The Forest Steward's Journal

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Journal of the Forest Stewardship Foundation

The MISSION of the Forest Stewardship Foundation is to "provide education and information to forest landowners, natural resource professionals and the general public about the science and ecology of forest lands, the many value derived from forested lands and the principles of sustainable forest land development."

DISCLAIMER: As in the past, we again advise that this information is submitted for your interest only. The Foundation's mission, as indicated above, is to "educate and inform", not to advocate or persuade. The Foundation takes no position, either endorsing or opposing, approving or disapproving, any of the assertions or arguments in the contributed information.

Message from the Chair

By Ed Levert, Chair of the Forest Stewardship Foundation

If you missed the 2025 Forest Landowner Conference you missed another good one. A field trip to the largest city park in the U.S., Mt Helena, followed the conference the next day. Putting on one of these conferences takes a lot of hard work and I would like to recognize Lorrie Wood for leading this effort and all those Foundation board members along with Society of American Foresters members who made it such a success. Financially our conferences have been helped by Forest Service grants in the past, but that funding dried up this year. We were so fortunate to have received financial support from nearly forty organizations. Thanks! We have already begun planning for the 16th annual Forest Landowner Conference, which will be held on May 15, 2026 at Carroll College in Helena, so mark your calendar and we will see you then.

Have you ever heard of "Moon Trees"? Well, I hadn't either, but in this journal edition Molly McClintock Retzlaff will tell us all about them. You will also hear more about what you might have missed at the 2025 Forest Landowner Conference plus information about lodgepole pine serotiny and forest windfall risk.

This is always an opportunity to remind you that this journal goes out to over 1200 folks, but our actual membership is about 140. If you aren't a member, please consider joining. You can join by going on-line to ForestStewardshipFoundation.org and clicking on the "membership" tab.

Linda Leimbach Retires as Foundation Treasurer

Although Linda originally volunteered to be our Foundation's treasurer, little did she know that she would also fill the role of secretary and membership chair. In going back through my old minutes I found that Linda volunteered to be our treasurer back on November 15, 2006. That's almost 19 years! Wow. What an asset she has been to our organization and in particular to myself. We are all going to miss her, but once again showing her ability, she recruited an outstanding replacement in Ellen Hutcheson. Enjoy retirement Linda.

Ed Levert

Ellen Hutcheson, Linda Leimbach and Ed Levert

2025 Joint Landowner Conference - Montana SAF Annual Meeting

By Sam Gilbert and Ellen Hutcheson, Stewardship Foundation Board Members

The 2025 Forest Landowner Conference was held jointly this year with the Society of American Foresters (SAF) at the Delta Colonial Hotel in Helena. More than 90 landowners, students and forestry professionals attended. Ed Levert, the Chair of Forest Stewardship Foundation, and Duane Harp with Montana SAF gave opening statements before the day of sessions began. The lineup of speakers provided a wide variety of educational opportunities for attendees, ranging from riparian restoration to bear safety.

The general session featured Sam Scott (University of Montana Bureau of Business and Economic Research) talking about the recent history of the forest industry and Gordy Scott (retired forester and active SAF member) discussing the efforts to develop a broader and more balance infrastructure, especially to process ponderosa pine and sawmill residuals.

During the past 10 years the forest industry has developed a relatively stable pattern of slow decline in output, but with significant variations between the industries in Oregon, Washington, Idaho and Montana. Oregon and Washington produce much more volume and tend to respond stronger to shifts in lumber prices such as the spike during Covid. Single family housing starts have historically been a predictor of lumber values, but the pattern is not as consistent as in the past. Montana delivered log prices have stayed very close to $425 per thousand board feet for quite a while. With the loss of the Pyramid Lumber sawmill in Seeley Lake, the only large mill processing ponderosa pine remaining is the sawmill at Thompson Falls. The closure of the Roseburg Forest Products mill in Missoula which utilized sawdust and other forest residuals has had an adverse economic effect on all remaining Montana sawmills. Efforts are underway to try and fill those gaps.

Brian Vrablick (Interior manager for American Forest Management, Inc.), Matt Arno (DNRC Forestry Assistance Bureau Chief) and Steve Marks (owner of Marks Lumber) spoke about how markets for timber affect the goals of private landowners and corporate land managers. Even though timber production is not the primary goal of many private and some public land projects, removal of trees is often necessary to achieve the overall desired vegetation and habitat conditions. The opportunity to generate income from the sale of timber can help offset costs and/or provide net income. As timber purchasers become fewer and further from the timbered property, the delivered log costs increase and make it more difficult for land owners to manage their lands. Sometimes this is to the point where no economically viable market is available.

Wendy Weaver (executive director of Montana Freshwater Partners) spoke about the importance of riparian restoration for ecological resilience. Her organization was formed after the high intensity floods of 2022 caused extensive damage to the Yellowstone River watershed. Partners in the organization have mapped stream sections to determine where previous channels have been and where they currently are to help determine restoration needs. They then seek to work with other groups to obtain funding and technical expertise to restore resilient riparian conditions. They also are working to provide assistance to landowners on flood and drought mitigation. In addition, they also provide general technical riparian information to interested parties.

Mark Vessar (DNRC Forest Practices Program Manager) talked about the implementation of the voluntary Best Management Practices that Montana has used in place of mandatory forest practices. A random inventory of forest harvests on private, State, federal and industrial forestry lands is conducted every two years. The audits quickly showed more than 95% implementation and effectiveness of the practices. Those BMPs are now being used by many States to guide their forest harvest practices. Road construction and maintenance are the most frequent causes of concern. Mark talked about road designs and techniques to get water off roads as quickly as feasible and preventing runoff from likely being able to directly access surface streams.

Rick Moore, retired Service Forester with the DNRC, gave a presentation on reforestation and site preparation. Natural regeneration is inexpensive but has some risks. Planting may be needed when natural regeneration isn't possible (inadequate seed source, competition, not enough shade, etc.) or to meet land owner's goals for species diversity. He provided sources for seedlings (Montana DNRC Nursery catalog and the University of Idaho Nursery). When planting, the land owner needs to be careful with seed source, making sure the seedlings match the site's elevation and aspect, and to be sure to plant the correct species.

The luncheon speaker was Rich Aarstad, an archivist at the Montana Historical Society. His presentation was Lore, Legenda and Outright Lies: Tales of Early Region One Rangers.

He entertained the group with some great stories and historical photographs.

Mike Giesey, retired silviculturist with the U.S. Forest Service and board member of Whitebark Pine Ecosystem Foundation, spoke about the decline of whitebark pine, a keystone species. Whitebark pine is a 5-needle pine that lives at high elevations. It is long-lived and an important species for wildlife habitat and food. This tree species is in severe decline, mostly because of climate change (increased disease, insects, and an altered fire regime). Because it lives at high elevations, it is often found within ski areas. The Whitebark Pine Ecosystem Foundation is working with ski areas through a certification program to help promote education, conservation, management, restoration, and research.

Products available from the Montana Conservation Seedling Nursery were discussed by Michael Butts (DNRC). The nursery is emphasizing containerized seedlings over bareroot seedlings and has extended its offerings from primarily trees to also include grass starter plugs and forb and shrub seedlings. They are offering 48 species in plugs and 8 wildflower species and 11 grass species as seed. Minimum orders for repeat customers are 9 large cell plant species and 24 small cell plant species. New buyers must double that order amount. In the past, buyers were required to own a certain amount of forested land to be able to order. Now anyone except commercial growers and people wanting products for landscaping can qualify, provided that the purpose is for environmental benefit. Orders are submitted by fall and the order is delivered to County Extension offices in the spring or can be picked up directly at the nursery. People wanting special orders of at least 1000 plants per species can contract with the nursery to grow the plants. This might include buyer collected seed. Setting up the contract might take 18 months to 3 years to arrange for all aspects of seed collection through growing the plants.

David Atkins (retired USFS forester) talked about wildland sourced products from the forest. This included things like mushrooms, medicinals, edibles, boughs and biochar. Some of these things are nontraditional as a business in our area and it might take some effort to learn the growing, collection and marketing techniques. He suggested that creation of co-ops might be a good way to share knowledge and diversify interests between the growers/collectors and the marketers. Local biochar production is currently at low levels, but equipment and businesses with larger capacity are starting to operate.

Bill Cook with Montana's Fish, Wildlife, and Parks gave a presentation on bear habitat expansion and safety. He explained that grizzly bears are on the rise in Montana and are beginning to move to the east on the plains. For bear safety, it's best to carry bear spray when hiking or out anywhere "west of Billings." He described some of the differences between grizzly bears and black bears. Watch for bear signs (beds, tracks, turned over rocks, etc.) and avoid these areas. Also avoid any carcass sites. He also explained that bears are attracted to "smellies," which include food and drink, garbage, compost, herbicides, pesticides, fertilizers, and even chainsaw bar oil. Be sure to secure "smellies" inside a garage, shed or house, or use an electric fence. Go to missoulabears.org for tips.

We thank everyone that attended and/or spoke at the conference. The critiques indicate that people were very happy with the subjects and the way they were presented. We also thank our sponsors and the people that donated and purchased items in the silent auction. All of this really helped to make the conference a success.

Please see our website (ForestStewardshipFoundation.org) for other information and on how to become a member of the Forest Stewardship Foundation.

Stuck Between a Squirrel and a Hot Place

By Peter Lesica

Peter Lesica is a botanist who has spent over 40 years conducting vegetation ecology research across Montana. He has been the author and co-author of publications about Montana's rare plants, wetland plants and alpine vegetation. He is an affiliate faculty member of the University of Montana. This article was previously published in Kelseya, the publication of the Native Plant Society.

Lodgepole pine (*Pinus contorta*) is an impressive plant. I say this in spite of the fact that lodgepole forests are among our least diverse plant communities and provide a less than emotionally moving backcountry experience. The trees are most often small and grow close together, resulting in "doghair" stands. These are surpassed in their impenetrable nature only by stands that have self-thinned leaving two-thirds of the poles stacked at all angles. As the Lewis and Clark diaries will attest to, these forests are generally not welcoming and majestic. What is impressive is the fact that lodgepole has one of the largest ranges of any tree in North America, dominating more than 50 million acres (50 times bigger than Glacier National Park) from the Yukon south to Mexico and from the Pacific Ocean to South Dakota and Colorado. Three common geographic races are recognized in this large geographic range: var. contorta, the shore pine occurs in sandy soil along the coast; var. murryana, sierra

lodgepole, is found in California's Sierra Nevada Range; and var. latifolia, the Rocky Mountain lodgepole with the largest distribution, is centered in the Rocky Mountains. How does such a scrawny little tree with a spindly crown come to be so abundant?

Several traits contribute to lodgepole pine's dominance across western North America. Lodgepole pine grows well in infertile soils. It tends to be most abundant in coarse sandy soils such as those found along the coast or those derived from sterile granite such as in the Sierra Nevada or Idaho Batholith of the Bitterroot Range. Other trees, such as Douglas fir, gain a competitive advantage in more fertile soils. Lodgepole pine also grows fast. For that reason it has been planted extensively in Scandinavian countries, the British Isles and New Zealand; over one million acres have been planted in Sweden alone. Probably the single most important reason lodgepole is so abundant is its ability to colonize after fire. It germinates explosively following fire forming the dense, even-age stands we are so familiar with. Lodgepole accomplishes this feat thanks to a trait unique among western pines: serotiny.

Serotiny refers to the production of cones that remain sealed shut by resin until opened by extreme heat, usually by fire. Trees without serotinous cones must recruit seed from outside the burned area, but trees with serotinous cones have a source on site and ready to go. Lodgepole pine trees in the Rocky Mountains can be either serotinous or non-serotinous. Both kinds have open cones when young, but after 50-70 years serotinous trees begin to produce closed cones, while non-serotinous trees never do. Producing open cones early in life may allow lodgepole trees to produce seed that can disperse to areas that remained uncolonized immediately after the fire. To be effective, this open-cone period must end and serotinous cones come on-line before the next fire. So the 50 to 70-year open-cone period usually corresponds to the average time between fires.

Although individual trees are either serotinous or not, nearly all stands of Rocky Mountain lodgepole are composed of a mixture of the two types (unexplainably Sierra Nevada var. murrayana does not have serotiny). Why? Studies in Yellowstone National Park and Montana's Bitterroot Range suggest that lodgepole stands with a higher proportion of serotinous trees experience more frequent fires because of climate or topography or these stands were initiated by a fire. Stands exposed to other types of disturbance, such as wind throw or insects, had higher proportions of open-cone trees. The existence of both types of trees in most stands suggests that most stands experience variability in disturbance types. But this expectation is at odds with the fact that fire is the dominant disturbance throughout most of the Rocky Mountains. Does some other factor bear on the proportion of serotinous trees in the Rockies? Researchers from New Mexico came to Montana to answer this question.

Red squirrels are the predominant cone predator and occur throughout the range of lodgepole pine. Craig Benkman knew that red squirrels feed on serotinous cones as well as open cones. When squirrel predation is high serotinous cones never get a chance to shed their seeds, but some open cones disperse seeds before they are taken by squirrels. Serotinous trees can be at a disadvantage with squirrels around. Benkman wondered whether squirrel predation might be responsible for maintaining the presence of open-cone lodgepole trees even when fire dominates the disturbance regime. If this were true Benkman reasoned, then lodgepole stands in areas where squirrels don't occur should have fewer open-cone trees than stands where they do. It turns out that there are a handful of isolated mountain ranges where there are lodgepole pines but red squirrels have not been present since before the last ice age. These include the South Hills of Idaho, the Cypress Hills of Alberta and the Sweetgrass Hills, Little Rocky Mountains and Bear's Paw Mountains in north-central Montana. Benkman found that these squirrel-free lodgepole pine stands all had more than 85% serotinous trees. On the other hand, Jim Lotan, from the Forestry Science Lab in Missoula, reported that 341 different stands with pine squirrels all had less than 85% serotiny, with the average around 34%. These researchers showed that it was not just the frequency of crown fires but also the occurrence of squirrel predation that determined the frequency of serotinous and open-cone trees in Rocky Mountain lodgepole pine forests. You can think about all of this and maybe count serotinous trees next time you're bored to tears hiking through a lodgepole forest.

Further Reading

Muir, P. S. and J. E. Lotan. 1985. Disturbance history and serotiny of Pinus contorta in western Montana. Ecology 66: 1658-1668.

Benkman, C. W. and A. M. Siepielski. 2004. A keystone selective agent? Pine squirrels and the frequency of serotiny in lodgepole pine. Ecology 85: 2082-2087.

Growing Moon Trees at the Coeur d'Alene Nursery

By Molly McClintlock Retzlaff, Plant Biologist, Coeur d'Alene Nursery, Coeur d'Alene, Idaho. USFS.

Wander through the Coeur d'Alene Nursery greenhouses and you'll see millions of seedlings growing. Most of these trees will be planted throughout the northwestern states to aid in reforestation after wildfires. Some, like the endangered whitebark pine, will be sent to Glacier, Yellowstone, and Grand Teton National Parks to assist with species restoration. All are from seeds stored in the nursery seed bank. However, a handful of these trees are from seeds that have had a much longer journey and are exceptionally special. They are destined for parks, schools, and other public spaces across the U.S. Meet the moon trees.

In 1971, former Forest Service smoke jumper Stuart Roosa was the command module pilot for the Apollo 14 mission. At the request of the Chief of the Forest Service, Roosa left earth with a selection of tree seeds packed in his bag. The seeds orbited the moon, returned to earth, and were germinated at multiple federal nurseries across the U.S. The seedlings were then planted throughout the US and the world. These became the first "Moon Trees," many of which still survive today (NASA). The known locations of the 1971 Moon Trees plus the whole history of Roosa and the Moon Trees can be found on NASA's website here: nssdc.gsfc.nasa.gov/planetary/lunar/moon_tree.html.

In 2022, the US Forest Service partnered with NASA to replicate the 1971 seed experiment and grow the next generation of Moon Trees. Most of the same species that traveled on the Apollo mission were selected for the Artimis mission and carefully packaged at the Bend Seed extractory (Photo 1). The original five species consisted of sycamores, sweetgums, Douglas-fir, loblolly pine, and redwoods. For the Artimis mission sycamores, sweetgums, Douglas-fir, loblolly pine, and giant sequoias were selected. These species grow throughout a broad geographic range in the US making them versatile for planting in many locations (USDA, Moon Trees Live 1 Episode 4).

The seeds launched into space on November 16th, 2022 and orbited around the moon. They traveled a total of 1.4 million miles before returning to Earth on December 11th, 2022. When the seeds were recovered from the Orion capsule, they were returned to the Bend Seed Extractory for x-raying to better understand how space travel might have affected the seeds (USDA, Moon Trees Live 2 Episode 2).

Once researchers finished collecting data from the seeds, the seeds were sent to the 6 federal nurseries for stratification and sowing. The seeds were stratified for 30-60 days (depending on the species) before being sown into containers in the greenhouse. Within two weeks, germinates began to emerge. The seedlings spent their first year growing in small 4x4x6 inch containers (Photo 2) and then were transplanted into larger containers in early 2024 (Photo 3).

While greenhouse staff carefully tended the moon trees, a panel of FS and NASA scientists combed through over 1300 applications from schools and institutions around the US. The lucky recipients were notified in 2024 and Moon trees started shipping out to their final homes not long after. Recipients were matched with tree species whose range fit well with the planting location. Several trees ended up staying in the area; Coeur d'Alene High School received a Loblolly pine, several schools in Spokane received American Sycamores, and Exploration Works in Helena Montana received a Douglas fir seedling. The Coeur d'Alene Nursery shipped out its final batch of Moon Trees in April 2025 (Photo 4). It has been an incredible experience to be a part of a project that has involved so many scientists and researchers around the US. We are very much looking forward to the next NASA collaboration and an even more exciting version of the Moon Trees study.

References

NASA. (2024, October 28) The "Moon Trees."
nssdc.gsfc.nasa.gov/planetary/lunar/moon_tree.html

USDA. (2022, November 2) Moon Tree Seed Preparation. Moon Trees Live1 Episode 3.
fs.usda.gov/learn/conservation-education/moon-trees

USDA. (2023, April 21) Moon Tree Seed Preparation. Moon Trees Live 2 Episode 2.
youtube.com/watch?v=SKhlWnO6S4Q

Article photos continued on next page ☞

Photo 1. Seed packaged for space.
(USDA Forest Service photo by Kayla Harriman)

Photo 2. Young moon tree seedlings. Species left to right: Giant Sequoia, Costal Douglas fir, Loblolly pine, Sweet Gum, and American sycamore. *(USDA Forest Service photo by Kas Dumroese)*

Photo 3. Moon trees in large containers.
(USDA Forest Service photo by Molly Retzlaff)

Photo 4. The last of the Moon Trees ready for packaging and shipping. *(USDA Forest Service photo by Molly Retzlaff)*

Planning Harvest Treatments Considering Windfall Risk

By Sam Gilbert, Retired Silviculturist

As dense stands of trees develop over time, they tend to keep strong wind currents above their crowns. The competition between the trees for nutrients and water and the lack of movement stress results in smaller root systems, especially for some species of trees such as spruce and lodgepole pine. Therefore, they can be at risk to blowing down by high winds, especially in the Spring when soils are wet from snowmelt and rain.

It is discouraging to do a forest practice that opens up a timber stand (pre-commercial thinning, commercial thinning, salvage, even-aged regeneration treatments and uneven-aged second and third entry treatments) and find that some or many of your leave trees have blown down. You can become more knowledgeable about the risks and hopefully avoid the results by following these risk guides. The source of the following information is Research Paper RM-92, June 1972, Partial Cutting Practices in Old-Growth Lodgepole Pine by Robert R. Alexander. Although the data is old, it is still applicable to today's conditions. They were developed for lodgepole and spruce-fir forests, but are applicable with a bit lower risk to dense stands of other conifer types that have deeper root systems.

Low Windfall Risk Situations

1. Valley bottoms, except where parallel to the prevailing winds, and all flat areas.
2. All lower and gentle middle elevation north and east-facing slopes.
3. All lower and gentle middle elevation south and west-facing slopes that are protected by considerably higher ground not far to windward.

Moderate Windfall Risk Situations

1. Valley bottoms parallel to the direction of winds.
2. All lower and gentle middle elevation south and west-facing slopes not protected to the windward.
3. Moderate to steep middle elevation and all upper elevation north and east-facing slopes.
4. Moderate to steep middle elevation south and west-facing slopes protected by considerably higher ground not far to windward.

High Windfall Risk Situations

1. Ridgetops.
2. Moderate to steep middle elevation south and west-facing slopes not protected to the windward and all upper elevation south and west-facing slopes.
3. Saddles in ridgetops.

The risk of windfall in these situations is increased at least one category by such factors as poor soil drainage, shallow soils, and defective roots and boles. All situations become high risk if exposed to topographic situations that funnel the wind, to microbursts and to strong winds coming from non-traditional directions.

The following pictures were taken during salvage logging of one of the five tornado areas that occurred in central Montana during a two-week period in 2010. It blew down 1100 acres of forest on National Forest and private lands.

The first picture shows the impact to Douglas-fir in a shelterwood harvest area that was logged in 2003. The second shows the results to spruce in a river bottom.

The third picture shows the challenge of establishing the Streamside Management Zone boundaries (worker is 20 feet above the ground) and the fourth shows a drag of logs that are being flown over a river channel by a skyline logging system.

Another indicator of risk to loss of leave trees from wind or snow loading is if the tree height in tens of feet is greater than the diameter at breast height of the tree in inches. For example, a tree that is 60+ feet tall and the diameter at breast height is less than six inches.

Consider attaining your desired spacing in a series of entries, rather than just one entry or marking your leave trees in groups to continue to help support each other. We generally prefer to select trees with a high live crown ratio that indicates vigor for leave trees. However, in high-risk situations, you might be better off to settle for trees with less than the best live crown ratio.

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Please Join the Forest Stewardship Foundation

Through memberships of only $25/year, we have been able to secure grants, publish and distribute the semi/annual the Forest Steward's Journal to over 1200 addresses and co-sponsor the annual Forest Landowner Conference and Insect & Disease workshop. Making forest education happen across the state is what we are all about. Over the past 25+ years these efforts have also included conservation easement and succession planning workshops, sponsorships of forest stewardship workshops along with a host of other efforts.

As a non-profit organization, our board members are not paid, but are passionate about this cause. Your membership means a great deal to our continuing success. Our membership has steadily increased over time to 140 members. Please consider joining the foundation by completing the membership application form/envelope found in each winter edition of the Journal or by going to our website at: www.ForestStewardshipFoundation.org.

Thanks for your help.

Ed Levert, Chair

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Save the Dates

Oct. 4	Tree Farm Annual Meeting	Hamilton, MT
May 15	2026 Landowner Conference	Carroll College