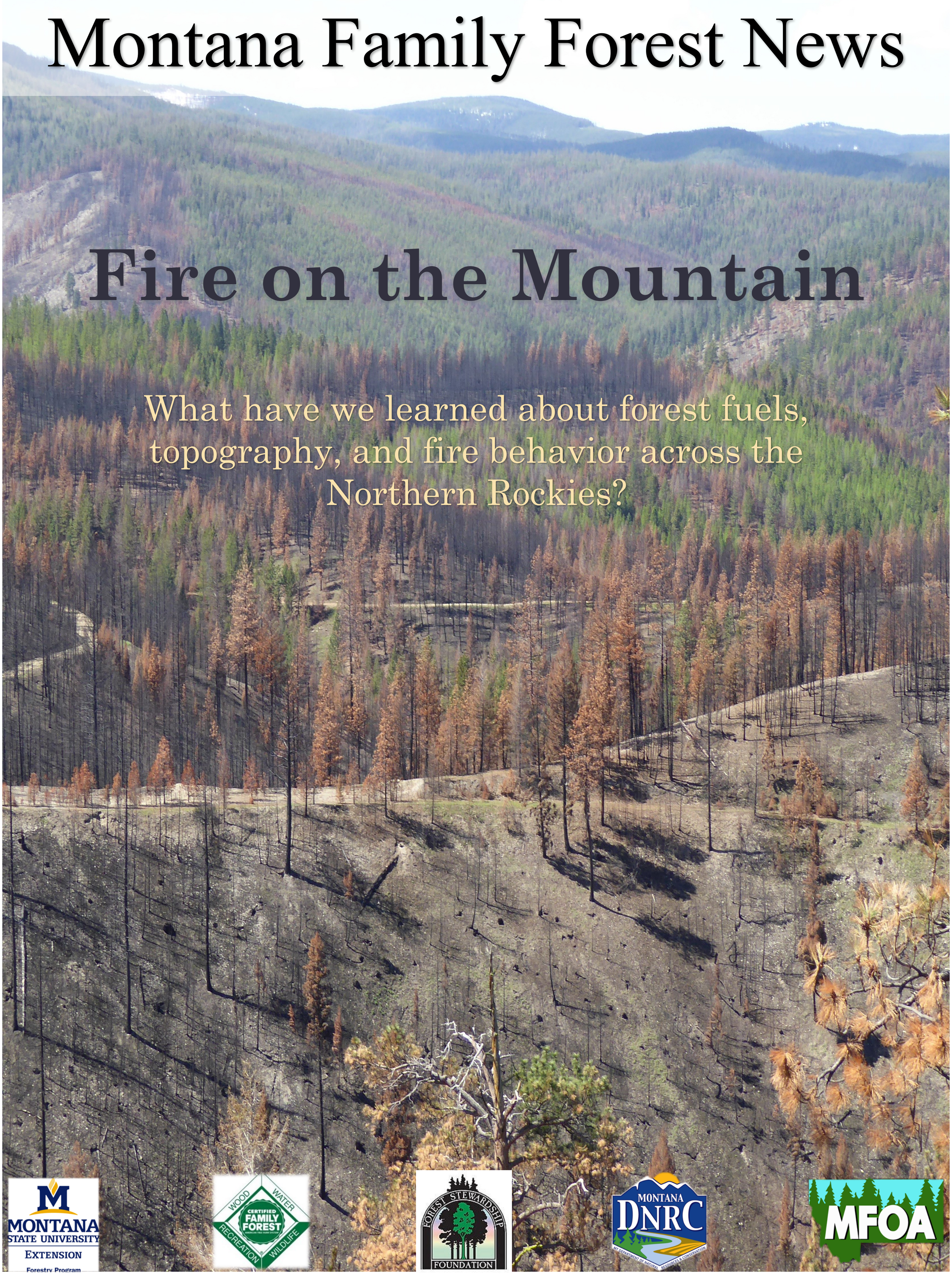
Issue No. 50—Spring 2023

Montana Family Forest News

Fire on the Mountain

What have we learned about forest fuels, topography, and fire behavior across the Northern Rockies?



MONTANA STATE UNIVERSITY EXTENSION Forestry Program

CERTIFIED FAMILY FOREST — WOOD WATER RECREATION WILDLIFE

FOREST STEWARDSHIP FOUNDATION

MONTANA DNRC

MFOA

About the cover—Peter Kolb, MSU Extension Forestry Specialist

If you look up the definition of "combustion" you will get a barely understandable explanation about exothermic reactions, oxidation and gaseous products. Most of us understand combustion as fire, something that is deeply rooted in our primal DNA, and singularly responsible for our species evolution from a food source for predators in some primeval jungle, to masters of our environment with eyes pointed to the stars. At the practical level for forest managers and landowners, fire is an important tool to recycle organic debris and help prepare a site for growing new trees and other plants. At the emotional level fire fascinates most of us who tend to gain much joy sitting around a fire soaking up its heat and staring into its flames. Alternatively it is also an event that can develop into a fearful monster that is capable of consuming everything we have worked for. How do we come to terms with all of these possibilities?

Human history with fire is one of mixed results. As hunters and gatherers we used fire to clear land, hunt wildlife and also attract wildlife with the lush vegetation that comes after a fire. Once agriculture was developed, fire on the landscape became more of an enemy, capable of destroying the crops needed to survive the winter. On hot dry years wildfires were feared by indigenous and settlers alike and events such as the Minnesota Hinkley and Wisconsin Peshtigo fires killed thousands of people. Across the west timber, mining and cattle became the economic necessity of life, and forest and range fires were the enemy. With the development of the Forest Service, protecting forests became the battle cry, especially after the 1910 fire burned over 3 million acres in a matter of days, also killing and injuring many. Fire fighting became a common summer employment, with increasingly sophisticated tools, trucks and airplanes and it appeared to be working. A change in climatic trends from Pacific Ocean dominated weather in the mid 1980's changed all that and 1988 Yellowstone fires where a reality check that none wanted to see. Increasingly warm and hot weather coupled with forests grown dense from 40 years of cooler and wetter Pacific moisture created firestorms and fire containment tried to keep up. It was war and any means needed to defeat the enemy was employed.

The realization that fire itself was not the enemy, but rather high intensity firestorms and severe fire effects were, came slowly. The learning continues, including fire containment tactics. The picture on the cover is from the Lolo Peak fire, where the fire on the mountain top threatened to blow into Missoula with a predicted approaching weather front. Then a firefighter tragically lost his life when a snag fell on him as he approached a fire line. To create a containment zone, extensive "burnouts" were lit from valley bottom roads around the entire mountain range. Burn out the fuels before approaching weather could fan the fire in the wrong direction was the plan. On the cover you can see where helicopters dropped incendiaries in strips across the forest. Former clearcuts like the one top-center in the picture had regenerated to 20 foot tall larch stands, that refused to burn and you can see where numerous attempts were made to ignite it from the air. Steeper slopes supported running crown fires, flatter areas more surface fires. Previously harvested areas for the majority of sites did not support fire. Eventually weather put out the Lolo fire, but not before a lot of forest had burned, including private forest lands that had been thinned in the years before by diligent landowners. These thinned areas made safe anchor points for burnout operations. Mistakes were made, and hopefully a lot was learned. But the learning must continue, both in science labs and on the ground where every fire is a learning experience. Some tactics remain controversial, some have become the foundation for safe wildfire containment.

Fire fighter lives should never be sacrificed to contain a wildfire. Landowners forests, the work they invested and property rights also need to be respected, and used appropriately for wildfire containment. During extreme drought, hot weather, and wind anything organic can burn. Managing both dead and live fuels remains our best option before a wildfire strikes. We can't prevent all wildfires, but we can influence how they burn. But one size does not fit all, and like any forest management, what we do has to be site specific to meet both ecological constraints and landowner dreams and desires. This issue of the Montana Family Forest News attempts to outline the basics of understanding the role of fire, and managing forests in an appropriate manner to reduce the risks of unwanted wildfire consequences.

Peter F. Kolb

From the Editor's Desk

This newsletter is possible through funding from the Renewable Resources Extension Act (RREA). It highlights numerous articles focused on information and resources that forest landowners can use to better their knowledge and potentially implement on their own land. The overall concept is to provide articles that capture one's attention based on current issues and updates on various organizations on a state and national level. Our goal is to provide articles that will give important information and encourage landowners to develop new ideas towards their land.

The newsletter is also available at
https://www.montana.edu/extension/forestry/publications/index.html

Every year our newsletter as a specific forestry related topic. These can be downloaded from our web site under "Montana Family Forest News"

Past topics by years are:
2022: Tree crown characteristics for selecting good leave trees
2021: Rules to thin trees by
2020: Tree seedlings-species, timing, natural or planted
2019: Tree harvesting options
2018: Managing for wildlife
2017: Considerations about climate change and forests, rehab burn piles
2016: Wood heat, burning slash piles, pine engraver beetles, forestry assistance
2015: Commercial thinning, property inheritance, forest products industry, fire dependent forest lessons.
2014: Western pine beetle, forest certification, estate planning, silviculture and marketing

Warm regards,
Christina Oppegard

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Letter from the Montana Tree Farm Chair

By: Holly McKenzie, Montana Tree Farm Chair

Happy Spring to the Montana Tree Farm family.

We just returned from a week of the National Tree Farm Leadership Conference in the deep southern State of Alabama. Montana Tree Farm was represented by our Certification Manager, Betty Kuropat of Troy, our administrative assistant, Ardrene Sarracino of Polson, and myself, the current Chair for Montana Tree Farm, Holly McKenzie of Columbia Falls.

We had a time in Gulf Shores, Alabama last week! Thank you to all ~150 Tree Farm Leaders that braved the trek from the airport and half fog/half sun weather to engage in lively discussion. We finally got the opportunity to reconnect and reflect after a few years apart.

Photo of Betty Kuropat at the National Tree Farm Leadership Conference in Alabama .

On Day 1, we started with some information on the strategic direction AFF is taking from Rita Hite and more information about the Family Forest Carbon Program with Richard Campbell. We ended the day at a welcome reception outdoors with a foggy view of the beach.

Day 2, we kicked off the day with several concurrent sessions hosted by ATFS Staff about what ATFS Certification does and does not do, how it works, the differences between Certified and Recognition state programs, and how this virtual community is rolling out. The AFF Policy Team also hosted some sessions sharing the work that AFF is doing to advocate for family forest landowners. We honored our awardees (to be announced soon if you haven't heard the buzz yet!) at a luncheon followed by our fantastic speakers Deron Lacey of Alabama's Limited Resource Landowner Education & Assistance Network and Ben Malone, Alabama NRCS State Conservationist. In the afternoon, we attended some panel discussions about landowner engagement, inspector engagement, certification growth pilots, and 3rd party assessments. From there, state programs headed into topic themed rooms to network with one another.

For Day 3, participants got a chance to ask questions of a panel made up of Angela Wells, ATFS Director; Will Martin, Executive Vice President of External Partnerships; Maya Solomon, Policy Director; Dr. Salem Saloom, AFF Board of Trustees Vice-Chair; and Chris Erwin, Southern Improved Forest Management Director. A final Q&A session of both live and pre-submitted questions proved to be valuable. To quote one Al Robertson, "I really feel like my questions have been answered this week, even if I don't really like the answer."

We attended a great field trip to Graham Creek Nature Preserve where a nearby town is running a community forest that protects the primary freshwater supply for several towns, while offering a variety of walking trails, frisbee golf, archery ranges, and educational programs for all ages. Graham Creek is also a diverse southern pine forest with loblolly pine, long leaf pine, live oaks, sweet gum, red maple, and some very pretty pitcher plants maintained with prescribed fire on the landscape.

The Leadership Conference offers some important leadership skills and helped us network with some amazing new friends that help run Tree Farm programs in their own states of Colorado, Illinois, Kentucky, and Wisconsin. The seafood is incredible in Alabama….so are the grits! And the white sand beaches are a well kept secret along with the reasonable prices and friendly people!

Enjoy this issue of the Family Forest News and get ready to be inspired to work hard on your tree farm this season! Your forest needs you and you need the forest!

Recap of the Annual Fall Tree Farm Meeting in Beautiful Potomac, Montana

Submitted By: Holly McKenzie, Montana Tree Farm Chair

Moose on the Loose Tree Farm

Every Autumn, our Tree Farm Steering Committee hosts an annual awards luncheon and tours 3 tree farms somewhere in Montana. This past Fall, we selected the Potomac area along the Blackfoot River to visit. We started our tour with "Moose on the Loose Lumber Company" where Elizabeth White manages a section of the old Plum Creek Timber land in the headwaters of Gold Creek. Their young forest is a mixed conifer stand of various age classes. With the help of forestry consultant, Mark VanderMere, they have been thinning the property and sharing it with local scouting groups and educational programs for several years. They have a nice outhouse and pavilion for hosting groups who want to learn about the forest, honeybees, and portable biochar kilns.

Learn more at: www.mooseonthelooselumbercompany.com

Matt and Melissa Arno Tree Farm

After leaving the Moose on the Loose Tree Farm, we began our descent from Sunflower Mountain and stopped at Matt and Melissa Arno's Tree Farm. Matt and his brother, Nate, share a love of forestry and forest stewardship just like their father, Steve Arno. This forest offered us a look at some recent thinning and adjacent BLM fuel reduction work with magnificent views of the Gold Creek Drainage. The Arno Tree Farm was just certified in the Summer of 2022! Congratulation!

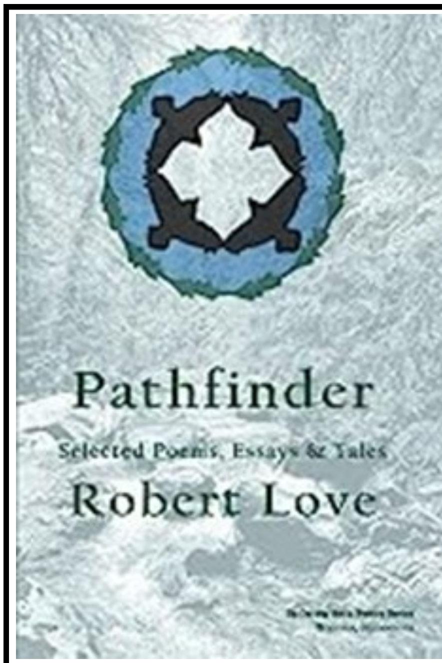
Dave Atkins Tree Farm

Our last tree farm stop took us up Twin Creeks Road to Dave Atkins's mountain top property looking over the Blackfoot River and Twin Creeks drainage. Dave and Shirley Atkins purchased this land in 2015 and named it "Wolden Forest" where they have thinned, pulled weeds, used prescribed fire, and built a "Stoltze Timber Systems" cabin with cross laminated small diameter trees. The Atkins have a talented architect daughter, Sarah Larsen, who toured us through the cabin and pointed out its finer features. Mark VanderMere explained how the portable kilns work and we viewed one on display. Matt Arno took another tour group up the hill to view a prescribed fire that followed some thinning work on the Wolden Forest. Dave Atkins was not with us on the tour as he was finishing a project he had started overseas.

Back to the Community Center in Potomac for our delicious catered lunch where Sharon Hood, Fire Ecologist with the USFS Fire Lab, was our guest luncheon Speaker. Sharon did a great presentation on the benefits of prescribed fire and ongoing results of a fire surrogate study at Lubrecht School Forest from 21 years ago. There is more information on this through the Fire Lab website.

We finished with an awards ceremony for our fine Family Forest owners and Tree Farm Inspectors. See the attached photos and write-ups for more details and please plan to join us for our next Annual Tree Farm tour and lunch in Lincoln County, Troy, Montana on Saturday, October 7th, 2023. Details will be mailed in Summer!

More photos from the Tree Farm Annual Meeting



Montana Tree Farm would like to promote a Montana Forester and Logger Robert Love's new book. It is a collection of poetry that demonstrates compassion and useful insight into nature's work. His ethical consideration highlights the importance the collective effect of family, friends, and neighbors.

The book retail for $18.95 and is available on Amazon at shorturl.at/hopAH

Mary Naegeli Memorial Scholarship

$1,000 in 2023

Mary Naegeli Memorial Scholarship $1,000 in 2023 MT Tree Farm offers a $1,000 scholarship annually to a resident of Montana enrolled (for the first time) or attending any accredited institution of higher education, on a full time basis, have a cumulative grade point average of 2.5 or above, and must demonstrate an interest in forestry/natural resource issues.

Applicants must have a Tree Farmer or a Tree Farm Inspector as a reference. Perhaps you know someone who qualifies for this scholarship. If so, please let them know about this great opportunity. Contact Cindy Peterson at 406-243-4706 or cindy.peterson@umontana.edu to be connected with one.

For more information and how to apply go to: https://www.treefarmsystem.org/montana-awards-andscholarship application are due May 31, 2023. Award will be announced by August 1, 2023 and will be sent directly to the schools financial aid office to be applied to the Fall 2023 school year.

Montana Outstanding Tree Farmer of the Year

Submitted By: Holly McKenzie, Montana Tree Farm Chair

Jim Watson and Carol Bibler

Long time Tree Farm Inspector and forester, Lorrie Woods, recently nominated Jim Watson and Carol Bibler as Outstanding Tree Farmers of the Year for 2022. The couple has managed their 587 acres for decades and signed up for MTFS 19 years ago after they attended the MSU Forest Stewardship Workshop. Jim is a retired mechanical design engineer and Carol is a retired geologist. Their objectives for Springbrook ranch are to provide sustainability for the forest, grasslands, and wildlife. This includes leaving the forest and grasslands healthy while providing safe harbor and habitat for the diverse wildlife populations. Income from this property is a lower priority than forest/ grasslands health and maintenance. Being a viewshed to many in Flathead County, all activities will be implemented with aesthetics in mind.

In the past fifteen years, they implemented commercial thinning, and products were hauled to local mills. Fuel reduction activities have included pruning, thinning, removal of mistletoe, and mowing around the perimeter of the property and all of the roads. Noxious weeds are mapped and treated on a continual basis. They are striving to create an old growth forest over time, while providing wildlife cover. As a result, some thickets of Douglas Fir that have mistletoe have been left for cover but have also been isolated from the surrounding forest to reduce the potential for crown fires across the property. Prescribed fire has been a topic for these owners for many years. They understand the values provided by fire in this ecosystem, have planned for a broadcast burn, but unfortunately, the laws in Montana make it very difficult for a landowner to implement a prescribed fire plan.

Jim is a long time Montana Department of Fish, Wildlife & Parks Hunter Education Instructor. Spring Brook Ranch hosts a field course for official hunter education classes once a year, averaging 50 students. The course features shooting ranges to conduct live fire training for .22 rifles, muzzleloader rifles, and 20-gauge shotguns at clay targets under the supervision of certified instructors and range safety officers. The course includes stations for campfire/ wilderness survival training, bear-safe practices and bear spray

Jim and Carol have done an outstanding job with their Tree Farm. They are constantly learning and applying what they learn. They continue to educate themselves and those around them on new noxious weeds, insect and disease infestations/solutions, rangeland management and many other topics including GIS and drones. Jim takes the ranch's portable sawmill to the annual Family Forestry Expo for a live demonstration as representatives of Montana Tree Farm. The very popular Expo attracts thousands of fifth-graders and families from throughout northwestern Montana. Congratulations Jim and Carol for all your efforts at Springbrook Ranch! Keep up the great work!

Tree Farm Inspector of the Year 2022

Submitted By: Holly McKenzie, Montana Tree Farm Chair

Craig Blubaugh and his granddaughter on her first take your granddaughter work day.

Our Inspector of the Year is Craig Blubaugh from Deer Lodge. Craig has been helping Tree Farm for many years and he fills an important void in the East Side of Montana forestlands. Craig is also a forester for Sun Mountain Lumber. Craig has been referred to as our "Go To Guy" by the certification managers over the years and he is always willing to pick up an inspection or sign some up even when those properties are way off the beaten path. Craig has a great attitude and we are so glad to call him part of our team! Congratulations Craig!

Montana Logger of the Year 2022

Submitted By: Holly McKenzie, Montana Tree Farm Chair

Jim Mathiason and Holly McKenzie

Jim Mathiason is the owner / operator or Makin' The Grade and he works with his brother, John Mathiason as the primary faller for the business. Jim is highly sought after by smaller private landowners and he does an excellent job of combining his artistic skillset with forest health treatments and aesthetically pleasing work. Cameron Wohlschlegel, of F.H. Stoltze Land and Lumber Company nominated Jim Mathiason because of his history with Tree Farm properties. Jim also serves on the Montana Logging Association Board and is an accredited ALP (accredited logging professional) logger. In a quote from Cameron, "Makin' The Grade is my "go to crew" for small private acreages and/or steep and challenging terrain. Jim's niche is that his crew is very low impact on the forest. The timber is directionally hand falled and then bunched for skidding with an excavator. This allows for minimal impact to the ground and residual timber. More often than not Jim not only logs but he cleans up the slash behind his operations as well; creating unit piles about the size of an automobile and scarifying below and around desired seed trees. This allows for a one time entry into a stand to achieve multiple objectives. Thinning of the overstory, slash control, and site prep/treatment for natural regeneration of the next generation of trees all get completed in one step.

Jim also takes the time to listen to private landowners objectives and is able to adjust and adapt to meet their goals. I know when I use Jim on private property they will be happy with the outcome, he always goes the extra mile and out of his way to see the job done the right way. For his over 30 years of logging and in woods excavation experience, along with his participation in MLA, maintaining his ALP logger status, and his continual improvement to forest harvest standards and improving Montana forests is why I believe Jim Mathiason deserves 2022 Logger of the Year." Congratulations Jim and John too! Thanks for your dedication to the Tree Farm Family Forests!

Tree Farm Anniversaries in 2022

Submitted By: Holly McKenzie, Montana Tree Farm Chair

During the annual meeting each Fall, we recognize our long time Tree Farmers with 75 years, 50 years, and 25 years of enrollment. There were no 75 year members this year, however we have 3 families with 75 year tree farms in Montana! This past year, we recognized 50 year tree farmers, Jennifer Kier with the Wiltzen family in Sanders County and Phillip Donally of Mineral County.

The 25 year tree farmers who joined in 1997

Joe Moran, Granite County

Naomi Hoiland and Duke (recently deceased) and Allen Chrisman, Flathead County

Jerry Furtney, Gallatin County

Montana Tree Farm Educator of The Year Award

Submitted By: Holly McKenzie, Montana Tree Farm Chair

Alfred "Sam" Gilbert and Holly McKenzie

We are proud to recognize Alfred "Sam" Gilbert as the Educator of the Year! Sam has enjoyed a long career with the U.S. Forest Service and many years of forestry consulting work. He has been helping MSU teach the Forest Stewardship Workshops since their inception 30 years ago and he makes numerous landowner visits and Tree Farm Inspections on the East Side of Montana…..even far away distant ones because he is dedicated! He even attended a Western Regional evaluation of Pat McKelvey this past Summer when Pat was nominated for Tree Farmer of the Year at the National Level.

Sam is a member of Society of American Foresters, he is a Tree Farmer with plans to help his family follow in his footsteps and continue the Tree Farm legacy. Sam is committed to his Tree Farm family and he is an excellent candidate for Educator of the Year! Sam is seen below with Steve and Diane Wilson receiving their Tree Farmer of the Year sign in 2021.

Alfred "Sam" Gilbert and the Wilson's

montana TREE FARM system

You're Invited!

Montana Tree Farm's Steering Committee cordially invites you to join the statewide Annual Tree Farm Meeting. The event kicks off with coffee and pastries followed by three Tree Farm field tours. Transportation will be provided. The tours will be followed by lunch, a silent auction, and a short business meeting.

Tree Farm Annual Fall Meeting - Troy, Montana

Saturday, October 7, 2023

8:00 am to 2:30 pm

Details will be mailed out with an invitation in August and in the Fall Newsletter!

Introduction to Conservation Easements

By: Mark Schiltz, Western Manager of Montana Land Reliance

Last year I was proud to join the Montana Tree Farm System (MTFS) steering committee to represent conservation interests for tree farmers. Given that I work for The Montana Land Reliance (MLR), an accredited nonprofit that partners with private landowners to permanently protect agricultural lands, fish and wildlife habitat, and open space, I've written this article to talk about private land conservation easements. Conservation easements were a controversial topic when I started working for MLR twenty-four years ago and, despite growing appreciation for their benefits and the fact that private landowners have chosen to conserve more than 2.6 million acres statewide to date, they remain a hot topic today.

To start, a conservation easement is voluntary legal agreement between a landowner and a qualified land trust or government agency that permanently limits uses of private land to protect its conservation values like agriculture, open space, scenic views, and wildlife habitat. Conservation easements are legally enforceable, get recorded, and run with title to the land regardless of who owns it once the easement's in place. No two conservation easements are alike. Each is tailored to the landowner's property and conservation goals. There's typically no minimum or maximum acreage that can be considered for a conservation easement, and no set timeframe for starting or completing them. Easements typically restrict subdivision and full-scale commercial development of the property but allow for continued agricultural and silvicultural uses; construction of necessary infrastructure; the sale, devise, gift, or other transfer of the property, subject to terms of the easement; landowner control of access and day-to-day land management decisions; and additional family and employee residences compatible with the easement's conservation objectives. Nationwide, there are over 1200 different land trusts, each with their own mission and focus. In Montana, 12 different land trusts work statewide and in various regions, again, each with their respective missions.

Over the years I've heard both criticism and acclaim for conservation easements. Unfortunately, conservation easements have been plagued with misinformation such as the idea that easements take private property off county property tax rolls, which is not true (see Montana Code Annotated (MCA) 76-6-208). Or, more concerning, that a land trust could purchase the land protected by its own easement at some incredibly reduced price, extinguish the easement, and sell the property for a windfall profit. Thankfully, Montana law again prevents this from happening (see MCA 70-17-111 (2)). And finally, with respect to the concern that a conservation easement will make a property unsellable, more than 10% of MLR's 1000+ conserved properties changed hands in the last two years to buyers who understood the appreciated the certainty and protections that the conservation easements afforded. Everyone has the right to their own opinions about the concept of permanent restrictions on private land, but the first and, most important, step is to get accurate information.

Tree famers think of land in terms of long-term forest growth cycles and make forest management decisions that impact natural resources for generations. Conservation easements can permit commercial and non-commercial timber harvests that can help landowners meet their forest management objectives, while restricting subdivision and protecting the open space and scenic views we all enjoy. Restricting land with a conservation easement is a fundamental private property right, however, any perpetual restriction should be well thought out and totally understood. Landowners should take every step to find the land trust that fits best with their long-term property management goals and seek the best professional legal, financial, and accounting advice before finalizing a conservation easement.

In addition to working for MLR, Mark Schiltz has spent the last 30 years managing his family plantation tree farm and wildland timber properties near Bigfork. Both properties are permanently protected with conservation easements. For more information, please contact Mark Schiltz at 406-837-2178 or mark@mtlandreliance.org.

Letter from the President

By: David Atkins, President

The new 2023 Officers of MFOA elected at our January meeting are: Dave Atkins as President, Pat McKelvey as Vice President, Cameron Wohlschlegel as Secretary and Christina Oppegard as the Treasurer. Allen Chrisman is the past President.

MFOA continues to actively protect the interests of forest landowners. We are in the middle of the MT legislative session. The Board is monitoring and responding to relevant issues that surface. This past year we participated with an interim committee regarding the valuation of your forest land for tax purposes. MFOA, along with other organizations is part of the Forest Land Taxation Advisory Committee. The committee worked with the MT Department of Revenue to develop legislation that provides a replacement revenue calculation process. Senator Mike Cuffe sponsored this legislation as Senate Bill 3. We testified in support and it has passed the senate unanimously. It has been transferred to the House where we are monitoring progress and will testify when the bill comes up for a hearing. Through our efforts and our partners we are on the path to a responsible and fair tax rate that prevented a substantial increase. Stay tuned for the final outcome.

The most recent Board meeting discussed HB 357 which was recently introduced. It would preclude state funded conservation easements in perpetuity. It allows for easements with a term of a minimum of 15 years and maximum of 40 years. It only applies to ownerships of 1500 acres or larger. We are gathering more information and will develop a position on this legislation. We encourage input from landowners to any of the board members.

Another purpose of MFOA is education and awareness. Our grant from the Montana Forest Collaboration Network for a survey of private forest owners in Montana is nearing completion. The survey focused on owners' knowledge of the danger from wildfires, what treatments they have conducted, their understanding of fuels treatments to reduce the intensity and severity of wildfires, whether they are interested in and what type of training they need to help them reduce their wildfire risk. The Survey is intended to help implement the Montana Forest Action Plan by identifying barriers and sharing that information with the responsible Agencies. MSU Extension Forestry is a critical partner in this project, and both Montana Tree Farm and FireSafe Montana are supporters. The preliminary results are very informative, we look forward to sharing the complete analysis in the next few months.

The Board of Directors is energetic and engaged, in looking out for the interests of private forest owners. If you want to make a difference and speak up for your rights as a forest landowner in Montana, please consider joining us – only $25 per year. Thanks for your support.

Enroll online here: https://www.montanaforestowners.org/

Wildfires, What to Do?

By: Dave Atkins, MFOA President

As a forest landowner with a cabin on it, the ever present possibility of a wildfire arriving is a constancy in life. The key to living with that knowledge comfortably, with few sleepless nights, is personal and neighborhood preparation. It comes down to risk management. Just as in driving an automobile we can control our own speed, not driving distracted and adjusting to road/weather conditions, but we can't control other people, animals running in front of us, etc. So we design things into the car and our driving behavior to mitigate the potential injury in case of an accident. We have air bags, seat belts, the vehicle is designed so that it collapses around the people inside and anti-lock brakes.

Wildfire behavior, the intensity and the severity of the effects on my property can be substantially mitigated with proper planning, design and implementation. Action in advance will minimize the risk of significant damage to our forest, our buildings and our loved ones. If we cooperate with neighbors, be they private, county, state or federal, the risks can be further mitigated.

Wildfires are driven by the fire triangle of weather, topography and fuels. We can't control the weather or topography, but we can control the fuels. We need to assess both our structures and our forest to determine their risk. We can make sure we clean the gutters and valleys of our roof of needles and leaves; the accumulations around the base of the building; making sure we apply the firewise guidance, including not piling our firewood under the deck or next to the building. Putting non-combustible materials within 5' of the structure and proper plant selection in our landscaping. All of these steps are reducing the fuels, especially the fine fuels that ignite the easiest. We all know you can't start your campfire with only big sticks, it takes the small material to get the fire going, which then can get the larger pieces burning.

The arrangement and size of the fuels in our forest function the same way. Reducing the ladder fuels and creating space between the crowns of trees, reduces the risk of a crown fire and thus the amount of embers being generated. Cleaning up the fine fuels, especially the less than 1" material, but also much of the 1- 3" diameter fuels will dramatically change the fire behavior. This is important for several reasons: a) it reduces the intensity of the fire making it safer and easier for firefighters to make a successful initial attack b) if the fire has escaped initial attack it gives the fire management teams more options for managing the fire as crews and equipment are brought in to build line and potentially conduct burnout operations; c) with less fuel the severity of the fire is reduced increasing the likelihood of your trees surviving.

Developing water sources staged around the property for quick access for initial attack is another worthwhile precaution. It adds to the likelihood of a successful initial attack. All these actions should make you insurance agent more comfortable as well. The time to address wildfire risk is well before the fire starts. It also allows for better sleep.

NIFTY Notes Jan 2023

By: Dave Atkins, MFOA President

Forest Thinning

Forest thinning what a vague term for the wide variety a treatments it gets applied to. It can involve cutting down small saplings when trees have regenerated in vast abundance that requires cash out of your pocket to get it accomplished. Or it can be a commercial harvest of sawlog and roundwood trees leaving behind a forest that has more room to grow, while it generated some immediate cash income for the forest owner. Or it can be done to reduce the risk of insect attacks.

Stewardship of a forest takes investment of time and money, if an owner wants to achieve their goals. We just completed burning hand piles from a thinning project we have been doing on 43 acres over the past couple of years. Our forest 159 acres of former corporate ownership hadn't had any of that early sapling thinning, as a result we had a lot of acres of dense thickets with three age classes intermingled with openings resulting from the previous harvests over the past 100+ years, as well as root rot affecting patches of our Douglas-fir.

The dense thickets created a wildfire risk with their ladder fuels, they also limited the growth of the trees from intense inter-tree competition. Our thinning goals have been to reduce the wildfire risk, increase the diversity of species by favoring ponderosa pine where possible, which are more resistant to the armillaria root rot than Douglas-fir. We are also looking to reduce the water stress by diminishing the root competition, which will make them more resistant to insect attack and allow them to grow faster in order to provide for larger more valuable trees for future commercial harvest.

The trees we thinned were from 1" to 5" in diameter leaving behind trees primarily 4-15" in diameter. The slash created needed to be bucked handpiled and burned, since the slopes were too steep (45-55%) for an excavator to work on. The last goal for this thinning project is to prepare the forest for an underburn. It has been >100 year since the last time fire spread across this forest and accumulations of woody debris during that time mean the potential for greater fire intensity around the base of the trees under wildfire conditions. We plan to conduct a controlled under burn with lower intensities than a wildfire.

I find great pleasure in investing in the health of our forest through thinning and making it more resilient for the future.

Montana Forest Owners Association

Annual Chainsaw Raffle

RDO Equipment Company, located in Missoula, generously donated a **Stihl MS 170 chainsaw,** retail price $200. According to manufacturer, "the STIHL MS 170 is the perfect lightweight chainsaw for homeowners seeking great value. Compact, and lightweight with just the right amount of power, the MS 170 makes quick work of trimming or cutting small trees, fallen limbs after a storm, and other tasks around the yard. And even at its great price, the MS 170 has many of the same design features the professionals depend on. The power source is gas with a powerhead weight of 8.6 lbs, guide bar length of 16 inches and a oilomatic chain of 3/8" PMMS."

Tickets are available to purchase at the Landowner Conference in Helena on May 5th and online through the MFOA website https://www.montanaforestowners.org/chainsaw-raffle.

Ticket prices are five for $10 or ten for $20. You may purchase through the link as many times as you like!

The raffle drawing will be at the Landowner Conference in Helena on May 5, 2023.

You do not need to be present to win or be a member of MFOA.

Letter From the Forest Stewardship Foundation Chair

By: Ed Levert, Forest Stewardship
Foundation Chair

Mark your calendar! The 13th annual Forest Landowner Conference will be held in Helena on May 5th at the Delta Hotels Helena Colonial) . This year's conference is titled "Becoming the Best Forest Steward Possible" with the opening presentation Forest Carbon: An Emerging Forest Management Objective by Michael Schaedel of the Montana Nature Conservancy . There will be numerous breakout sessions of interest to both forest landowners and professional foresters. The following day on May 6 the Foundation will be sponsoring a Ties To The Land(TTTL) workshop on successional planning. Another TTTL workshop will be held in Kalispell on May 13. Make plans to attend the conference or TTTL workshops by checking out the agenda and registering online at www.ForestStewardshipFoundation.org.

You can help the foundation's efforts by donating items for the Forest Landowner Conference's silent auction. Please contact Ed Levert at televert@kvis.net or call at 406-293-2847 for more information .

Forest Insect and disease issues are always of interest to landowners and foresters so we are sponsoring with the Montana DNRC to bring you a free workshop on this subject the following day, May 2. The workshop will be indoors and at the Delta (Colonial) Marriot from 8AM -12PM. This is an opportunity to bring in samples of your own for identification and receive a valuable guide to forest insects and disease.

If you aren't already a member of the non-profit Forest Stewardship Foundation you can join this small energetic organization by registering online with a low dues payment of only $25/year. Not only do we sponsor the annual Forest Landowner Conference, educational workshops, but we also publish a bi-yearly Forest Stewards Journal.

Ed Levert, Chair

Save the Dates!

13th Annual Landowner Conference May 5, 2023

Ties To The Land Workshop May 6, 2023

Delta Hotel Helena Colonial
Helena, MT

For More Information and Register: www.ForestStewardshipFoundation.org.

Ties To The Land Workshop May 13, 2023

Montana Fish, Wildlife, and Parks Region One Office
Kalispell, MT

For more information go to:
https://www.foreststewardshipfoundation.org/ties-to-the-land-workshop

Wildfire behavior - what do we think we know?

By: Peter Kolb (PhD) MSU Extension Forestry Specialist

Forest ecosystems across the Northern Rockies have experienced fire, both from lightning and humans for the entirety of the Holocene—also known as the warm period of the last 10,000+ years that developed after the last ice age. Differentiating between the historical role of human caused fires and lightning fires is difficult. We use the oral history of various indigenous tribes, the observations of early explorers, and the hard evidence of charcoal in soil and lake sediments, and scars on trees that survived damage from a burn events. The latter give us evidence of fires, but not who set them. Patterns of frequent fires have been documented along known ancient travel corridors across Montana and Idaho, that combined with the verbal history told by First Nations people have provided much evidence that humans used fire on the landscape quite often during the Holocene. However, evidence of fires is also commonly found in areas less frequented by people, and the common occurrence of lighting strikes during a given summer (the Valley complex fires in the southern Bitterroot in 2000 were caused by more than 80,000 recorded lightning strikes over a 24 hour period) is also strong evidence that humans were not the sole reason forests across this region historically burned.

Picture 1. A surviving group of western larch in an otherwise fire devastated previously forested mountainside.

The record of historical fires in the Inland Northwest ultimately tells us that fires acted across these ecosystems long enough to select for many organisms in the plant, microbe and animal kingdoms that had developed some sort of mechanism to survive or avoid fires, and eventually gain an advantage from fires. An examination of the main tree species of this region not only gives us many different and unique examples of these survival mechanisms, it also provides an insight into the different patterns and roles that wildfires played in the evolution of our forest ecosystems. The stark differences in how these semi-predictable wildfire behaviors influenced different ecosystem development can be categorized by: 1) Fires that burned frequently on hot dry sites that prevented large fuel buildups and thereby burned mostly as low severity surface fires, and 2) Fires that burned less frequently across wetter landscapes and thus tended to burn as severe crown fires that killed trees in large patches. This last category can be further split into wildfires that burned every 20-100 years and created a mixed severity patchy mosaic of crown fires and surface fires across landscapes, and fires that burned every 100-500 years and created large areas (patches) with severe tree killing fire effects. Understanding these historical patterns and how plants adapted to them is essential knowledge for land managers today as we try to conserve these forested landscapes in a productive and interactive manner. This not only includes considering functional historic disturbance events such as wildfires, but the needs of the human populations that now have a much greater potential influence on these landscapes than our ancestors did. Examining our fire adapted tree species is the first step to solving the puzzle of integrating wildfire with forest management and conservation.

Fire Ecology of the Inland NW

Western Larch is perhaps the most fire resistant conifer found across Montana, Idaho, Eastern Washington and Oregon. The term "resistance" means this species can often survive the effects of fire that are typically 5-fold.

The heat from fire affects trees by: 1) Killing needles and buds that in most tree species results in tree death; 2) Killing the seeds sequestered in the cones and therefore limiting the ability of trees to regenerate; 3) Killing the fragile inner bark in branches and stems, destroying the ability of the tree to transport sugars and grow new stem tissue; 4) Damaging the upper roots and basal stem that is the main junction point for shallow feeder roots that are important for water and nutrient uptake, tree stability, and storage of starches and sugars, and 5) Altering the local temperature extremes, water cycles, nutrient availability, microflora and fauna, and competition from other plants and trees.

Picture 2. A 4-year old larch seedling that seeded into a burned area from mature trees 1/2 mile away.

Western larch is resistant to all 4 types of damage and well suited to take advantage of the 5th effect. It has deciduous needles that it replaces every year. Larch needles are fairly succulent, and even when they burn off they do not contribute to heat creation but rather absorb heat away from the woody "pegs" from which they grow, that allows for new needle growth the next year. Having them scorched by fire mid to late summer causes them to follow the natural pattern of needle abscission, just earlier than normal, but after the most productive time of year for photosynthesis (May, June and early July when ample moisture is available). Larch also grows tall quickly, which allows the needle bearing branches to escape surface heat generated by future fires. The thin wispy crowns allow for air to move through them, and thus they do not trap heat and allow for greater convective cooling. Direct exposure to flames from intense active crown fires will kill larch needles and branches, but not as quickly as other conifers. Decreasing tree densities within or around larch stands increases their fire survival.

Larch stems develop thick heat resistant layered and corky bark at a young age. This shields the sensitive inner bark and cambium from the heat generated by surrounding burning trees and surface fuels. Larch stems tend to enter the soil with little root flare, thus the thick stem bark extends under the duff and organic layers that can accumulate under trees on the soil surface. Lateral larch roots develop into horizontal feeder roots deeper in the mineral soil than most other tree species, which allows them to avoid damage from the heat of burning soil surface organic layers. Larch also produces copious pitch that it directs towards protecting wounds and larch can survive 50% of its basal stem killed by fire.

Finally, larch seeds are very small and produced in tiny cones. These are not fire resistant, are relatively cheap for the tree to grow back in large numbers after a fire event, and the tiny seeds can disperse in the winds further than most other native conifers, giving this species the ability to find and colonize disturbed soils across miles of landscape. In addition, the small size of larch seeds makes them less sought after by predators such as birds and mice, though perhaps more easily taken advantage of by soil fungi and other microfauna.

Every strategy a tree has developed to survive some level of wildfire disturbance carries with it some cost. The small light seeds of western larch also means they have minimal reserve energy, and germinating seeds cannot produce a long rootlet that can find deeper soil water, or a very robust sprout that can fight its way to sunlight through thick organic layers or competing vegetation. Larch seeds need to land on the perfect soil medium and condition to grow. This means a highly disturbed mineral soil such as one that has had its organic and plant layer burned off, or been scarified from snow and rain erosion or logging machinery. It also requires full sunlight and will grow poorly or not at all in partial to full shade, thus needs a disturbance that has created a large sunlit opening.

Fire can offer the additional benefits of creating an alkaline ash layer that is hostile to fungi—larch seeds biggest predator, and one that holds water quite well, creating a humid microclimate for the seed to germinate in. Lightly burned wood ash also tends to be rich in macro nutrients that fuel the little larch seedling to grow tall very quickly. It is not uncommon for first year larch seedlings to grow from a tiny seed to more than two feet in height during the first year after germinating on a burned soil surface.

Western larch is a species that evolved to survive and colonize landscapes that are disturbed by severe stand replacing wildfires infrequently—every 50-500+ years. In many ways these adaptations have made western larch dependent on infrequent stand replacing wildfires across the Inland NW. The final characteristic of larch that allows it to survive in infrequent but severe wildfires is that it is very long lived—with some of the oldest trees exceeding 1000 years. This strategy is to patiently wait for centuries until a crown fire roars across the landscape, and then to be the only surviving tree species capable of producing seed and colonizing the burned landscape. Again, there is a cost for this strategy. Infrequent wildfires (50-500 years) occur where the climate typically keeps the vegetation and fuels too wet to burn. Only during periodic severe drought is wildfire a major event. Since prolonged drought is not a typical seasonal event, larch has developed only moderate drought tolerance, which limits its population to the wetter and more humid moisture zones of the interior Columbia basin of the NW, and gives it a fairly narrow range of occurrence across the entire western United States.

Picture 3. Serotinous lodgepole pine cones before and after fire. Seeds survive in cones for 30+ years and after fire can create dense (20 stems per m²) patches of seedlings.

Lodgepole pine is similar to Western Larch in that it is equally adapted to survive infrequent but severe wildfire, but that is where the similarity ends. Rather than being "resistant" to fire effects where mature trees are designed to survive a wildfire, this species is considered fire "resilient". It relies almost entirely on one fire survival mechanism: fire resistant cones that protect and provide for prolonged seed longevity. It is also relatively deep rooted, shade intolerant and like all 2-3 needled pines, needs full sunlight and a modicum of soil disturbance for its seeds to find the right conditions to germinate and survive. Whereas most native conifers drop seeds out of their cones within one season of cone maturity, most lodgepole pine cones remain tightly sealed until heat opens them (Picture 3). This is called cone "serotiny" and has two main functions: 1) To preserve and protect viable seeds for 30+ years, and 2) To protect seeds from extreme heat and open in a delayed fashion after a heating event such as wildfire.

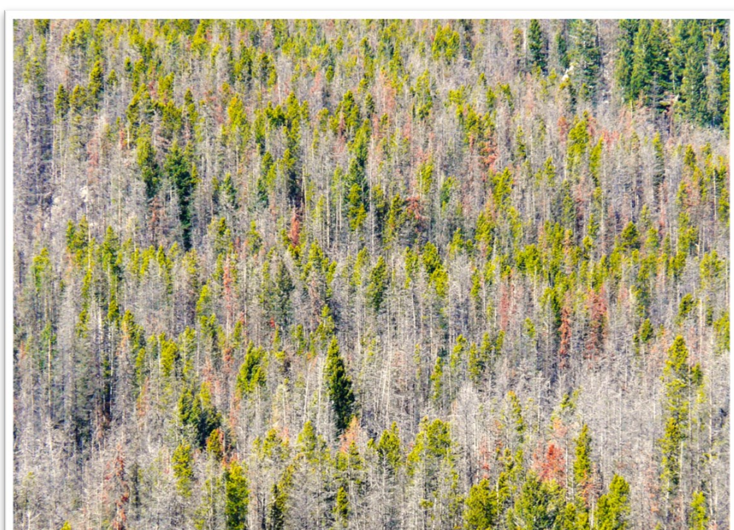
Lodgepole pine seedling and mature trees are very easily killed by wildfire. They have thin bark, are attacked by a variety of insects and diseases that causes very flammable pitch to stream down their stems, and have fairly combustible needles when drought stressed. One could hypothesize that mature lodgepole pine trees are adapted to sacrifice themselves to fire in order to provide the heat for opening their cones and killing off surface vegetation to prepare the perfect seedbed for their seeds and the next generation of their species. Since they are more drought adapted than western larch (especially to low humidity summer conditions) they occupy a much larger range across the western United States and are one of the most abundant tree species across mid to high elevation and dry forest ecosystems of the Inland NW and the central Rocky Mountains.

Lodgepole pine's dense tree seedling development after severe wildfires can suppress other plant establishment creating floristically simple and uniform forest conditions (Picture 4). The species has also developed a somewhat unique relationship with Mountain Pine bark beetles. When LP pines reach larger diameters and sizes at about 90 years of age, they become a perfect food source for a bark beetles, allowing populations to develop into outbreak proportions. This creates a mass landscape die-off of most of the trees, and an ideal fuel bed for a stand replacing wildfire. This is the final reproductive mechanism that ensures its seeds find a successful place to germinate and grow into the next generation of lodgepole pine. Severe wildfires also tend to kill off all other tree species and their seeds, allowing an expansion of lodgepole pine over wildfire affected landscapes. The greater Yellowstone ecosystem is dominated by lodgepole pine because of this strategy. In the absence of severe fires, other tree species, that are much less fire resistance such as Douglas-fir, subalpine fir and spruce, and whose seeds can germinate and grow into trees in the shaded understory of the mature pines could eventually become more prevalent across the landscape.

Picture 4. Dense lodgepole pine regeneration after a wildfire is fairly common. Stand replacing fire gives this species an advantage over other conifers.

An interesting phenomenon noted for lodgepole pine is that in certain areas, such as some of the island mountain ranges across Montana or wetter forest sites across the NW where stand replacing fire was not as common or predictable, cone serotiny is not as prevalent and half of the cones open much like other tree conifer cones do. In these forest ecosystems lodgepole pine survives by colonizing smaller openings caused by lesser disturbances such as root diseases and windthrow. Thus pure stands of this species across a landscape are an indicator of infrequent large forest replacing wildfires, and mixed patches of the species indicate a history of smaller scale disturbances such as less severe wildfire, root disease an windthrow.

The mutualistic relationship with Mountain pine beetle may also have developed further than we know. For most plant/predator relationships, plants develop defense mechanisms through genetic mutations and natural selection resulting in greater species resistance to pests and pathogens (Picture 5). Since lodgepole pine protects its seeds in serotinous cones for 30+ years, beetle killed trees maintain as viable a genetic reproductive component in their population as trees that survived the beetle outbreak. Dead trees promote severe wildfire, that in turn kills the trees exhibiting beetle attack resistance, which erases the effects of natural selection for beetle resistant trees. This may be why lodgepole pine as a species may suffer the greatest bark beetle outbreaks of any species across the NW United States. Large forest replacing wildfires prevent the selection for bark beetle resistance. This theory remains to be tested using genetic analysis on lodgepole pine, but studies on the genetic influences for bark beetle resistance for other species such as Norway Spruce in Germany has shown genetic resistance mechanisms exist within populations.



Picture 5. After a severe mountain pine beetle outbreak, 10-20% of the trees survive the attack in most populations. It is highly unlikely that this is coincidence and more an indicator of genetic resistance.

This might provide some opportunity to use beetle outbreaks as a selection method for which trees to harvest and which trees to leave. By harvesting beetle killed trees and leaving surviving (beetle resistant) trees, the seed source and gene pool of beetle resistant trees can be enhanced. This would be a situation where human management can enhance or speed up the genetic evolution of lodgepole pine beetle resistance as well as lessen the risk of future severe wildfires.

No discussion about historic wildfire impacts would be complete without an examination of **Quaking Aspen**. As a species it is perhaps the most fire adapted and fire dependent tree species found across the NW United States. Mature trees are easily killed by wildfires because of their thin bark (Picture 6) and the open canopy that allows for good grass, forb and other fine fuels to develop in the understory that supports wildfire spread. Aspen also develops an extensive underground root system that survives most wildfires. Root sprouting is stimulated by increased soil temperatures that occur on a fire blackened soil. This typically results in 20-80 sprouts growing per mature stem the year after a wildfire that can grow into mature trees within a decade. This mechanism creates clonal colonies of aspen—where all trees in a group originated from one ancestor tree and subsequent wildfires allowed for a colony of trees to develop that share the same root system and DNA.

Fire killed aspen stems quickly decompose. Their rapid decay makes them ideal habitat for smaller cavity nesting birds such as nuthatches, chickadees and mountain blue birds. Aspen groves also facilitate the development of highly organic and fertile soils. Both the organic content from annual leaf drop and the promotion of lush grasses and forbs with a high rate of fine root turnover are responsible for this. These soils are very productive for conifer seedlings to establish and grow on, especially more shade tolerant species such as Douglas-fir, subalpine fir and spruce.

Wildfires are an important and critical periodic disturbance factor for quaking aspen to persist on a landscape. Fire eliminates competition from conifers that can invade and shade out aspen groves. Since aspen is a clonal organism, its main reproductive strategy is to resprout after a disturbance such as fire. Many groves such as the one in Picture 6 are actually a single organism. Based on the clonal expansion rates it is estimated that some clones are 2000—10,000 years old. Aspen does produce tiny seeds attached to wispy cottony sails, that can float in the wind 10's to 100's of miles. Aspen regeneration from seed is uncommon and has been rarely documented, though it was found to have seeded in on study sites of severely burned subalpine sites across Montana.

Picture 6. The thin bark of quaking aspen is very susceptible to heat damage from wildfires (top picture). Although aspen leaves are not very flammable, heat from surface fires can kill them. Root sprouting is very prolific following mature tree mortality from fire (middle picture) and in many cases aspen clones increase in size following wildfire impacts (bottom picture yellow line indicates zone of aspen sprouting after fire).

Picture 7. *Frequent surface fires keep fuel loadings low and also kills almost all Douglas-fir seedlings and most ponderosa pine seedlings. Grasses and forbs also benefit from the nutrient cycling from such fires that facilitates the development of more open park-like groves of trees.*

Ponderosa pine and Douglas-fir are tree species that are best adapted to dominate drier and more drought prone landscapes across the Inland Northwest. These ecosystems are also prone to burn more frequently from wildfires because average summer conditions are hot and dry, creating a flammable fuel bed that lightning can ignite. They also occur along the lower elevation areas that were commonly used by indigenous people, that also used fire extensively across landscapes. Both of these species have developed adaptations to survive frequent low intensity wildfires, but not severe high intensity fires as the previous three tree species.

Their primary fire adaptation is a thick layer of basal bark that shields their inner bark from the heat of surface fires. Of the two species, ponderosa pine is significantly more fire resistant than Douglas-fir. Pines tend to develop lateral roots that are deeper in the mineral soil and away from surface heat as well as a thinner wispier crown and needle architecture that allows heat to disperse and benefit from the effects of convective cooling. A rapidly developing tap root supplies ponderosa pine seedlings with a consistent water supply allowing seedlings to maintain a higher foliage water content than the more shallow rooted Douglas-fir, which in turn protects seedlings better from the heat of surface fires (Picture 7). Historically, frequent surface fires were responsible for creating widely spaced groves of ponderosa pines mostly devoid of Douglas-fir with grass and forb understory plant communities (Picture 8). Alternatively severe crown fires that burned large patches across landscapes might have been responsible for eliminating ponderosa pine from certain landscapes such as portions of the Deerlodge, Tobacco Roots, Bridger and Gallatin mountain ranges in SW Montana.

Douglas-fir is not considered fire resistant until it is a mature tree, and even then it is susceptible to a delayed fire-caused mortality. Ponderosa pine can seal off fire damage on its stem (often surviving more than 50% of its stem girdled by fire much like larch) with pitch, and rarely suffers root crown damage due to its deeper developing root system. Douglas-fir alternatively tends to suffer from heat damage to its upper roots because they flair laterally above the mineral soil surface (Picture 9).

Picture 8. *Primm's meadow along a tributary of the Blackfoot river drainage consists of over 80 acres of 550+ year old ponderosa pines. Several trees contain fires scars from past centuries of surface fires lit by the numerous different tribes that used this flat spot for rest and as a staging area for hunting and huckleberry picking in the surrounding cooler and wetter mountain forest types. Some trees bare the scars of cambial harvesting by native people who used the inner bark as a food supplement and a means to preserve game sinew that was used for sewing and bow and arrow making. Named after early homesteaders who raised cattle on this site, logging companies resisted requests from the homesteaders to cut down the trees so more grass could grow because of the unique quality of this isolated stand of giant ponderosa pines.*

After a fire kills the upper root surfaces, these get infected with wood decay fungi and that can develop into severe root decay. This slowly kills mature Douglas-fir and we found in a 20-year study of the 2000 Valley Complex fires in the southern Bitterroot that of the 600 Douglas-fir trees that initially survived the fire, 30% died within 3 years and 98% died within 20 years following the fire. Half of these mature trees had no visible fire scars. Although relatively short-lived after a surface fire, injured Douglas-fir were found to be prolific seed producers that resulted in dense seedling recruitment under fire affected Douglas-fir. By the time the mature trees had died from fire related stem and root damage, thousands of seedings per acre had established under and within approximately 150 meters of temporarily surviving Douglas-fir trees.

Picture 10. Fire can act as a thinning agent for conifer regeneration, however, it can also act as a site preparation mechanism that prepares a good seedbed that results in phenomenal conifer seedling recruitment as is shown in this time series following the 2017 Roaring Lion Fire in the Bitterroot foothills.

Picture 9. The exposed root crowns and shallow roots of Douglas-fir (top picture) make them very susceptible to surface fire heat damage. These wounds become infected with stem and root decay fungi that slowly diminish the trees ability to procure water and soil nutrients leading to decline (middle picture 10 years after fire). After 18 years dense Douglas-fir regeneration was commonly found under dying mature trees (from 2000 Bitterroot complex study).

The impacts of wildfires as a tree thinning and fuel reduction mechanism across drier forest sites are well documented. Frequent burning by pre-European Indigenous people has been attributed to creating stands of giant old ponderosa pine forests that were fairly wildfire resistant. Such use of fire is today considered part of an important restoration practice that might be implemented across many landscapes to alleviate current fuel buildups and forest density issues. However, the long term effects of such fires are less understood. Post-fire weather plays a very important role, as does the return interval of the next fire. Almost all of the wildfire affected areas that we monitored for the past 23 years that had surviving mature trees, also developed very prolific tree regeneration under them. In some situations tree regeneration was not noted until 5 years after the fire, whereas others showed seedling recruitment the following spring. Cones and seeds that survived the heat of the wildfire as well as cool, wet springs appeared to be significant determining factors that allowed prolific tree regeneration to develop.

Using prescribed fire might be a double edged sword, where fire is useful to reduce surface fuels and thin established conifer seedlings, it might also create a seedbed that promotes dense subsequent conifer regeneration. The timing of prescribed fire as a fuel and seedling reduction tool may be a very important consideration. Such fires need to be set when they enhance the development of dense and healthy understory grasses, sedges and forbs that may inhibit future tree seedling recruitment, while at the same time reducing excessive surface fuels. How and when the optimal fire is to be conducted remains an important practical research question.

Other forest tree species—grand fir, subalpine fir –larch—hemlock, Engelmann spruce, western red cedar, hemlock, white pine, whitebark pine, limber pine, juniper

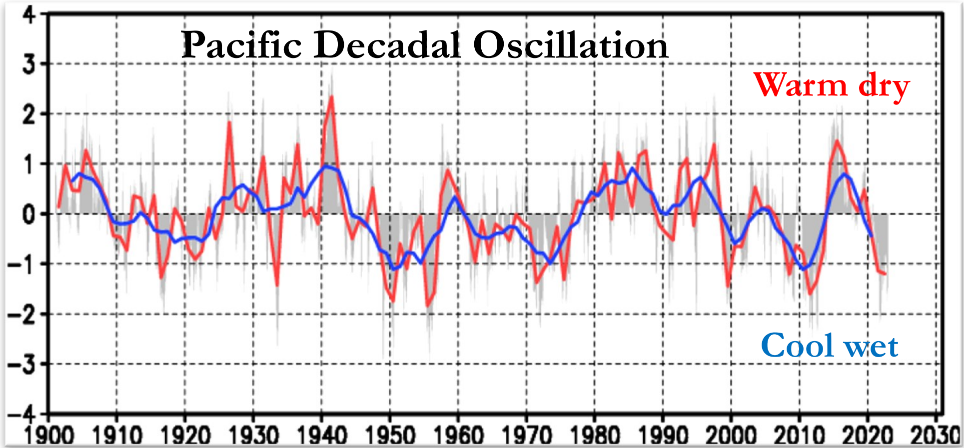
The other tree species native to the Inland NW do not possess strong wildfire adaptations. All of them are easily killed by wildfires, though a few such as the pines listed above that are shade intolerant, can gain an advantage by seedbed preparation from fire, and the reduction of light competition from more shade tolerant species. Most of the other species benefit from long fire free intervals as they are more shade tolerant and move into landscapes under the solar protection of the more fire resistant tree species. Again, the pines are the exception to this rule as they are largely shade intolerant. Also with the exception of limber pine and some scenarios juniper, they occupy wetter forest ecosystems where fire is not a frequent visitor. They rely on wildfires burning a mosaic across the landscape, leaving intact islands of these fire sensitive species from which they slowly spread into fire affected areas in the decades and centuries after fire. Severe wildfires that burn across larger landscapes can remove these species from the ecosystem for long periods of time. If a warmer climate develops, these species might have their ranges diminished by more frequent severe wildfires.

Managing Forests for Wildfire Resilience

Understanding the fire ecology of our native tree species is essential to understand the historic and future role of wildfires across the Inland Northwest. It also gives us guidelines of how mechanical treatments should be designed. As a landscape phenomenon, the perception and use of wildfires has gone from a useful tool of Indigenous peoples, to a real and damaging threat to settlers and infrastructure in the first and second centuries of the United States, to once again a useful tool and in some cases, a proposed utopian process for maintaining a wild Rocky Mountain forested landscape. Rocky Mountain landscapes remain the same. Climatic fluctuations also remain cyclical, though there is a threat of prolonged climatic warming. Some forested areas have experienced extensive logging and dense tree regeneration, the latter being a goal of forest management over the past century for fear that logging would result in deforestation.

Picture 11. Mixed ponderosa pine and Douglas-fir stand that was precommercially thinned and then burned in order to reintroduce fire as a safe and practical site maintenance treatment. In Montana, whoever lights the fire is liable for any damages that result if the fire escapes to adjacent properties. To use fire as a landscape "broadcast" treatment considerable expertise, equipment and reserve labor forces are required.

Other forested areas have grown overly dense as a result of a prolonged cool-wet phase of the Pacific Decadal Oscillation from the 1940's until the 1980's that coupled with active wildfire suppression resulted in fewer wildfires and less area burned across forested landscapes for half a century (Picture 12).

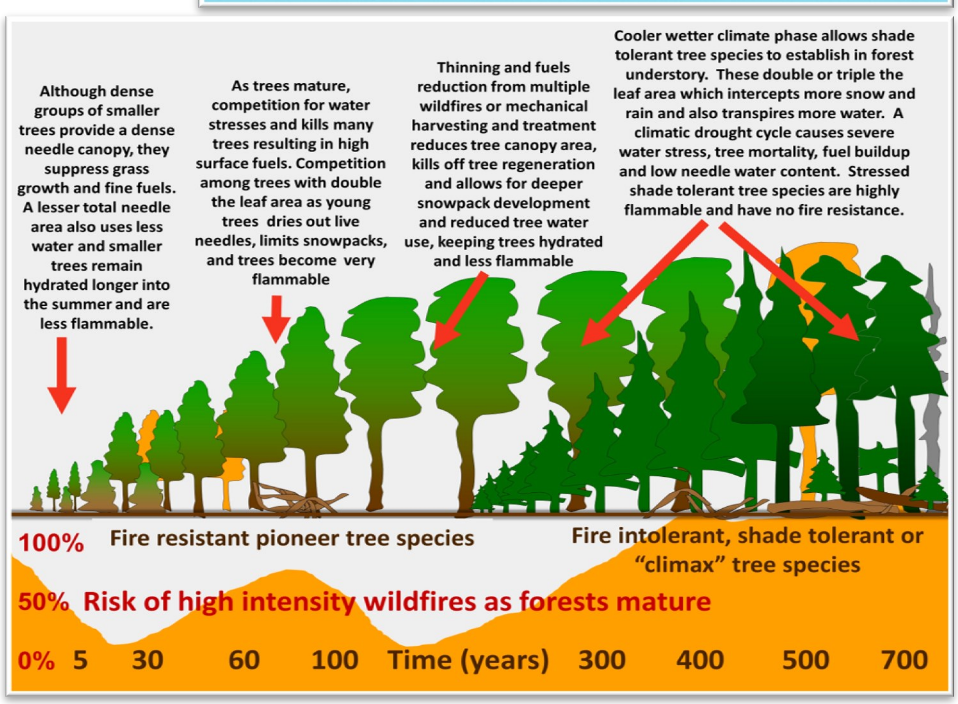


Picture 12. Graphical representation of warm-dry and cool-wet influences of the Pacific Decadal Oscillation across the NW United States. The period from the mid 1940's until the early 1980's was one of the longest prolonged PDO cool-wet periods of the past 400 years, that likely caused good tree growth and regeneration and lower wildfire potential. From 1980 until 2000 you can notice the increasingly hot and dry climatic influence that led to water stress and significant forest dieback, insect outbreaks, and increasingly severe wildfires.

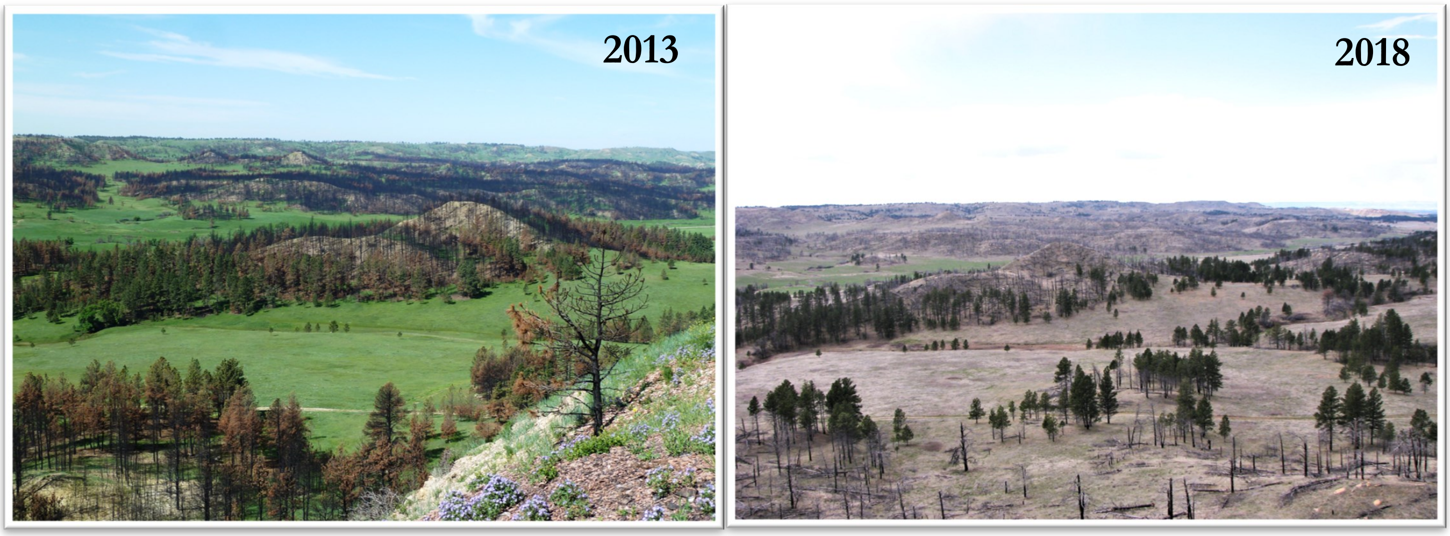
Since the late 1980's, and especially over the past 23 years a significant portion of our forested landscapes across Montana (about 40%) have experienced more severe wildfires than the previous 60 years. This was a result of many different and often confounding factors, though a century of wildfire suppression is often blamed (unfairly in my opinion) as the main culprit. The cost of containing fires, the impacts of extremely poor air quality, and the loss and simplification of once diverse forested landscapes as a result of these wildfires has resulted in a call for action to treat fuels across larger landscapes and multiple ownerships.

Dry versus Wet Forest Types

Through our understanding of different tree species and their evolutionary relationship with fire, we also have learned that wildfire, either natural or human caused, had, and potentially has a different role and impact across different forest types. Maintaining, restoring, and creating new groves of



Picture 13. As forests develop, they go through phases of growing too dense, self thinning from both light and water competition, and then growing too dense again (top). Frequent fire can play a role as a thinning agent and maintain an open forest of fire tolerant species. Fire can also be an agent that brings the entire process called "secondary succession" back to its starting point with a stand replacing fire when the forest is too crowded and water stressed (bottom). The diagram and timeline is for a South and West aspect. A North and East aspect can bypass the "pioneer" species phase and immediately grow back into a climax phase forest if seed sources for shade species are present.

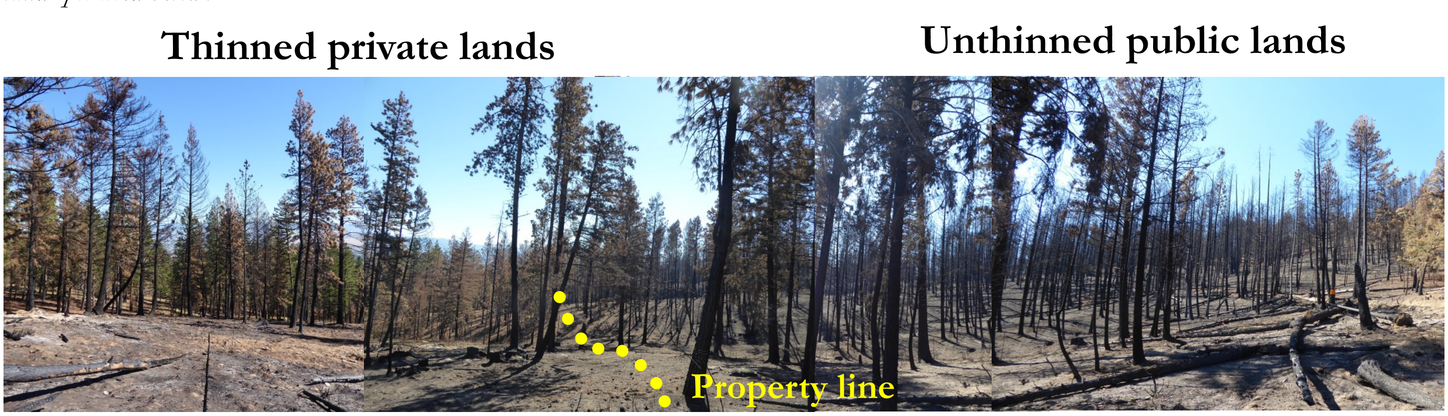


Picture 14. Grassland/forest fire in eastern Montana acted as a forest reducing agent by killing 75% of the trees and their seeds across the landscape. Ponderosa pine cones do protect seeds from surface heat, but not crown fires. They are also not able to disperse their large heavy seeds more than 10 or 20 yards from live trees, unless cached by seed eating birds such as Clark's nutcracker. Natural forest regeneration and pine movement back across these landscapes make take centuries.

ancient and giant trees, as well as fire adapted and resilient forests requires multiple land-use tools. These need to be sensitive to the ecological history and species potential across different forested ecosystems. They also need to be sustainable and affordable to make an impact across the 25 million acres of Montana forests.

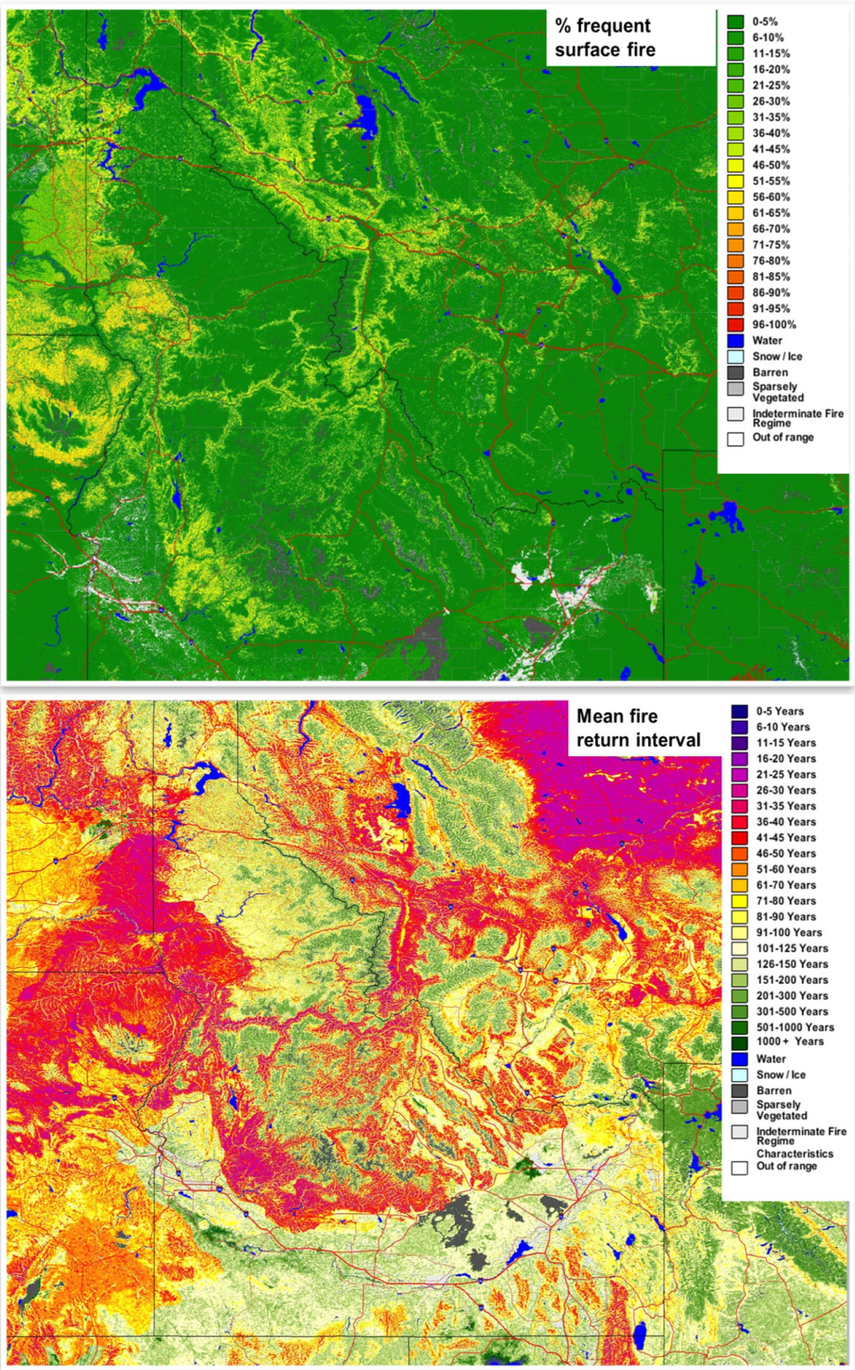
Picture 15. The Roaring Lion fire that created its own wind vortex and burned across this mountainside in one day. Red circle indicates location of thinned private lands pictured below.

For drier forest types across western Montana the goal is to create and maintain a more open forest of widely spaced tree species that are adapted to survive frequent low intensity surface fires. Such a condition also makes them less susceptible to severe stand replacing fires that can be forest "removing" on such sites (Picture 14). It also conserves conditions to which other native plants and animals that have coevolved on such frequent fire ecosystems are adapted. Prescribed burning is only one tool that can be used, and it carries with it several options that include broadcast burning across ownerships and landscapes, or mechanical thinning and harvesting followed by debris pile burning, chipping or mastication.



Picture 16. The Roaring Lion fire was both a fuel and localized wind driven fire. Videos of this fire are easily downloaded from YouTube as it formed a rotating vortex across the mountainside. Post-fire analysis showed that even with localized high winds, the previously thinned forest (red circle on the picture above) caused this fire to change behavior from an active crown fire to a surface fire. This change in fire behavior saved trees from being killed as well as many houses from being lost, and helped contain the fire.

Originally concerns about nutrient cycling were declared when too much woody debris was removed from such restoration sites. Long term site productivity studies (LTSP) found minimal effects on most soils, and the risks associated with too much woody fuels were found to be more important. The majority of macro and micronutrients found in trees are in the inner bark, which is consumed and recycled by insects, arthropods and fungi within the first year of harvesting. Wood itself is mostly devoid of nutrients and consists of carbon, oxygen and hydrogen (carbohydrates). For decomposers to digest wood they need to draw nutrients out of the soil, causing a nutrient deficiency until the wood is completely decayed. This process across most forest types of Montana may take from 30 to 150 years.

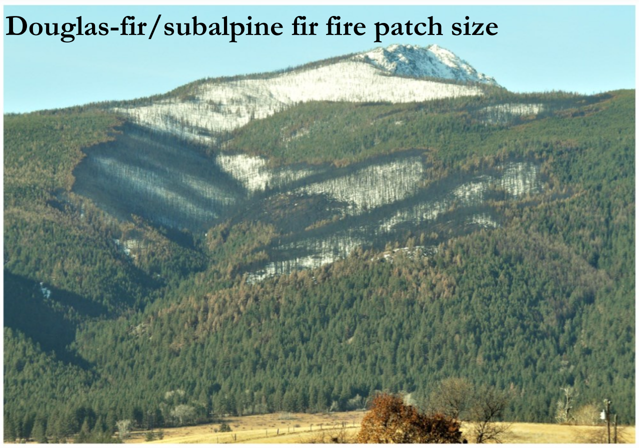


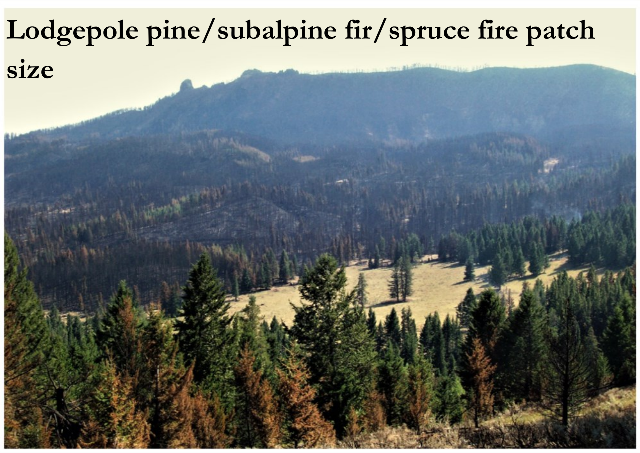
Picture 17. Maps created by the Landfire study (https://landfire.gov/) that collected and mapped historical wildfire return intervals across the United States. The upper map shows frequent surface fire areas as Yellow. The lower map shows mean fire return intervals as color coded. Prairie ecosystems had some the shortest average fire return intervals through history because grasses provide an annual fine fuel that is very flammable.

Western Montana forests dominated by ponderosa pine, but also Douglas-fir and in some areas western larch, evolved with frequent fires that kept a proportion (though not all) of these sites open grown with widely spaced trees that would reach ages of 300+ years. According to the Landfire study (Picture 17) that examined fire return intervals across forests of the entire United States, only limited areas across Montana, defined by the lower elevations in the Bitterroot valley, Clark fork drainage, Fisher River, and Blackfoot river drainages were noted as having frequent fires. These areas coincide with frequent historic use by Kootenai and Salish first nations. Pioneer records also show that this is where open grown stands of ponderosa pine and western larch occurred.

Areas along the Thompson and Fisher rivers in NW Montana are wetter forest ecotypes and were thus dominated by old western larch trees. They benefited from frequent fires, though perhaps less frequent than drier ponderosa pine sites. These areas also were important travel corridors and living space for indigenous tribes who were documented to routinely set fire to these landscapes as they passed through (See David Thompson journals). The giant larch grove and world record western larch on the west shore of Seeley lake is an example of a stand created and maintained by such burning practices for over 1000 years.

When trying to understand the role of past fires, and modern forest management practices that are in sync with past wildfire disturbance regimes, it is important to note that not all natural forest ecosystem across the Inland NW were comprised of ancient giant trees. A map of average fire return intervals across the region (lower graphic Picture 17) shows that "less frequent" fires, and thus a





Picture 18. As local climatic conditions get wetter, forests grow faster and denser. This limits wildfire to becoming less frequent, but increasingly severe across larger areas.

greater probability of stand replacing fires of varying sizes and magnitude played a more significant role across larger portions of the landscape than did frequent understory fires.

Using forest management practices such as forest thinning alone becomes a much more difficult endeavor when trying to affect fire behavior across infrequent wildfire regimes. Trees and vegetation grow more quickly across wetter ecosystems, and therefore fuel accumulates at a faster rate.

More productive forest sites also means that vegetation treatments such as forest thinning have less longevity in their effectiveness of reducing high intensity wildfire probabilities. Trees grow large and dense faster as does surface vegetation. Wetter forest ecosystems also support shrub species such as ninebark, oceanspray, fools huckleberry and true huckleberry species. These shrubs add an additional fuel dimension to wildfires as they readily burn during dry late summer months. Thinning trees may provide for more light and enhance the shrub fuel component on a landscape treated for tee density.

When the size and magnitude of wildfires is examined across the wetter forest ecosystems it becomes obvious that the less frequent wildfire occurrence, the higher the risk of high intensity wildfires that can resist control until they reach a fuel barrier. When high intensity wildfires develop, forest thinning is less effective as a single treatment for containing such fires. Picture 18 demonstrates the footprint of high intensity wildfires across multiple landscapes, ranging from the drier forest types of the Bitterroot valley, to higher elevation forest types in the Yellowstone Ecosystem, and finally the wetter forest types north of Kalispell in the Kootenai National Forest. The largest footprints of severe wildfires also tends to coincide with the prevalence of lodgepole pine across the ecosystem, a species uniquely adapted to thrive in this type of wildfire regime. So what is the solution for trying to modify wildfire behavior in such fire regimes that is more compatible with human habitation, and yet conserves the natural functionality of fire within these systems?

An examination of wildfire affected forests across the historic infrequent but severe wildfire regimes of the Inland NW has shown some surprising trends. It has been well documented that past wildfire effected areas across these forest types do not seem to burn as readily.

Areas that have burned over the last 50 years often act as barriers when active crown fires run into them. This has led to the thought that if more fires are allowed to burn across these forests, future wildfires will be contained by older wildfire affected areas, and thus wildfires will become self regulating natural occurrences. In an ideal world where the climate and weather is a predictable and stable entity, this could work. However, historical fires also have shown us that climatic variability is the "normal" for the NW, and hot dry periods of the Pacific Decadal Oscillation coincide with historical

Picture 19. A mid to high elevation forest comprised of lodgepole pine, spruce, subalpine fir and Douglas-fir after a century or more without wildfire in the Belt mountains of central Montana. Overly dense tree growth during the cooler wetter climatic period of 1945-1985, suffered drought stress and mortality during the warmer-dry period from 1985-2005 resulting and many dead trees and excessive fuel loading. Tree harvesting in the 1970-90's created patches of younger trees within an undisturbed "old growth" forest. A wildfire the following year showed the differences in fire behavior across a landscape with harvesting (B and C) that created a mosaic of tree ages and species versus an adjacent drainage that had remained untouched by harvesting (A). Similar effects of patches created by tree harvesting on wildfire behavior can be found on most Montana wildfires of the past 20 years.

intense wildfires that have burned across the landscape. Plus wildfire movement is not only controlled by the weather and topography, but also fuel types. This is where "nature" by itself may not be the regulatory entity that creates an "equilibrium" that humans can live with. At least not with the modern density of people and demands that we make on these ecosystems to provide us with clean water, wildlife habitat, recreational opportunities, living space, and natural resources such as wood products.

Mechanical thinning and harvesting that reduces tree density and increases the landscape mosaic of patches of different tree species and age classes is a very viable option for many forest types. Modern harvesters can selectively remove trees, process them and stack them for transport in a manner that minimizes road construction and creates a more "natural" level of disturbance. In many situations, the value of the trees removed can offset the costs of the work. However, for this to happen a viable wood products and professional logging community needs to be supported by a regional effort and sustainable harvesting plan. Which trees need to be removed and in what configuration will vary by site, harvesting equipment available, stand condition, and landowner goals and objectives.


Picture 20. Thinning tree density in a forest can dramatically reduce the risk of a crown fire. In this picture from the Lolo Peak fire, a burnout was conducted under extreme fire conditions through private lands that had been previously thinned. Due to the conditions even trees in the thinned forest were killed, but a majority survived compared to adjoining unthinned lands where the fire immediately turned into a firestorm that raged through the crowns of the denser forest.


Picture 21. As the fire from the lower elevation burnout in Picture 20 reached mid-elevation forested sites above it (left picture), previously harvested areas supported lower fire intensities and often slowed fire progression across the landscape. Whenever the fire reached denser, older forest conditions, surviving patches of trees became fewer and fire effects were more severe (right).


Picture 22. Harvester removing select trees to thin a forest of ponderosa pine and Douglas-fir grown too dense, followed up with multiple burn piles to reduce fuels and apply beneficial fire properties such as charcoal and site preparation for natural tree seedling recruitment. Thinning tree densities using harvesting followed with debris pile burning can result in similar forest properties across historic frequent fire regimes as did the use of fire by indigenous people.

Harvesting and fuel reduction work cannot eliminate fire from Inland NW landscapes, however, it can change the probability of the kind of fire that will burn. Pictures 19, 20 and 21 shows the impacts of previous forest thinning and harvesting on even the most extreme wildfire behavior. Even with harvesting of trees, fire remains an important risk, and essential tool for forest managers across Montana. Currently it is used by many private landowners extensively as a means to treat debris accumulations from forest treatments using a "pile and burn" methodology (Picture 22). Debris piles can be burned when snow is on the ground and risk of fire escape is minimal. Using many smaller piles across a forest versus a few larger piles, can be used to create an effect similar to broadcast burning by strategically placing burn piles where soil scarification is wanted to recruit new tree seedlings. Smaller burn piles also require less restoration of soils than large burn piles that typically result in heat affected surface soils that can take decades to recover without post-fire rehabilitation. Any burn-pile affected soils can easily be rehabilitated by mixing the top few inches of fire affected soil with slightly deeper soils (see forestry facts sheet).

When thinking about using forest management as a tool to minimize the risk of unwanted wildfire effects across the landscape, it is important to consider that not all dry forest types were historically impacted by frequent wildfires, and not all wetter forest types only experienced stand replacing fires. Central and eastern Montana experienced more wind driven grassland fires that also burned into forested areas. High winds and extremely low summer humidity creates a typically summer fuel structure that supports severe and fast moving wildfires. As mentioned, across these regions wildfire historically played more of a forest limiting role. Although thinning of trees can reduce the risk of a wildfire developing into a crown fire, summer grass fires can be intense enough to kill trees in thinned forest conditions. Across many dry forest types and the grassland dominated forest of central



Picture 23. Thinning tree density in a forest can dramatically reduce the risk of a crown fire, but can also increase the fine fuel loading. A dense canopy (left) limits understory vegetation, whereas a thinned forest increases forb, grass and shrub growth potential. When dry conditions prevail in late summer, grasses can promote a fast moving and dangerous range fire.

and eastern Montana, thinning promotes better grass growth (picture 23). This is a benefit to land managers that rely on grasses for their livestock. However, this same grass tends to dry out and go dormant after mid-summer heat and drought, creating a highly flammable fuel bed. Thus "thinning trees" needs to consider the tradeoffs of tree and canopy spacing that can inhibit a crown fire spread, versus one that can promote a grass fire, unless grazing management is part of the wildfire hazard reduction plan (picture 24).

One of the key management tactics for thinning forests for wildfire resilience is determining the spacing to use between trees, and this can be very site specific. For forest growth, tree stem spacing has been used to maximize stem growth. Rules such as "stem diameter + 8" have been used for decades where the tree diameter (4.5 ft above ground) in inches plus 8 equals the ideal spacing in "feet" between stems to optimize growth. This is a proportional rule that ensures larger trees get wider spacing versus smaller trees. Although this is a good starting point, it does not take into consideration individual tree crown width. For tree species that are resistant to surface fires, but not crown fires, the goal is to keep a wildfire out of the tree crowns. Thus tree growth rules for spacing may need to be modified with a minimum distance between crown edges of 10-30 feet. This prevents a fire that climbs into an individual tree's crown, from spreading into neighboring tree crowns and create what is known as an "active crown fire". Active crown fires create enormous heat, facilitate rapid fire spread, are difficult to contain, and kill most trees they burn through.



Picture 24. Using a combination of wide tree spacing to reduce the risk from an active crown fire, with bands or patches of denser tree spacing to reduce grass, forb, shrub and tree regeneration to reduce the risk of a range fire uses the concept of a "shaded fuel break". The size of the patch will vary based on forest type, landscape and landowner objectives. For a dry pine site (left), grass reduction is the objective. A wetter Douglas-fir site (middle) requires denser patch spacing to reduce tree regeneration, forbs and grasses, and a wet forest type (right) requires very dense forest cover to shade out shrub species.

Alternatively, more spacing between tree crowns also allows for more light to reach the forest floor, which in turn allows for more forb, grass, shrub and tree seedling growth. The observation of more sunlight, along with more air movement creates the legitimate concern that the understory of a thinned forest will dry out more quickly and be more prone to wildfire ignitions and spread. An overriding factor that this argument does not take into account is the overall water balance of the forest. Thinned forests allow more snow and rain to reach the forest floor. This rehydrates water depleted soils, that in turn keeps vegetation moisture content high and less flammable. Unless there is a severe drought, when surface vegetation can dry out and create a higher fine fuel risk. Although this may promote a surface fire, the risk of a crown fire is still averted. Fire suppression efforts are much more effective against surface fires than crown fires.

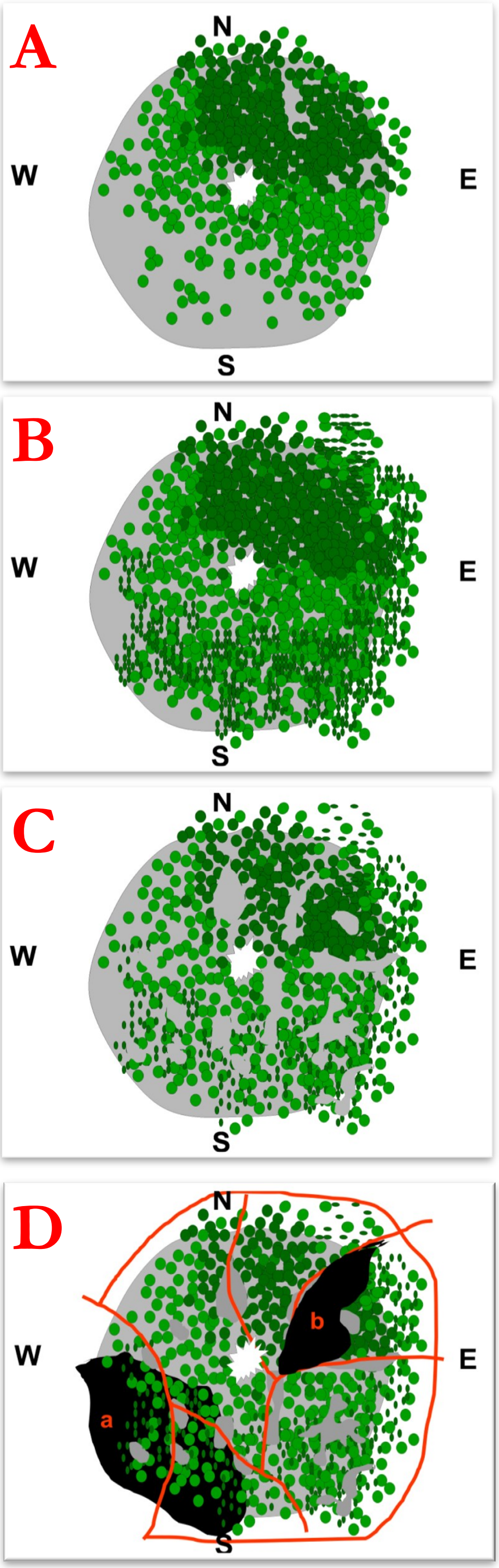
The tactics that work best for dry forest types, can be very different than what will work for wetter forest types because the natural history of wildfires has created different tree fire resilience mechanisms. Whereas dry forest types are dominated by tree species that can survive surface fires, wet forest ecosystems are dominated by tree (and forb and shrub) species that can survive crown fires, and for some species such a level of disturbance is needed to survive as a species.

Where is does this transition occur? This will vary by location, but in general where tall shrubs such as ninebark and oceanspray start to occur along with quaking aspen, western larch and lodgepole pine.

Taller shrubs are an indicator of faster and more productive tree growth due to more moisture. Wildfires in these ecosystems occur during periodic and extreme drought. Converting such forest types into more fire resilient forests, as would occur in valley bottom ponderosa pine forests is possible, but extremely difficult. Since vegetation grows quickly, fuels also accumulate quickly, requiring more frequent fuel treatments.

As experience across landscapes has shown us, managing fuels across infrequent but severe wildfire ecosystems appear to be best suited for creating fuel mosaics—or perhaps more accurately—snowpack mosaics (picture 25). Where snow accumulates deeper and lasts longer into the growing season, vegetation stays hydrated, and nonflammable longer. If such mosaics are strategically placed where fire suppression teams can create effective fire breaks, containment of fires is more effective and safer for fire fighters. Such strategies are already used in wildfire containment, though often fuel breaks need to be created ahead of an advancing fire. Most fire suppression teams look for natural fuels breaks to use when developing a containment plan (picture 26).

There is no absolute certainty with regard to fuels management effectiveness in the event of a wildfire. A 40 mph wind gust, a steep slope or topographic canyon that creates a “fire chimney” will overwhelm the best fuels treatment. Appropriate fuels treatments in the appropriate place can, however, greatly increase the probability that more of your forest will survive a wildfire event. When coupled with home safety zone treatments in the wildland –urban-interface, the effects of wildfires can be less traumatic and damaging to human infrastructure. This article is intended for forests of the Inland Northwestern United States. Other regions, such as southern Oregon and California have different understory shrub species that are highly flammable and like our lodgepole pine, promote stand replacing fires as a survival strategy. Forest manipulations there may have entirely different impacts than across the Inland NW. **All forest management is regional and site specific!**



Picture 25. Aerial view of a hypothetical mountain with wetter forests on North and East slopes and drier forest types on South and West slopes (A). Over time and wetter climatic cycles these forests grow dense with ample tree regeneration (B). To implement greater fire resilience and resistance, thinning on S and W slopes with some patch creation, and a greater reliance on patch creation with some thinning on N and E slopes is strategically conducted. This allows for keeping fires under the trees on Sand W slopes, and containing crown fires on N and E slopes.

Picture 26. The reality of wildfire burning into a mosaic of treatments that allowed for effective wildfire management.

F.H. Stoltze Land & Lumber Co. Use of Fire on the Landscape

By: Matthew Bishop

F.H. Stoltze's use of fire throughout the years has been fairly minimal by most standards. Our main use of fire is for slash hazard reduction is in the form of burning slash piles created from timber harvests. We do not use any broadcast burning due to the liability and risks involved with a large-scale burning operation.

Size comparison of excavator pile and landing pile (left side of photo). Photo curtesy of Matthew Bishop)

Our slash piles consist of material created from the harvest of timber. The majority of the piles are made of non-merchantable tree tops, branches, and small chunks of wood. Slash piles can range in size from about 6ft in diameter to 50+ ft in diameter. Smaller jackpot slash piles are normally created by hand or with excavators out in the woods. These smaller piles accomplish multiple objectives by reducing slash loads and providing areas for natural regeneration once burned by torching off the duff and exposing mineral soil. Larger piles are usually main landing piles and burn at a higher intensity than hand or excavator piles; these piles often times require more work after the initial burn which can include grass seeding, re-piling of unconsumed material, or even stirring to help heal the soil and speed up site recovery.

At Stoltze we like to let slash piles sit for at least three months to a year to allow for the piles to "cure." Curing allows for easy ignition of the slash pile as well as less residual smoke from the pile due to a lower moisture content and better consumption of fuel.

We try to conduct all of our slash pile burning in the Fall. Fall burning ensures that there is a full winters worth of moisture that enters into the burned area to make sure there is no residual heat and the pile is completely out.

Here in NW Montana, there is also a spring burning season in which some landowners choose to burn their slash piles. Generally, if done correctly and at the right time there are no issues. One issue to be wary about with spring burning is holdover or residual heat, especially with a larger slash pile. Larger slash piles generate quite a bit of heat that can linger beneath the soil surface and in root systems of nearby vegetation. Under the right conditions, this residual heat can pop back up later in the summer causing issues if not caught quickly. On rare occasions larger slash piles can hold heat deep in the soil through winter and begin to smoke in the spring. This situation is usually referred to as a holdover and in most cases can be handled quickly with the use of an excavator, water truck, or other small machinery. The excavator can stir up the ash pile and bring the hot ash to the surface while the water truck quenches the embers.

Over the past few years there have been a few alternatives to fire that have been used to help with disposing of slash piles, especially the larger piles. One tool that has been a big help with mitigating the risks associated with slash pile burning is a grinder (ours is a Rotochopper). These are large scale horizontal grinders that can handle the large volume of slash in a landing pile in a relatively short amount of time. Grinding is not as cost effective as burning slash piles, but it greatly reduces your fire risk, allows more flexibility with slash disposal, eliminates smoke, and reduced the impact of burning on the landscape. It's possible for grinding to be done for a landowner at little or no cost depending on the job and location. However, there are some limitations on where grinding can take place.

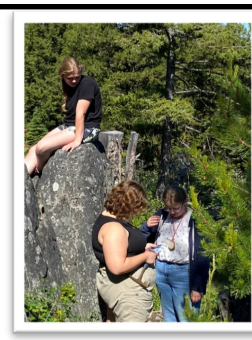
The biomass (wood chips) that is produced from a grinder is hauled using a chip van which has limited off-road capabilities and needs a large turn around area. The grinder itself also needs a relatively flat area for the machine to sit on during operations. In addition, landing piles need to be placed somewhat close to roads to facilitate easy grinding. If you're planning a harvest and intend on grinding piles instead of burning, your Forester or Logger can easily modify their landing to accommodate both the logging and grinding process.

At Stoltze, we generally grind around 120 tons of in woods logging slash/day on various ownerships to supplement our Cogeneration Facility. Our Cogen burns about 190 tons of biomass and mill residuals every day to create super-heated steam that we use dually to dry lumber and spin turbines which creates enough electricity to power 2500 homes/day and releases water vapor instead of smoke!

F.H. Stoltzes' B66 Rotochopper and chip van. (Photo curtesy of Matthew Bishop)

Other tools for managing slash instead of fire consist of mulching heads that can be mounted on skid steerers or excavators, as well as time. What I mean when I say time is that some small slash piles can be left with no treatment to naturally decompose back into the soil. This provides for habitat for small animals such as rabbits in the short term while allowing for a slow release of nutrients back into the soil in the long term. Just make sure you are still meeting state slash standards with the amount of slash left un-treated.

Overall, here at Stoltze our use of fire is minimal due to risks involved but fire does play an important role in managing our slash in a cost-effective way. The burning of slash piles is a relatively easy and efficient way to reduce your slash hazard and to meet MT state slash requirements after a timber harvest. While burning of slash is a cost effective and efficient way of reducing your slash hazard it may not always be the only choice or most comfortable choice. Consider pile location (close to homes or other structures), pile size, time of year, conditions, and other options when decide how to remove the slash on your property. Just make sure to check state and county regulations before burning as well as weather forecasts and moisture conditions and if needed consider some of the alternative disposal methods discussed in this article.



Montana Natural Resources Youth Camp

July 16-21, 2023

Lubrecht Experimental Forest, Greenough

Camp Fee: $300.00 (6-days)

We invite all youth ages 14-18 to spend one week in the rustic setting of Lubrecht Experimental Forest east of Missoula and learn about Montana's natural resources. The accommodations are comfortable, the food is great, and the instruction and friendships are the best.

Campers learn about forests, streams, soils, geology, range land, wildlife, and recreation, and spend a half-day rafting the Alberton Gorge of the Clark Fork River. In between the field sessions, taught largely by professionals that volunteer from a variety of natural resources based agencies and industries, specialty evening programs, guest speakers, hands-on learning-through-discovery, and campfires provide for a lasting summer camp experience.

Scholarships and applications are available at https://www.montana.edu/extension/forestry/mnryc/index.html or Contract Christina Oppegard, Camp Director at 406-243-2773 or christina.oppegard@mso.umt.edu.

MONTANA STATE UNIVERSITY
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Forestry Program

MSU Extension Forestry

Online Publications

Forestry Factsheets

https://www.montana.edu/extension/forestry/publications/index.html

- Shaping and Pruning Your Ornamental Trees
- Hand pruning Container and Bare-root Tree Seedlings
- Wildfire Severity Photo-guide for Assessing Damage and Aiding Recovery of Trees and Forests across the Northern Rockies
- Do Burn Piles Need Rehabilitation?
- Burning Slash Piles; What's the Best Way to go About it?
- The Difference between planning and doing Forest Management
- Forestland Grazing: Understory Forage Management
- Managing your Timber Resource: Which Trees to cut, which Trees to leave?
- Using Alternative Slash Management Systems in Western Montana
- After the Storm: Caring for Your Trees
- Developing a Wildfire Hazard Reduction Plan for Your Property
- Alternative Forest Management
- Managing Bark Beetles
- Forest Soil - How does it function?
- What is a Tree - Biology and Growth
- Pruning Trees
- Trees and Shelterbelts
- Photo Guide for Assessing Wildfire Severity
- A 13 year case study of the impacts of the Fridley Fire across land ownerships and management responses in the Northern Rockies

Other Publications

- 2018 MSU Extension Southern Bitterroot Wildfire Recovery Tour- Sula State Forest
- Climatic Influences on Forests across Montana – Strategies for Conservation and Functional Retention
- Management Practices For Forest Health And Catastrophic Wildfire Resistance
- Growing Trees on Montana's Prairie
- Call before you cut - A Resource Guide to Forest Management
- Biodiversity Guide for Montana Forest and Woodlot Owners
- Timber Sale Planning and Forest Products Marketing
- Guide to Forest Aesthetics in Montana
- Identifying Montana's Forest Invasive Weeds
- Watersheds in Montana
- E3A: Exploring Energy Efficiency & Alternatives

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Online Videos

Instructional Videos

https://www.montana.edu/extension/forestry/publications/index.html

Restoration and Utilization

- Bioenergy in Northwest Montana, Bioenergy Day 2017
- Restoration Renaissance: A new Paradigm in John Day, OR. When the town's remaining lumber mill threatened to close, environmentalists and local leaders stepped in to save it.
- From the Ground up: A Story of Stewardship in Lake County, OR. A remote rural community becomes a national leader in collaboration; redefining the idea of stewardship.
- Living with Fire: Black is the new Green in Trinity County, CA. Local leaders and forest managers are discovering how living with fire keeps communities safe and creates new local businesses.
- Forest biomass diversion in the Sierra Nevada: Energy, economics and emissions; highlighting the benefits and challenges associated with managing forest biomass and transforming it into a source for renewable energy.

Forest Stewardship Program

- The Big Picture (public land survey system, topographic maps and photos)
- Northern Rockies Forest Ecology and management (5-part series)

Extension Forestry Video Resources

- Rocky Mountain Forest Processes
- YouTube Channel New Channel!

Prescribed Pile Burning

- Prescribed Pile Burning for Landowners Webinar (November 19, 2020)

Forest Management Videos

- Northern Rockies Forest Ecology and Management (5-part series)
- Timber Harvesting for Private Landowners (produced by F.H. Stoltze Land and Lumber with other sponsors)

Chainsaw Safety Awareness Videos

- Chainsaw Safety Awareness (2-part series)
- How to Fell or Cut Down a Tree Using a Chainsaw


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Sun Mountain Lumber

DEER LODGE

Sun Mountain Logging

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2023 Calendar of Workshops and Events

Workshop/Events	Date	Location	Information
Forest Stewardship for Loggers	April 18-20	Kalispell	https://www.logging.org/
Forest Stewardship	May 4-5 & 12	Frenchtown	Full, Waitlist Open
Forest Stewardship	June 8-9 & 16	Bozeman	Full, Waitlist Open
Forest Stewardship	July 13-14 & 21	Kalispell	Full, Waitlist Open
Forest Stewardship	August 3-4 & 11	Trout Creek	A Few Spots Remaining
Forest Stewardship	September 7-8 & 15	Corvallis	Full, Waitlist Open
Forestry Mini-College	March 4, 2023 *Save the Date: Saturday, March 9th, 2024*	Missoula	University of Montana
MT Natural Resource Youth Camp	July 16-21, 2023 *Save the Date: July 14-19, 2024*	Lubrecht Experimental Forest	Deadline: July 7, 2023
Germany Forest, Culture and History Study Tour	May 18-June 3, 2023	Bavaria and Thuringen, Germany	Registration Closed
Project Learning Tree	See online calendar for event schedule		

Other Workshops and Events

Annual Landowner Conference	May 5, 2023	Helena	https://www.foreststewardshipfoundation.org/events
Ties to the Land Workshop	May 6, 2023	Helena	
Ties to the Land Workshop	May 13, 2023	Kalispell	

2024 Forest Stewardship Workshop Interest Survey

Interested in a Forest Stewardship workshop? Help us plan for 2024 and into the future.

Complete a quick survey of locations you might like to attend a workshop to help us determine 2024 and future workshop locations. Those on the survey will have an opportunity for early registration in 2024.

Registration information: https://www.montana.edu/extension/forestry/calendar/index.html

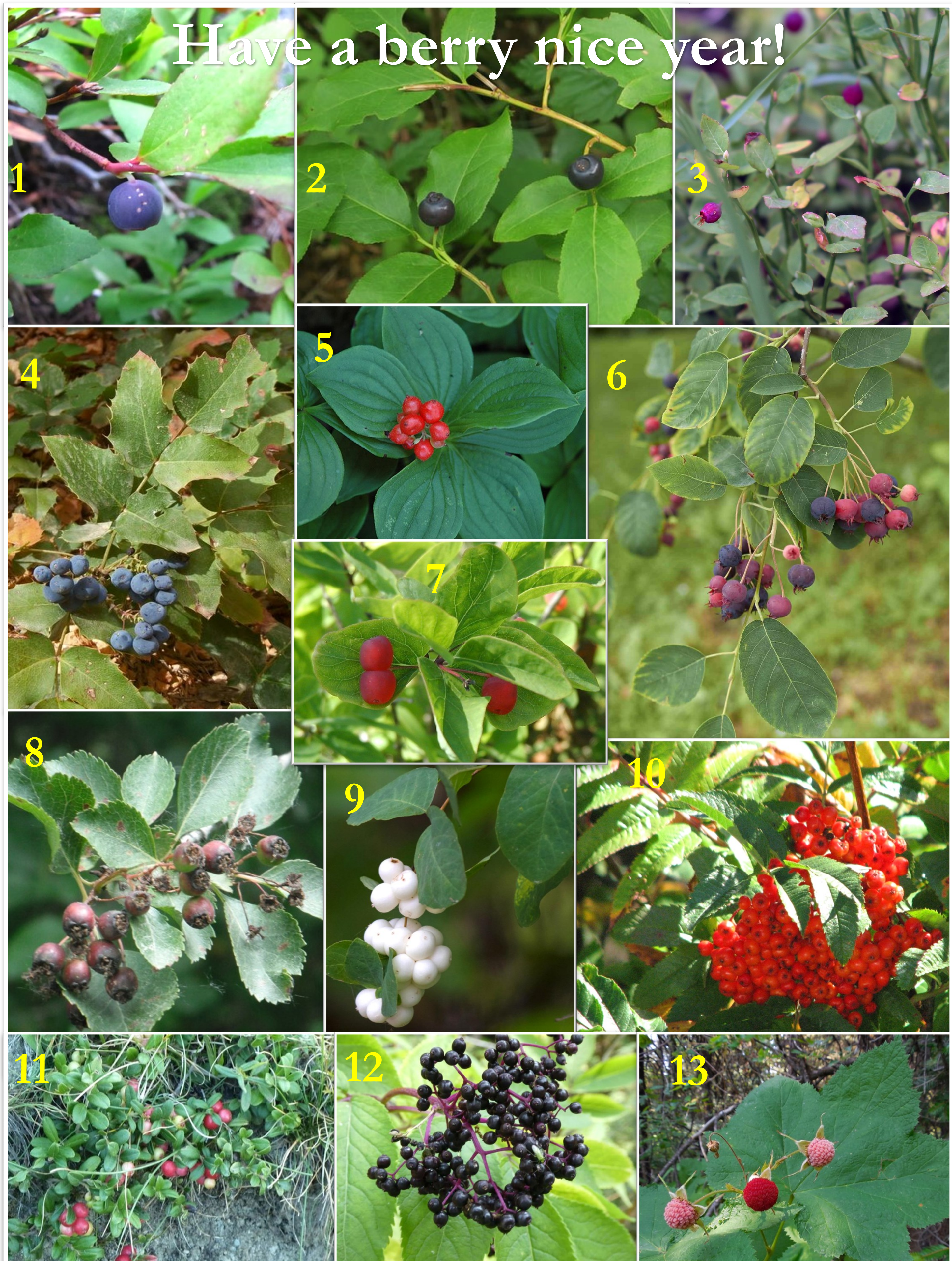
We would like your Feedback

If you like/dislike certain things about this newsletter or have ideas for future topics.
Please send us your thoughts!

MSU Extension Forestry • W.A. Franke College of Forestry and Conservation
32 Campus Drive • Missoula, MT 59812-0606 Email: extensionforestry@montana.edu

Berry Guide - most shrubs and forbs respond well after moderate wildfire effects. Fires recycle a lot of macronutrients (nitrogen, phosphorus, potassium, sulfur and calcium) as well as mineral micronutrients. Among berry pickers it is well known that certain highly desirable edibles such as huckleberries have bumper crops about 8 years after a wildfire. Always be certain of your identification, some berries are toxic!

1. **Globe huckleberry** - Vaccinium globulare. The tallest of the Montana huckleberries it is a prolific berry producer and also grows the largest berries within this family. It grows in wetter forests that support grand fir, western hemlock, western red cedar and the lower reaches of subalpine fir.
2. **Big huckleberry** - Vaccinium membranaceum. Very similar habitat to globe huckleberry. Leaves tend to be thinner and more delicate and berries similar or smaller. On drier sites (mainly Douglas-fir) it can look similar to dwarf huckleberry (vaccinium caespitosum) that is a notoriously poor berry producer.
3. **Grouse whortleberry** - Vaccinium scoparium. Found mainly in subalpine sites this is a very low growing shrub that can form a low carpet of fine green twigs. It produces very small berries that can be among the sweetest and most flavorful of the huckleberries though frustrating to pick in any quantity.
4. **Oregon grape** - Berberis repens. A common small evergreen in Douglas-fir and grand fir forests with leaves that resemble holly. Berries are edible but very sour—considered decent when consumed in jam. Roots contain alkaloids that have many medicinal and antiseptic properties. Considered poisonous in large quantities.
5. **Bunchberry dogwood** - Cornus canadensis. Low herbaceous stature most noticed for starshaped white flowers early summer. Red berries are edible but not very flavorful. Found across many forest types.
6. **Service berry** - Amalanchier alnifolia. One of the most important food source for native people. Berries can be eaten raw, dried, jellied or mashed into cakes. Lewis and Clark reported some tribes had 15 lb compacted cakes of these berries as a stored food source. Berries vary from year to year from starchy to very sweet. Hard wood stems were used for multiple purposes including tepee pegs and shovel handles. Grows in sunny spots across most forest types and is actively sought after by most wildlife.
7. **Utah honeysuckle** - Lonicera utahensis. Low to medium shrub on moderately dry to wetter forested sites. Berries are fused together and are very juicy and considered edible. Caution—these might be confused with bracted honeysuckle that has poisonous berries—though the taste of the latter is considered so disgusting that few would want to eat it.
8. **Black hawthorn** - Crataegus douglasii. Found mainly along waterways this shrub can get 15 feet tall and branches are covered with inch long spines covered in a waxy irritant. It has been reported that scratches to the eye can result in blindness. Prolific berry producer—though berries are very dry and fairly bland. None the less berries are very sought after by birds and bears.
9. **Common snowberry** - Symphoricarpus albus. Berries are considered poisonous as are the leaves, stem and roots. Grouse and bears may eat them though they appear to have laxative properties to the latter. One of the most common shrubs across many forests and serious unwanted "increasers" in livestock pastures. They resprout prolifically after wildfires.
10. **Mountain ash** - Sorbus scopulina. Although mountain ash is a common ornamental, it is found across a wide range of forest types but prefers the wetter and cooler slopes of mid elevation and subalpine forests. It grows into a small tree size and can easily be found in the late summer and fall by the clusters of bright orange berries it carries. Berries can range from bitter to extremely sour and not considered the best to eat though they are reported to be very high in vitamin C. Inner bark of branches was used medicinally for sore chests and headaches as an infused tea or steam. Also used as a gargle for sore throats.
11. **Bear berry or kinnikinic** - Arctostaphylos uvi-ursi. A low creeping vine like woody shrub with evergreen leaves commonly found on ponderosa pine and Douglas-fir forests. Berries tend to be dry and tasteless. Leaves were thought to help with urinary tract infections, and where also dried and smoked in pipes.
12. **Elderberry** - Sambucus spp.. Found on moist sites across many forest types the raw berries are considered mildly toxic. When cooked they may excellent jams, syrups and drinks including wines.
13. **Thimbleberry** - Rubus parviflorus. Common along warm and wet forested areas. Berries can be tart and are best eaten raw. Leaves can also be eaten though are best known as toilet paper substitutes.


Have a berry nice year!
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