

The Forest Steward's Journal

Winter 2023

Volume 39

Journal of the Forest Stewardship Foundation

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

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



From the Chair

A Happy New Years to you all. 2023 has been a good year for our Foundation and with the recent addition of several new enthusiastic board members I am encouraged that 2024 will prove to be even more exciting.

This Forest Stewards Journal edition is a mixed bag of articles that we think you will enjoy. Dave Atkins discusses the production of biochar, Zoe Leake gives us tips on producing management plans and Jill Hautaniemi tells us all about White Pocket Rot (*Tomentosus*) root disease. Besides these articles we thought you should meet some of our newer board members. Often times it is difficult to come up with interesting article so if you have a topic that you would like to submit, please let us know.

I would like to give a shout out to our retiring treasurer, Linda Leimbach, who after over 16 years is moving on. Linda has been an invaluable member of our board and has done her best to make sure we dot the i's and cross the t's. We were so fortunate to have Linda all these years and now we have a new treasurer, Ellen Hutcheson. Those of us who know Ellen, also know what an outstanding treasurer she will be. Fortunately for us Linda will remain on our board.

This is about the time of the year that we start seriously planning for the 2024 Forest Landowner Conference. We have April 19th reserved at the Colonial Delta Helena Marriott Hotel for the conference. This year's theme is "Becoming the Best Forest Steward Possible". An additional bonus this year is that we will also be hosting a ½ day workshop the next day following the conference

on techniques for managing noxious weeds and the use of herbicides and non-herbicide applications for forest management including insect infestations, thinning and site preparation.

We are pleased that our Foundation will be sponsoring a 5th forest stewardship workshop in September at Condon. MSU Forest Extension has experienced budget shortfalls for 2024 and we are most happy to provide financial help.

Do you have a forest related business that you would like to advertise? Our Forest Stewardship Foundation website lists many services, but we are setting up a "cork board", where you can simply send us your business card for posting. There is no cost for this service. We just want to offer landowners a listing of available forestry services.

Ed Levert CF, Chair

A Summary of Montana's Forest Stewardship Workshops

Data is from the 2023 Accomplishments and Participation Report, prepared by Cindy Peterson and Lexi Smith of MSU Extension Forestry

Most States use the money that they receive from the Farm Bill through the U. S. Forest Service to hire foresters to

prepare management plans for private forest landowners. Program managers in Montana decided that landowners would be more likely to understand and implement their Stewardship Plans if they were given some basic knowledge about forests and a format to develop their own plans. Montana State University Extension Forestry based at the University of Montana developed the content and format for the plans and trained advisors to help conduct the workshops and verify that the plans the landowners developed were appropriate for the conditions on their property and their landowner goals. The Stewardship Workshops started in 1991 and have been conducted annually since that time. Florida foresters attended one of the Montana workshops and since then have implemented a similar program in their State.

The owned acres are about a quarter of all the private forested lands in Montana. That is quite a testament to the effectiveness of the program. The average acreage per landowner has varied over the years. In some years, workshops were conducted for specific rural subdivisions. In those cases, there were lots of landowners with small acreages. Some of the central Montana landowners had very large acreages. Not all of the acres were verified, because the initial verification data is done soon after the Workshop is completed and landowners have not had an opportunity to inventory and plan for all of their forested acres.

Most of the workshops have been in the western part of Montana, because that is where the majority of the private

Year	#WS	Participants	Ownerships	Owned Acres	Year	#WS	Participants	Ownerships	Owned Acres
1991	5	140	88	12902	2008	5	112	69	8069
1992	9	338	214	137651	2009	4	77	52	167154
1993	10	368	226	311183	2010	6	162	107	22700
1994	10	222	141	84338	2011	5	78	52	3789
1995	10	214	136	112110	2012	5	60	46	17148
1996	10	232	148	57808	2013	5	64	37	13412
1997	8	167	105	18155	2014	4	120	77	10217
1998	5	130	90	54977	2015	4	83	56	4282
1999	6	166	110	27879	2016	4	107	81	19015
2000	6	88	65	15531	2017	4	104	63	10819
2001	5	95	72	23065	2018	5	140	91	8369
2002	5	106	73	39190	2019	5	103	68	9324
2003	5	88	58	16936	2020	4	93	58	8886
2004	5	113	70	53570	2021	5	118	79	22473
2005	5	80	50	16033	2022	5	138	91	10802
2006	6	107	71	13347	2023	5	152	92	12670
2007	5	87	47	6013	Total	190	4452	2883	1365522

*There might be some errors in the pre-2005 data

forest land is located. However, workshops have been held as far east as Lewistown and Billings. The locations rotate over the years to be as convenient as possible for landowners.

The program has modified over the years. In the early years, workshops were held as three-hour evening sessions

over a seven-week period. Recently, prework is given to the attendees and they attend the workshop on Thursday and Friday of the first week and Friday of the second week. A consistent factor has been that an interval of time is provided for the landowners to do a field inventory on at least a portion of their property.

The owners attending the 2023 workshops were queried to indicate some of the characteristics of recent workshop attendees:

Age of the Owners				Years that the Property has been Owned				
<40	40-60	>60		<5	5-9	10-19	20-30	34-75
10%	36%	54%		38%	26%	13%	11.5%	11.5%

Percentage of landowners planning to do improvements on their land in various resources:

- Forest Health 92%
- Fuel Reduction & Wildfire Resilience 91%
- Wildlife Habitat 92%
- Water Quality 30%

The original employees that designed and got the workshops started and subsequent employees and advisors that have modified the program to continue making it an attractive learning experience for landowners deserve a lot of credit. Lexi Smith has been hired as the new Stewardship coordinator. She and Cindy Peterson will work together until Cindy’s retirement in May 2024. At that time, Cindy will have been the Stewardship Coordinator for 19 years. The program looks to be in good hands to continue into the future.

In mid-1992 (after discussions with the U. S. Forest Service representative that oversees the program) the Forest Stewardship Steering Committee recognized serious concerns that funding for the workshops might not always be available. They recommended that a Foundation be established to seek alternative funding sources to sustain the program. A group of Stewardship Workshop graduates got together and established the Forest Stewardship Foundation. The original goals of the Foundation were to inform the general public and private landowners about:

- The natural science and ecology of forest lands,
- The values that are derived from forest lands, and
- The principals of sustainable forest land management.

The Forest Stewardship Foundation also continues to function to the present time. The goals have been slightly modified. Providing a source of funding for the Stewardship Workshops has always been a top priority, but hasn’t been required to sustain the base program. The FY2024 funding for the Stewardship Program is \$40,000 below historic funding levels. The Foundation has agreed to pay the costs to fund the fifth workshop in 2024. It will be located in the Condon, Montana area. Funds raised in the past have been used to put on additional workshops, road maintenance workshops, TV articles, landowner workshops, and support to other educational events.

The Importance of Forest Management Plans and How to Get Started

In forestry, as is true in every specialized avenue, we like our buzzwords. These days a very commonly used buzzword in the business is “management plan.” Management plans seem to be all the rage, especially in this age of grant money being divvied out by the fistfuls across the country. However, writing a plan can be a daunting task, especially if you are not sure where to get started or what to include. Turns out it is simple and straight forward.

So why have a forest management plan anyway? When talking to a new forester or contractor about your property, having a plan indicates to us that a landowner has put time and thought into their ownership objectives. It is an excellent space for identifying your ownership objectives for the property. Having clear and concrete objectives is arguably the most important first step when undertaking active management. For a professional to make management recommendations, they must understand what outcome they are aiming for. Your plan is also an excellent space to keep a record of previous management. Knowing what has occurred in the woods in the past can shed light on wood quality, species composition and much more. Lastly, a forest management plan is required to qualify for any type of grant funding in Montana. Opportunities like the Environmental Quality Incentive Program (EQIP) through the Natural Resource Conservation Service (NRCS) utilize the plan as a tool to fund management practices, counting on the language and objectives used to identify how and when you will receive particular funding.

Forest management plans do not have to be complicated, data laden, biologically burdened works of science chiseled into stone. Keep it simple! Start with a map of the property. Divide the timbered acres into “blocks,” differentiated by changes in timber, ground conditions, or past management, whatever makes the most sense. Go through each block and jot down what you know about the forest. For example note the size and thickness of the trees, species present, the ground conditions (steep or flat), any streams or bodies of water, roads or other access, and anything else that

seems relevant. These “relevant” things will jump out at you: something unique that feels worth mentioning. Next include any past management history that you know about, dating back as far as you know. Then, most importantly, state clearly what your ownership objectives are for this area. How you intend to reach these goals is not important, that is what the contractors and foresters are for. What is important is to know what you want to achieve. A forester can always help you edit the plan to include more detailed information about what management is needed as well as how and when to do that.

There is a wealth of resources available to private landowners to help get a plan going, or to get additional input to beef up your product. MSU Extension Forestry has developed a program that provides forestry information about forest, range, wildlife and soil and water resources and written/digital formats to prepare a Stewardship Plan. They also offer the mini-college and presentations on different topics. Montana Department of Natural Resources (DNRC) service foresters will come out to your property and take a look around with you at no cost. The DNRC website is a hotbed of information – there are endless educational materials readily available and easy to read. Industry foresters are an excellent resource to landowners. Every sawmill in Montana has foresters on staff at your disposal, with no cost for a field visit. They will come out to your property to help you identify what you have on your hands, work out your objectives, and make recommendations for management. Consulting foresters are also widely available, and some will tour the property the first time at no cost. Each of these foresters can also help you write the plan or make edits.

Montana Tree Farm and the Forest Stewardship Foundation each publish two newsletters each year. The newsletters provide articles that are of specific interest to private forest landowners. People that join Tree Farm can use the mapping program that the national organization has developed.

As we enter the cold, dark months, now is a great time to get started writing. Whip out your map and highlighter, draw some units! Get out the computer or even just a notepad, write down what you think you want! Before you know it you, like Johnny Cash, will “get it one piece at a time, and it [won’t] cost [you] a dime!”

Zoe Leake is a Resource Forester for Pyramid Mountain Lumber, Inc. in Seeley Lake Montana. She is also a board member of the Forest Stewardship Foundation and currently serves as Secretary.

Biochar Production on a Tree Farm *By Dave Atkins*

Biochar is a very beneficial product that can be easily produced on your property as part of eliminating slash that can contribute to wildfire risk mitigation. Biochar added to your forest soil, your garden or agricultural land and can increase the water and nutrient holding capacity. Yes, you say, I have heard that, but HOW do I make it?

It is pretty simple and doesn’t take any specialized equipment if you aren’t concerned with how efficient the process is. I made my first biochar from a pile of branches and shrub trimmings from around my house about 5 years ago. The pile was about 5’ tall and about 10’ in diameter and I torched it off as usual and as it burned down, I chunked in the unburned pieces around the edges.

The key step is the timing of putting the fire out. In the past I would normally have let the pile burn down to a bed of ash. If you want biochar you want to stop the process before it goes that far. Think back to your pile burning efforts, you have the initial big flame stage as the needles and fines rapidly combust and yellow and orange flames dance around wildly 10-15’ in the air. After that initial rush the fire calms down to yellow flames about 2-5’ high and this can last a while, but then it progresses to the point where there is almost no flame, but you have a bed or hot glowing coals in the center, but the coals around the edge are starting to become white with ash. That is the time to put it out. Get your hose, shovel and rake. Spray it then stir, spray and stir, repeat until dead out. Voila! You have biochar!



That first pile generated about 20 gallons of biochar that I shoveled into 5-gallon buckets mashing it up with a small sledgehammer as I shoveled into the bucket. I mixed the biochar into the planting hole for hazel nut seedlings in an orchard I was establishing. I mixed in roughly 10-15% biochar into the soil that went back into the hole. I knew the biochar didn’t have much for nutrients in it, so I put some fertilizer pellets into the hole with it. I priced biochar in a garden store and found a 2.25 quart bag of char cost \$11.99. I had produced about 40 of those bags worth \$480 from my

slash pile! Of course, it would have cost a lot less than that if I had bought it in a larger quantity.

I have progressed a long way since that first pile, after reading, watching YouTube and further experimentation on my own. I am still learning, still experimenting and talking to other people along the way. I have turned into a serious biochar Geek!

The key to producing more biochar from the same amount of slash is to change the combustion process. In fact, the best recovery is to cook the wood in a retort without oxygen. As the wood is heated up to ~800-1000 degrees F it decomposes. Wood is made of carbon, hydrogen and oxygen compounds and when it is heated without access to air the chemical bonds are broken down and the hydrogen and oxygen are driven off as a variety of compounds which are combustible. In fact, that is what you see as the flames of your campfire or slash pile.



I looked into purchasing the retort pictured. It is made in the U.K. but it was going to cost close to \$25,000 and I couldn't justify that level of investment for the amount of slash I needed to dispose of.

I found that a simple "flame cap" kiln could increase my char recovery. There are multiple designs out there and I settled on the Ring-of-Fire (ROF) kiln (pictured in the sequence below) for the ease of transport and assembly, the relatively low cost and the second layer of metal that creates a heat shield that makes it more comfortable to work around. I paid ~\$1200 for one the year before the pandemic, just before the price of steel shot up. Someone with welding equipment and skill can build their own. The design has been improved since I bought mine.

The flame cap kilns increase the recovery of char by allowing less air to get to the bottom of the pile so less of the carbon in the wood is burned. The steps of the process are:

1. Start a fire in the bottom with branches generally < than 1.5 inches about 12-18" deep.
2. Let them burn partially into coals and then add larger material 3-4-5" diameter.
3. Laying the wood in the same direction so it stacks and consolidates with minimal air space between the pieces, which facilitates better charring and more carbon recovery. The idea is to de-limb and sort the material into sizes that will nest relatively tight. I am not willing to spend that much time as my first priority is slash disposal. So, I am balancing the amount of time I spend to achieve that goal with the amount of

time I spend to make the creation of biochar more efficient.

4. As the material burns down, add more slash up to the top of the kiln, let it burn down and repeat. This can be down until the amount of char in the kiln is 2/3 to 3/4 full.
5. When the yellow flames are gone or nearly gone and the charcoal is starting to turn white with ash on the surface, it is time to douse it with water.
6. The first douse knocks the heat down and then you disassemble the ROF (remove the wing-nuts) and let the sides roll back. Then get your shovel and rake to spray and stir, or mix with snow depending on the conditions.

Inevitably I end up with some pieces of wood that are not completely charred through, so I save them for the next batch.



I have progressed from a small sledge hammer smashing the char in the bottom of a 5-gallon bucket to laying a big piece of cardboard on the ground and driving over it to crush it up. I then scoop it up with a snow shovel and put it on a 1/2 inch screen over the top a plastic trash barrel.

My wife has chickens and we put char into their bedding material. When the coop is cleaned out the bedding and the excrement are mixed into a compost bin. This "loads" the char with nutrients and microbes which turns the char into biochar, a slow-release fertilizer that is alive ready for application to your garden, orchard, crop field or forest.

A lot of my forest land is too steep to drive a piece of equipment on and thus not conducive to setting up a kiln and having it remain upright, let alone trying to haul it around, up and down through the woods. Therefore, on this ground I use what has been termed, "conservation burning". Make your normal slash pile as compact as possible, ideally with larger pieces nearer the bottom. Then you light it in the upper third of the pile and let it burn down to the bottom. This enhances the char recovery. Then if you have snow on the ground, when the pile reaches the goal (none/minimal flame stage), you can mix in snow or I started to take my shovel and fling the hot coals into the snow around the pile. This stops the burning and scatters the biochar into the forest at the same time. This doesn't load the char with nutrients but it adds to the forest soil water holding capacity.

continued on next page ➞



These last few pictures show equipment that can be used with a logging operation that develops big landing piles that result from whole tree yarding and processing at the landing.



The ideal system that I expect we will progress to is the use of the slash at a central location where the wood is processed in a retort or other pyrolysis process that captures and uses the energy for heat and or power production. Until that day, this is a great way to dispose of your slash and improve your forest's soil in the process.

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.

Tomentosus Root Disease

By Jill Hautaniemi, US Forest Service Pathologist

Despite their elusive nature, root diseases are among the most destructive forest pathogens in the world. They are caused by fungi that grow on and decay the roots of trees, often spreading from tree to tree through underground root contacts. These diseases cause a slow decline in health and vigor as the root system of the tree decays and becomes unable to take up water and nutrients from the soil. As the structural integrity of infected trees becomes compromised by the decay, they often fall over, resulting in the characteristic circles of dead, dying, and windthrown trees that form as root disease fungi spread from tree to tree underground.

The biggest challenge in diagnosing root disease is that most of the activity is happening in the soil. Tomentosus root disease, a disease caused by several species of fungi in the genus *Onnia*, is no exception. It is a root disease that primarily impacts lodgepole pine and Engelmann spruce in Montana, causing a white pocket rot in the roots and lower bole. White pocket rot occurs when the fungus decays the wood irregularly, resulting in a spotted or honeycombed appearance. This decay pattern is similar to the decay caused by *Porodaedalia pini*, also known as red ring rot. However, red ring rot is usually found higher in the bole while tomentosus rarely makes it more than 3 ft above the root collar. Tomentosus is usually confirmed in an area by looking at roots of windthrown trees and examining stumps for the characteristic decay pattern.



Tomentosus root disease does not spread from root to root underground as aggressively as other root diseases. As a result, the circles of dead and dying trees may look more like small irregular patches. Symptoms will be most prevalent on lodgepole pine and Engelmann spruce, and stumps in the vicinity may display the distinctive honeycombed decay pattern. Although tomentosus tends to kill a tree slowly over decades, it can still be devastating in recreation areas. The decay created by tomentosus root disease causes a tree to be more susceptible to windthrow which can create a hazard. Although the trees may look only slightly unhealthy, green trees can fall over during wind events, making this an important disease to look out for in campgrounds dominated by susceptible species. Several campsites in the west have had most of their trees removed due to the risk tomentosus root disease can pose to tent pads and other structures.

Root diseases are considered diseases of the site, which means they will exist in a stand for decades. Once tomentosus root disease has been diagnosed in a stand, the best way to reduce the impact long-term is to remove susceptible species and promote less susceptible species. Lodgepole pine and Engelmann spruce are the primary hosts in Montana, but Douglas-fir and western white pine can be occasional hosts as well. If you leave susceptible species, you can expect them to decline over several years, and eventually die by windthrown or bark beetles.

Although root diseases are natural parts of our forest ecosystems and create heterogeneity in the forest, they can interfere with management objectives and cause the death of high-value trees. Because diseases such as tomentosus will exist on a site in perpetuity, it is important to plan

for the long-term. In the short-term, removing trees can seem counter to management objectives but can still be the best move for perpetuating a healthy forest into the future. Creating a resilient forest often includes promoting a diversity of site-adapted species, so even if root disease is not present, host-specific insect and disease issues are not as devastating when they do occur.

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Foundation Board Member Changes

There have been changes in the membership of the Forest Stewardship Foundation Board of Directors during the past year.

Members leaving the Board:

Kip and Connie Buegge and **Eric Hoberg** have gone off the Board due to completing their terms or moving to other locations. We thank them for their valued service to the Foundation.

New members to the Board:

We welcome Ellen Hutcheson, Zoe Leake and Rick Moore as new members on the Board. The following is some information about each of them.

Ellen Hutcheson grew up in the Midwest and followed a dream to work in natural resources. She attended Colorado State University and earned a Masters degree with a concentration in economics. She then pursued a career with the U. S. Forest Service, working mostly in forest planning as an economist and analyst. She moved to Libby in 2000 and worked for the Kootenai National Forest until retiring a few years ago. She is fortunate to live on forested acreage at the edge of town. Over the years she has worked to manage her own land. Through contacts with Forest Stewardship Foundation Board members and help from the County Forester, she was able to have a commercial timber sale on a portion of her land in 2013 and recently completed a fuel reduction on most of the remaining acres. She is excited to join the Board and contribute to knowledge and assistance for other land owners. She has recently taken over the role of Treasurer on the Board.

Zoe Leake has been going to the woods since she was in diapers. She remembers drawing a picture of a knuckle

boom loader loading a log on the tailgate of her Dad's pickup truck. Her move to Montana was originally in 2014 to attend the University of Montana, where she studied Natural Resource Conservation. She began working as a consulting forester in 2018 alongside her Father in Mississippi River bottomland hardwoods. Now she is a Resource Forester for Pyramid Mountain Lumber in Seeley Lake. In addition to her duties as Secretary on the Board, Zoe is also on the Board of Directors for Swan Valley Connections and on the steering committees of Montana Tree Farm, Southwest Crown Collaborative, and the Industry Coalition for Forest Planning. She is Pyramid's point person for working with private landowners to identify and achieve their ownership objectives. In her free-time she enjoys skiing, backpacking, traveling, hunting and swimming in Montana's beautiful lakes.

Rick Moore idealistically headed-out of Michigan State University in 1978 with a forestry degree in hand. He was headed for a seasonal position with the BLM in Cottonwood, Idaho. Since that time, he has worked for the Forest Service in Wyoming and Colorado including a stint with the Pike Hotshot Crew. During that time period he earned a Master of Science degree in parks and recreation management from the University of Wyoming. He moved on to Rapid City, SD joining the ranks of the South Dakota Division of Forestry working with private landowners and in fire management.

Having grown-up in Michigan, he had a desire to work in the northern hardwood forest, so in 1987 he returned to Michigan working exclusively with private landowners. He had found his niche. However, after 17 years, the need for a new challenge brought him to Kalispell and the Montana DNRC where he continued his passion of assisting private landowners while helping out with the Northern Rockies Type 1 Incident Management Team.

He was told by folks that he would know when it was time to retire, and at the end of 2021 he knew it was time. Since then, he has continued to assist with the Forest Stewardship Program and the Foundation. He has also taken on the role of instructor with Road Scholar in Glacier National Park.



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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.

Save the Dates

February 7-9	Coeur d'Alene, ID	Foresters Forum
March 9	Missoula, MT	Forestry Mini-College
April 10-12	Polson, MT	Montana Society of American Foresters Conference
April 19	Helena, MT	Landowners Workshop
April 20	Helena, MT	Chemical Applications in Forestry - Weeds and Other Practices
July 14-19	Lubrecht Exp Forest	Montana Natural Resources Youth Camp

MSU Extension Forestry Stewardship Workshops

May 2-3, 10	Frenchtown, MT
May 23-24, 31	Bozeman, MT
July 11-12, 19	Kalispell, MT
July 25-26, 8/2	Eureka, MT
TBA	Condon, MT

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