action taken to protect and conserve old forests should be considered on a site-specific, local basis. The current conditions, desired future conditions, disturbance regimes, ecological priorities, treatment alternatives, and values of human and non-human communities must be carefully considered and will vary across regions, ownerships, and stands.

Large, high-severity wildfires are a particularly grave and growing threat to many remaining old forests in the US. We can reduce the risks of these wildfires through science-based ecological forest management which includes cultural burning, prescribed fire, and managed wildfire (for more information see the Guild's policy statement [Fire, Forest Management, and Communities](#)). For example, recent studies have shown that the Emerald Point forest, one of the last remaining old-growth stands in Lake Tahoe, California, is more likely to resist future catastrophic fire events if it is treated proactively with prescribed fire (Weeks and others, 2025). In frequent fire forests where fire has been excluded for many decades, fuels reduction projects should generally prioritize the reintroduction of fire as a critical ecological process. However, returning fire usually first requires thinning and significant site preparation, both for operational safety and to ensure that old trees are not killed (e.g., Minard 2002). Thinning often must be followed by prescribed fire to effectively restore forest health and reduce the risk of high severity fire (Davis and others, 2024). These decisions are often controversial and, politically, socially, ecologically, and/or financially difficult for land managers and stakeholders to plan, discuss, and accomplish.

Non-native plants, pests, and pathogens are another serious threat facing old forests (Gunn & Orwig 2018). Pests such as the hemlock woolly adelgid threaten to remove keystone species from old-growth forests (Orwig and others, 2012). Invasive species outcompete and overwhelm native plant species. For example, stiltgrass outcompetes native plants, reduces herbaceous diversity, impedes native woody species regeneration, and creates extensive stiltgrass monocultures (Oswalt and others 2007; Adams and Engelhardt 2009). Though intact old forests may be more resilient to invasion by non-native plants, they are not immune (e.g., Knapp & Canham 2000). Stewardship to remove invasive species may be required for old-growth forests to survive. These stresses on old forests often exacerbate each other. For example, invasive sudden oak death also encourages fire by killing trees and creating more heavy fuel and then has caused an increase in the mortality risk for redwood trees (Metz and others 2013; Valachovic and others 2011). This confluence of stressors only adds to the urgency to mitigate their impact on old forests.

Promoting old forest conditions

Given the limited and declining supply of remaining old growth forests, accelerating the development of old forest characteristics is critical to restoring their functionality and processes at the landscape scale. Forest management can help younger forests move towards old growth characteristics. Targeted silvicultural interventions accelerate the development of old growth



characteristics in younger or middle-aged forests (Lindh and Muir, 2004) by increasing overall spacing, recruiting high levels of dead snags and downed logs, increasing growth of individual trees (Choi and others, 2007; Keeton, 2006), and reintroducing heterogeneity to reflect local disturbance regimes, especially in planted monocultures (Churchill and others, 2016). These interventions can also provide opportunities to treat damaging invasives and support local social and economic development.

Promoting old forest characteristics can help stands develop hydrologic regimes that permit old-growth obligate plants to survive (Mazziotta and others, 2016). In western Oregon, research suggests thinning can encourage old-growth-associated understory herbs (Lindh and Muir, 2004). In those forests, it may be possible to develop large tree density and canopy height diversity similar to old-growth forests in as few as 150 years, though other attributes such as organic matter accumulation and species diversity may take longer (Busing and Garman, 2002). Forest management to encourage old forest attributes was able to improve both vertical and horizontal structural complexity in southwestern Washington (Chamberlain and others, 2021). Research has shown similarly promising early results in redwood–Douglas-Fir forests of northern California (Plummer and others, 2012) and lodgepole pine of the inland Northwest (Sullivan and Sullivan, 2016). Crown-release treatments in Wisconsin hardwood forests accelerated large tree development and are expected to contribute to other old-growth structural characteristics (Singer and Lorimer, 1997).

Carefully targeting areas of young forest to manage for old forest characteristics is important, and if selected carefully, cultivating old-growth characteristics in second growth can serve to improve connectivity between existing old growth stands (Bauhus and others, 2009). This can include focusing efforts on sites where the forest may already be on the path to becoming old, based on site-specific analysis, with input from ecologists, foresters and where available TEK. Managers should also consider contemporary stressors such as the changing climate and invasive species that may make emulating old growth forests more difficult (Fassnacht and others, 2015). Management to promote old forest characteristics may present different operational challenges and risks than traditional forestry. For example, retention of large downed logs can reduce the ease of access and snag retention increases the risk to forest workers (Bauhus and others, 2009).

Conclusion

Overall, the Guild is aware that discussion of old-growth forests provokes passion and interest, and we share that passion. We are also aware that some would say the answer is already in our hands - that protection is the “perfect solution”, that any human intervention in old forests is wrong or misguided. Whilst supportive of protection in many cases, the Guild does not see the solutions as simple as protection versus harvest. The Guild believes that both humility and reflection are key attributes for addressing the challenge of conserving and restoring old-growth forests. Forest stewards must be cognizant that there is no single recipe for success across the



board, that context matters. The Guild is convinced that a combination of good science, high quality practice, and continued monitoring of progress, with adjustments over time and experience, will lead to better outcomes.

There are also forest system level tools that are worthy of consideration, to help us better plan for and understand how we might achieve our goals at the landscape scale. For example, the Triad Model for balancing human and ecological needs can include the protection or restoration of old growth as well as timber production (Seymour and Hunter 1992; Himes and others 2022). The Triad Model suggests zoning that contributes to protecting existing old forests or high-value biodiversity cores and identifying and capitalizing on opportunities for restoring legacy trees and forests. The Triad Model includes a mix of at least three key zones, including ecological reserves, buffer areas adjacent to these cores, and more extensively managed forests where ecological forestry is practiced with consideration of local biodiversity. Successful stewardship – whether strict protection, harvesting, recreation or cultural activities – must be intentional and well-planned, with input from directly and indirectly affected stakeholders, scientists and forest practitioners of all kinds. Successful strategies should be specific to the site and landscape, build on ecological knowledge, employ thoughtful forestry techniques, and provide sustainable livelihood options.

At the level of individual ownership, working forest conservation easements can permanently conserve forests for public benefits and maintain the private ownership’s long-term vision for productive ecological forestry (Best and Wayburn, 2001). These are cooperative legal agreements that protect the conservation values of a forest property (e.g., watershed health, wildlife habitat, carbon sequestration, and open space) while ensuring good forest management and a continuous supply of wood and other forest products and services (Best, 2019). Accredited land trusts, operate in every county of the country and work in close partnership with landowners to develop and monitor conservation easements. Working forest conservation easements will often include additional detail regarding the long-term goals of forest management (i.e., structure and composition), restrict the types of silviculture that can be practiced (i.e., limited opening sizes, or additional restrictions on even-aged management), impose restrictions on volume that can be harvested from the easement, and require regular updates of data and management planning (see the Guild’s [*Ensuring Sustainable Forests through Working Forest Conservation Easements*](#)).

We as authors and elected members of the MPC humbly offer these concepts for consideration by the Guild Membership and anyone else who may care about the stewardship of our old forests. We recognize that these are but small components of a much broader set of solutions, but hope that these will be insightful ideas that are worth sharing.



References

There are hundreds of relevant references on the topic of the stewardship of old forests and trees. The references cited here are what scientists and practitioners associated with the Guild's Membership and Policy Committee believe are the most useful and directly applicable to this statement. That said, the Guild is always looking for more science and best practice documentation. Please forward relevant references or documented experiences that we should be aware of to: Zander Evans, the Guild's executive director (zander@foreststewardsguild.org).

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