

The Forest Steward's Journal

Summer 2022

Volume 36

Journal of the Forest Stewardship Foundation

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

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



From the Chair

Are we about back to normal? Well at least we were once again able to meet face to face in Helena for our 12th annual Forest Landowner Conference. We were able to co-sponsor the event with the Society of American Foresters, which made for a great program, which our board member Conny Buegge so well explains in her recapture of the event. This year's event was recorded and all presentations may be viewed on our Foundation's website, ForestStewardshipFoundation.org. None of this would have been possible without the generous contributions from our many supporters.

On the Saturday following the conference we were able to sponsor a free Insect & Disease workshop for forest landowners, foresters and interested public. There were nearly 40 attendees for this very educational presentation that was presented by Amy Gannon and Jill Hautaniemi from the DNRC. We hope to be able to conduct more of these types of workshops in the future. We would like to hear from our readers of any particular forest related subjects that you might be interested in for future workshops and Journal articles.

Our summer journal articles include the first of a two-part series on biochar by Dave Atkins, Jill Hautaniemi explains that those brown needles on your trees might not mean the tree is dying and Judy McKelvey gives us her suggestions on noxious weed control.

If you are interested in what other forest landowners are doing on their property you might want to attend the annual state Tree Farm meeting in Potomac on September 24th. There are three stops planned in the Blackfoot River area including one at Dave Atkins's where you will learn about producing biochar, prescribed burning and other forest management activities. Contact Ardrene Sarracino at Montanatreefarmsystem@gmail.com for more information. This is much more than just a tour as you will have a chance to meet and visit with other like-minded forest owners.

Ed Levert, Chair



2022 Forest Landowner Conference

By Conny Buegge

At this year's Landowner Conference all 130 people who attended were afforded the opportunity to make or rekindle connections with other individuals who were similarly interested in the future of our forests. The attendees were encouraged to analyze overstory and understory conditions, soil conditions, fuels and insects so that they are aware of what is happening in the forest. It really is about caring for our forests to preserve them and help them flourish. Each person that I talked to had positive things to say about the conference which began with Governor Gianforte saying how much he valued forest stewardship and his desire to "put boots on the ground" with a management plan spanning 9 million acres of land managed by the Montana Department of Natural Resources and Conservation.

This joint conference of the Montana Stewardship Foundation and Montana Chapter of Society of American Foresters brought an impressive list of experts with years of research and field experience to present a variety of topics that attendees could choose to attend. **Dr. Mark Finney** from the Fire Science Lab in Missoula was the keynote speaker. He offered us a detailed history of fires in Montana, explaining different causes and severity through the decades. He left us with this challenge: "Fires will come. When do we want it and what kind do we want it to be?" **Dr. Andrew Larson**, professor of Ecology, proposed that we need to look at what has been happening with fires to inform us about what we will need to be doing for the future. He said that we need to be clear about our priorities and free of organizational barriers so that we can get to work "before the smoke clears". **Matt Arno** of DNRC talked about Montana's Forest Action Plan that will guide management on the State lands. **Dr. Peter Kolb** from MSU Extension Forestry addressed effective post-fire rehabilitation, showing slides that demonstrated the value of promptly implementing a plan to thwart erosion and influx of noxious weeds. **Julie Berkey** of DNRC introduced us to information about prescribed burns and how they improve resiliency to wildfires and leave better grazing for wildlife. **Lauren Snobl**, a wildlife researcher at the College of Forestry and Conservation, explained that fires reduce hiding and thermal cover but also enrich the soils with nitrogen that entice elk into areas to feast on healthy plants such as fireweed, which is one of their favorites. **Amy Gannon** of DNRC talked about how wildfires impact forest insects and diseases. Videos of each of the presentations are available on the Montana Forest Stewardship Foundation website foreststewardshipfoundation.org, click on Posts and Videos.

The Stewardship Foundation also sponsored a workshop on Saturday presented by **Amy Gannon** and **Jill Hautaniemi** of DNRC that went into detail about the important forest insects and diseases that affect our forests and actions that can be taken to reduce impacts.

It was encouraging to see future foresters attend the conference. Montana Forest Stewardship Foundation helped donate funds to cover expenses so that 10 forestry students from the University of Montana could participate in the conference. Lexi Smith, chair of the Student Society of American Foresters Chapter, has her eyes set on ecological restoration. Kolson Verkler plans to study the effects of fire on forests, and perhaps study abroad in Australia, Chile or Argentina. Jared Schmidt and his wife Jamie were preparing to take 8 of Jamie's middle school students into the forest that weekend to study water quality, wildfire, elk and more.

In a book I read several years back, the author kept repeating "You don't know what you don't know." With the knowledge and facts we gleaned from the conference, we will be asking better questions and we know some of the people that can provide the answers. Once we know the right things to do to keep or make our forests healthy, the follow-through is up to us.

As a landowner, I came away from attending my first Landowner Conference with an abundance of information and a good number of contacts for helpful resources. My husband and I were so glad that we made the trip to Helena. Like most landowners that we talked to, we were impressed with the knowledge and experience of the speakers. I understand that this conference might well have been one of the best ever. Especially, free from social distancing restrictions, many attendees were delighted just to be able to meet in person and see old friends and colleagues. We are already looking forward to the next one!

Conny and her husband Kip are urban transplants that happily moved to their forested property in northwest Montana fourteen years ago. They are serious about maintaining the beauty of their property and realize that they need to actively manage more than just their garden. This means monitoring conditions, anticipating changes, and fighting noxious weeds and insidious diseases in the trees so that their little portion of the forest remains a place where both trees and wildlife can thrive, not just now but for future generations.

Biochar - What, Why and How?

By Dave Atkins

This is a two part article. The second part will cover how a local forest owner can produce char and improve the soil on their land with relatively minor changes in their practices. It will show examples and lessons learned to date.

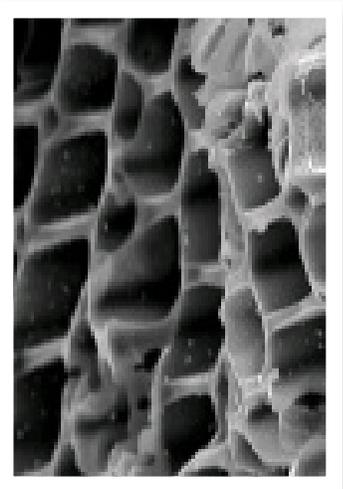
So what is biochar? It is the same thing you get in the bag of lump charcoal at your local hardware store for your BBQ. The difference is what you do with it. There are a variety of different ways to produce it, some simple, low tech and relatively cheap, others are the opposite. In the US and Internationally there is growing interest and you can find a lot of YouTube videos on it. But it is the addition of the char to enhance the soil productivity that gives it the “biochar” name.



Terra Preta is a Portuguese term for black earth. Archaeologists working in the tropics discovered this black earth full of char that is associated with ancient human settlements. Typical tropical soils are very pale colored because there is so much rain that the nutrients and carbon are leached from the soil.

Char is produced by burning wood under limited oxygen conditions. Wood is about 50% carbon, with the rest mostly hydrogen and oxygen with a very small amount of minerals. The low tech charring or pyrolysis of the wood drives off much of the oxygen and hydrogen and some of the carbon as a wide

variety of compounds that make up smoke and if you manage the process well you combust most of the smoke to be water and carbon dioxide in a nice clean burn. The high tech option keeps virtually all of the carbon and removes virtually all of the oxygen and hydrogen. In either case the remaining char has an amazing amount of tiny pore space in it (shown magnified at right) which is great for holding nutrients with electrical charges and also for holding water. The char also provides a great home for microbes and fungi in your soil that adds to the vitality and productivity of the soil.



The char doesn't have much in the way of nutrients when the pyrolysis process is finished, but this makes it useful in barns, chicken hutches, pig pens, etc. The char adsorbs the nutrients thus reducing the potential pollution of ground or surface water if it is nearby these concentrations of animals. Another way to charge it with nutrients is to mix it with compost.

One of the most valuable attributes of the carbon in the char is its longevity. When it is reduced in the pyrolysis process the carbon becomes very resistant to decay processes. Therefore, the benefits can be centuries to over a millenia long in duration. The longevity has become attractive to people that are figuring out how to store captured carbon pulled out of the atmosphere. Protocols are being developed to be able to sell the carbon storage value of biochar. As discussed in the last issue of the Journal, the American Forest Foundation in partnership with The Nature Conservancy have developed the Family Forest Carbon Program. It was piloted in Pennsylvania and this year is being expanded to States nearby.

Another use of the biochar has been demonstrated in mine site rehabilitation. Many of these sites have lost most of the fine soil sized particles and thus have little or no water and nutrient holding capacity and in some cases that is combined with acid conditions. The char can help with all three of these problems, since char from conifers is generally somewhat basic which can help reduce the acidity, while holding onto heavy metals.

In Australia they have found half to one percent char in dairy cow feed increases their milk production and reduces their burp (methane) production.

All of these uses have been researched over the past decade or so, however larger scale applications that can result in cost effective production and application are still in development. There are efforts going on world-wide and a number of countries are well ahead of the USA. A company in Berlin, Germany is making a rigid bioplastic out of biochar.

The Ring-of-fire kiln is a simple, relatively low-cost way of burning your slash in the woods to produce some char:



While Phoenix Energy is a combined heat and power plant in the 2-5 megawatt range and the slash has to be hauled to the location. A few of these types of energy production systems have been built in California, especially near orchards where trees are pruned regularly, have to be replaced and the material can't be burned in the open because of air pollution concerns.

In the next issue the second part of the series will explore more closely the efforts in Montana to produce and use biochar from slash at a small landowner scale to an agency or large landowner scale.

Dave Atkins is a forester and forest ecologist and family forest owner with his wife in the lower Blackfoot river drainage. If you want to explore the topic in more depth, check out: treesource.org for a three part series on forests and carbon.

Forest Health Blurbs

A multi-species group of trees in poor health is often an indication of an abiotic stressor such as severe weather events, early or late frosts, nutrient deficiencies, herbicides or road salt.

Foliar diseases usually depend on cold, wet springs to proliferate. To mitigate foliar pathogens, try to keep trees spaced far enough apart that the foliage gets air flow and dries after rains.

Many fungal rust pathogens require two different species of host plant to complete their life cycle. For example, white pine blister rust, an aggressive rust fungus that kills 5-needle pines, cannot complete its life cycle without its alternate host, currants/gooseberries. However, reduction and removal of currants and gooseberry is very labor intensive and frequently unsuccessful due to its ability to regrow rapidly from seed. Planting genetically resistant trees and pruning infected branches are more effective ways to prevent and manage the disease.

Did you know dwarf mistletoes can shoot seeds distances of up to 30 to 40 ft? When trying to reduce spread of dwarf mistletoe in a stand, try to create a buffer of at least 30 feet, leaving only non-host species.

Are my pine needles diseased?

By Jill Hautaniemi, Montana DNRC Forest Pathologist

Many people fear for a tree's health when the needles are not a luscious shade of green and this fear is not unfounded as needles discolor when the tissue dies and photosynthetic pigments in the leaf break down. Not all needle death is a cause for concern, however. In the autumn even evergreen trees will cast old needles that are not getting enough sun and are no longer useful to the tree's survival. This will be noticeable as a distinct block of needles, the ones closest to the trunk, uniformly turning a straw or red color and falling off. This most notably and regularly happens in pine trees in September and October.

So how can we know when color change in pines is caused by a needle disease? There are some patterns of discoloration characteristic of needle diseases to look for. For example, needle diseases tend to proliferate more in the lower crown of the tree where the foliage is thicker and doesn't dry out as often. Some needle diseases cause old dead needles to be retained for several growing seasons, leaving distinct limp, grey needles hanging in the crown (*Lophodermium nitens* on western white pine). Furthermore, the disease may have a specific pattern of discoloration on the needle such as needles with red tips and green bases (*Elytroderma* needle cast), or red bands on green needles (*Lophodermella concolor* on lodgepole pine) or red bands on tan needles (*Mycosphaerella pini*). The crown may be thin, sometimes appearing to thin from the inside of the crown outwards and older foliage may be predominantly impacted (*Lophodermium* species). Depending on the time of year, fruiting bodies of the fungus may be visible on the needles, usually as black dots or slits in the needle. These patterns will differ from branch flagging which is when the foliage on an entire branch turns red and dies, a pattern seen with branch diseases such as *Diplodia* shoot blight and western gall rust. Damage caused by a needle disease is more diffuse than flagging and not usually confined to one branch.

Trees can tolerate some defoliation. An adult tree that is defoliated once will suffer some growth loss but live. Young understory trees, however, are more sensitive to needle loss and can be outright killed by a needle disease. Native species of needle diseases and defoliating insects are important agents of disturbance on the landscape. Not every understory tree can grow into the canopy and the forest relies on forms of natural disturbance such as fire, insects, and disease to thin the understory and keep overall competition for water and nutrients down. If a stand of adult trees is being overcome with needle disease, it may be too damp and there might not be enough air circulation for the foliage to dry between rains. Greater spacing between trees will help the foliage dry naturally and create an environment that is less conducive to these pathogens. Some individual trees are more genetically susceptible to needle diseases and if the problem persists, removal of the most heavily affected individuals may be warranted.

The causes of needle discoloration on pines are many and can be difficult to tease apart, even for experts. Needle discoloration can be a generic symptom of poor health and is not always caused by a needle disease. Root diseases, canker diseases, defoliating insects, and bark beetles can cause a pine to lose its green color. It's important to remember to look at all parts of the tree such as the trunk and the branches, as well as the needles. Although alarming, these needle disease fungi are a natural component of our forests and do not regularly require treatment.



A western white pine with *Lophodermium nitens*.



A ponderosa pine with senescing needles.

Weed Control on the Tree Farm

By Judy McKelvey

My husband Pat and I have lived in the North Fork Travis Creek area, located south of Helena, MT, for most of 50 years. Our homestead property, where we built our home and raised our family, came with few noxious weeds. Thistles of various kinds were evident in some spots and were controlled mechanically. After our first small logging project, more weeds appeared on the landscape. Within a few years, as other Travis Creek area residents became aware of the growing noxious weed problem, we formed a weed management group in the neighborhood. We worked with the Forest Service and other already trained group members to become educated as to the proper application of herbicides for weed control and which products were most effective. With the Forest Service and Jefferson County, our weed management group set up a yearly weed control day in June or early July. Before spray day, community members would walk areas of concern and identify them to be treated on spray day. In the early years, the group applied for and received grant money for specific projects.

In 2014, Pat and I purchased additional property along Buffalo Creek. It was a property with potential but had a poorly managed existing logging project with multiple trees left lying on the landscape and numerous noxious weeds rampantly growing everywhere. Initially, I treated areas within sight of the more traveled logging trails and two-track roads leading to the old homestead cabin on the property. Each year I walked additional areas expanding my knowledge of the physical attributes of the property and, of course, the problem weed areas. The areas initially treated show great improvement as the seed source was reduced. The last two years I have been able to apply a 2nd treatment in the Fall, further reducing seed production in some of the more infested areas. Animal trails will always need treatment because multiple seed heads are carried in animal fur. For example, elk bedding sites often show three or more types of noxious species germinating within the same bed.

Spotted knapweed, hoary alyssum, cheat grass, hounds' tongue, Canada and musk thistle, as well as nuisance species not necessarily identified as noxious were present. Montana's Noxious Weeds is a handy reference publication that includes identification information and control recommendations for each noxious weed. The booklet is available from your County Weed District. A downloadable PDF of this publication is available online at: <http://msuextension.org/publications/AgandNaturalResources/EBO159.pdf>

In hindsight, we would have sprayed infected areas prior to our mechanical logging project in hopes of reducing the seed spread, our weed control labor, and material costs. If a project is in your future, pre-project spraying is recommended for two years prior to bringing equipment into your area.

Spraying has become a Spring through Fall activity for me. Our hopes include introducing biological weed control for some species. A useful guide is Field Guide for the Biological Control of Weeds in the Northwest. A downloadable PDF of this publication is available online at: <https://www.ibiocontrol.org/westernweeds.pdf> [ibiocontrol.org]

Biological weed control is expensive but hopefully longer lasting and easier on the environment than other methods. At times, especially if there is moisture in the soil, mechanical treatments are useful additions to my integrated management tool box. Hoary alyssum is often difficult to kill with herbicide unless sprayed at the perfect time. It appears to die but returns. I have found that pulling in areas where the root comes up with the foliage is effective. Hoary alyssum often has multiple stiff stems and if a person can pull its handful of stems all at once when the soil is moist, it can be pulled along with its long root intact.

Earlier in 2021, I determined that I should become a certified Pesticide Applicator through the *Lewis and Clark County* Extension Service so I could use restricted herbicides. Not having studied and taken a test in numerous years, I was somewhat over whelmed by the idea. The Extension Agent administered the test with no time limit and allowing an open book. I passed! At this point, I added Tordon to the chemicals in our arsenal in order to combat leafy spurge.

In Spring and summer, weather permitting, I spend several days a week, up to 4 hours per day, carrying my one-gallon sprayer. I have come to anticipate the long walks, enjoying the scenery, encouraged by the shrinking diameters of weedy areas, and counting my blessings living in such a beautiful landscape.

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Save the Date

Montana Natural Resources Youth Camp
Potomac, MT
July 10 - 15, 2022

Annual Tree Farm Meeting
Potomac, MT
September 24, 2022

Forest Health Blurbs

Did you know that trees in poor health will sometimes produce what are called “stress cones”? This occurs when a tree produces an abnormally large number of cones as a last-ditch effort to leave progeny behind before it dies. This can be a good indicator of tree stress and can be a sign of an underlying forest health issue such as a root disease. Stress cones can also be used to identify stressed trees for removal during management.

Even evergreen trees will sometimes shed foliage at the end of the year. If you ever see the needles closest to the stem turning yellow in late summer or fall, these are the tree’s oldest needles that are being shed. Although this can look very alarming, this is a normal phenomenon and is not damaging to the tree in any way.

Many root diseases spread within a stand from tree to tree where their roots touch underground. This is what causes the distinctive circles of dead and dying trees which are often visible in satellite imagery and aerial photos.

Not only do Dwarf-mistletoe infections cause trees to produce large bushy growths called witches’ brooms, but they also can slow growth in a stand. For example, Douglas-fir dwarf mistletoe infections can reduce basal area growth in a stand by as much as 14 to 69 percent depending on the severity of the infection and larch dwarf mistletoe can cause tree volume growth losses of as much as 50 percent.

It is not uncommon to see chewing damage or tooth marks around cankers caused by rust fungi. Rodents such as porcupine, mice, and squirrels will gnaw on the cankers because of the sweet sap produced by the tree at the canker site. This can cause misdiagnosis of canker diseases as animal injury and make distinguishing between canker diseases difficult. In these situations, context clues such as the tree species and the presence of canker wounds in neighboring trees will help with a diagnosis.



You can provide additional support by designating the Forest Stewardship Foundation as your charity of choice on AmazonSmile.

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The Forest Steward's Journal is a publication of the Forest Stewardship Foundation. Comments, articles and letters to the editor are welcome.

Please Join the Forest Stewardship Foundation

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

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

Thanks for your help.

Ed Levert, Chair

