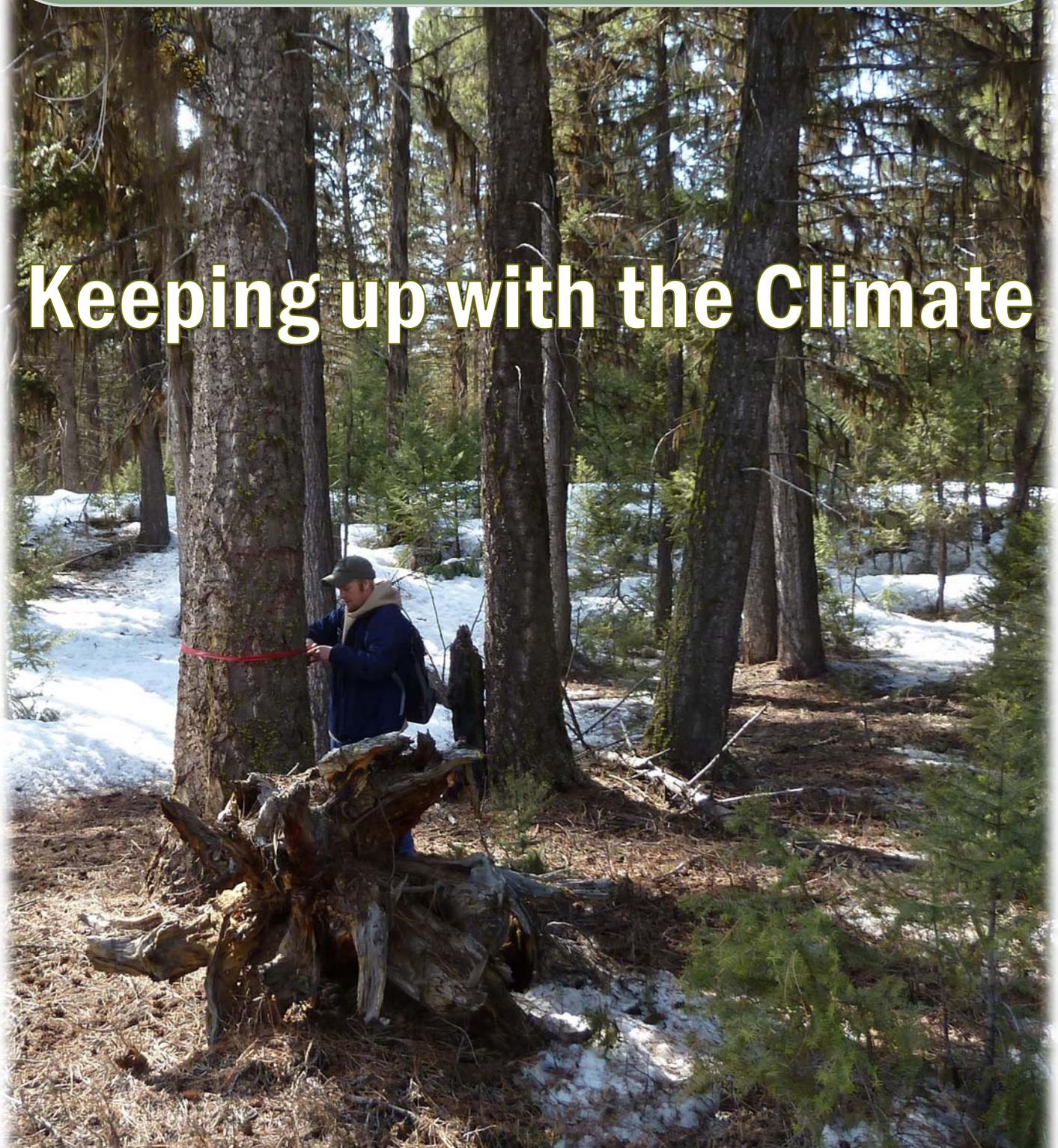


Montana Family Forest News

Keeping up with the Climate



Front cover, Peter Kolb (PhD), MSU Extension Forestry

Every forest owner desires healthy trees, which can be assessed in multiple ways. The density and quality of tree crowns is the standard used by many European foresters, whereas tree diameter and height growth is often preferred by American foresters. Both examine a component of the same thing: tree growth. Better crowns produce better growth that is measured by diameter and height growth. The environment a tree grows in also has a major impact on tree growth and tree health. Some characteristics of a local environment are very difficult to change, such as soil depth, fertility and water holding capacity, and local weather and climate, whereas other components can be manipulated, such as tree density and tree species. These latter two are of course, the essence of the practice of forestry. Although initially developed to enhance wood production of tree species that were most useful to the landowner and communities, the application of “forestry” is also essential for moderating the effects of the environment. Appropriate forest thinning practices offer individual residual trees more light, more soil water and sometimes even more soil nutrients. With the increasing concerns about a changing climate, and the documentation that the climate of the Earth has always fluctuated across a variety of time scales and a variety of magnitudes, changes in our climate should be considered when planning for and managing a long-term plant community such as a forest. What species to manage for, and in what density or distribution across a landscape remain questions that can be difficult to answer for scientists and applied managers alike. However, manipulation of these basic two components of a forest can have profound impacts. Pictured on the front cover is a forester measuring the diameter and growth rate of a mature Douglas-fir in early May. Perhaps more important is the observation of where snow packs remain, and where different tree species are regenerating. Water availability remains one of the most important resources for healthy trees and good growth. Managing forests for enhanced snowpack accumulation and retention may be as important as selecting for the best trees on a site if the goal is to help Montana trees survive periods of extreme weather and climate changes.

DESIGNER:

Christina Oppegard
MSU Extension Administrative Associate IV

EDITOR:

Peter Kolb
MSU Extension Forestry Specialist

ADVISORS:

Cindy Peterson
MSU Extension Associate Forestry Specialist

Martin Twer

MSU Extension Forestry Bioenergy Assoc. Specialist

FINANCIAL CONTRIBUTORS:

Montana Tree Farm
Montana Stewardship Foundation
MSU Extension Forestry
Montana Forest Owners Association

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. If you wish to view the full color version of this newsletter and for additional articles such as landowner spotlights please go to our website at <http://www.msuxextension.org/forestry/publications.htm>.

Warm regards,

Christina Oppegard

Table of Contents

Front Cover Caption

Tree Farm News

- 1 2017-A Year of Change for Montana Tree Farm, Allen Chrisman, MT Tree Farm Chair
- 3 Montana Tree Farm: In Memoriam, Allen Chrisman, MT Tree Farm Chair
- 4 Dennis Swift Memorial Award, Gary Johnson, MT Tree Farm
- 5 Lawrence Crofutt-2016 Tree Farm Scholarship Recipient, Cindy Peterson, MSU Extension Forestry
- 6 Montana Tree Farm Scholarship and Attention Tree Farm Inspectors, Cindy Peterson, MSU Extension Forestry
- 7 Tree Farmer of the Year—The Chrisman Family, Mark Boardman, Stolze Land & Lumber Company
- 9 Timber Harvesting Video for Private Landowners, Mark Boardman, Stolze Land & Lumber Company
- 10 A Montana Tree Farmer's Cheat Sheet for Acing the ATFS Assessment, Angela Wells, MT Tree Farm Certification Coordinator
- 13 American Tree Farm System National Leadership Conference, Greenville South Carolina, Allen Chrisman, MT Tree Farm Chair

MFOA

- 14 Montana Forest Owners Association Moves Forward, Jody Christianson, MFOA

Special Feature

- 15 Do Burn Piles Need Rehabilitation? Peter Kolb, MSU Extension Forestry

Forest Stewardship Foundation News

- 18 Letter from the Chair, Ed Levert

Extension Forestry and Stewardship News

- 19 Montana Master Forest Steward Program -An Advanced Curriculum for Forest Landowners, Martin Twer, BioEnergy Associate Specialist, MSU Extension Forestry
- 20 The Next Generation of Family Forest Landowners and Natural Resource Professionals, Martin Twer, BioEnergy Associate Specialist, MSU Extension Forestry
- 21 Keeping up with the Climate, Peter Kolb, MSU Extension Forestry Specialist
- 25 Transferring Joint Tenancy Real Property Without Probate, Marsha A. Goetting, Professor and Family Economics Specialist

Features

- 27 Managing for Changing Site Conditions, Cameron Wohlschlegel, Forester, F.H. Stoltze Land & Lumber Co.
- 29 The Wildlife Page, Peter Kolb, MSU Extension Forestry Specialist
- 31 Root Disease Effects on Stand Structure and Forest Succession, Kathleen McKeever, Forest Pathologist, Montana DNRC, Forestry Division

Advertisement

- 32 Weyerhaeuser, Marks –Miller Post & Pole, Inc., and Northwest Management, Inc.
- 33 F.H. Stoltze Land & Lumber Co.
- 34 Tricon Timber
- 35 Watershed Consulting LLC
- 35 2017 Calendar of Workshops and Events

Explanation of Back Page

- 36 Tree Survival in Times of Environmental Uncertainty, Peter Kolb, MSU Extension Forestry Specialist



2017 - A Year of Change for Montana Tree Farm

Allen Chrisman, Montana Tree Farm Chair

As the new Chair for the Montana Tree Farm System, I want to thank Angela (Mallon) Wells for the leadership she has given Montana Tree Farm over the past two years. We have many things to be proud of in our accomplishments during her term.

Over the last two years we had great Annual Meetings in Bozeman and Florence, with excellent attendance, outstanding visits to local Tree Farms, and exceptional speakers. We began to implement our strategic plan, and polled a sample of the membership to help us determine whether to continue as a Certified Tree Farm Program, or drop down to a Recognition Program. It wasn't an easy decision, but the Steering Committee decided to continue as a Certified Tree Farm Program into the foreseeable future, trusting that continuing to brand our wood products as "Certified Sustainable" was the right decision.

With the decision to remain Certified comes the need to plan for fees (\$10 for each Tree Farm) that will be assessed annually by National beginning in 2019 to help offset the cost of the Third Party Assessment conducted nationally by PricewaterhouseCoopers (PwC). To cover these costs, members at the Annual Meeting in September approved a recommendation from the Steering Committee to implement a Membership Fee of \$30 per year beginning in January of 2018. The Membership Fee will provide funds necessary to begin payments to National in 2019. We expect to have notices out to Tree Farm Members in November or December with explanation and requests for payment.

Also regarding Certification, Montana and Colorado, out of the Western Region, were selected for the Third Party Certification Assessment by National and PricewaterhouseCoopers for 2017. We have had our initial meeting to set up the Certification Assessment which will occur the week of June 26. It will entail visiting some 15 Tree Farms over a period of three days. If you are selected, please be proud to represent Montana and the American Tree Farm System. The visits will be brief, about one hour at each Tree Farm. If you are selected, your Inspector will be contacting you to help you prepare.

We welcome the Third Party Certification Assessment. The Assessment looks at all aspects of our program, from everything done at the State level down to the work we as Tree Farmers do on the ground in compliance with our Management Plans. We also look forward to the feedback we get on what areas we might improve. We expect they might take things we are doing in Montana and share them with other states. We do need to thank Angela for the outstanding work she has done with the Tree Farm database. As you would expect, the information in the database must be accurate for us to do well in the Assessment.

Montana Tree Farm recently received a grant for a Part Time Administrator. We advertised the contract informally, and are pleased to announce that Elizabeth Richardson of Whitefish has agreed to provide those services. Elizabeth brings with her an outstanding background in Office Management, Grant Writing and Event Scheduling, most recently as the Director of Scheduling in the Governor's Office. We think she will bring some skills to our State Organization that will help us do a better job serving Montana Tree Farmers. Elizabeth will also take care of the Secretary duties for Montana Tree Farm.

And I want to thank Peter Pocius who will serve as the Vice Chair for the next two years. Peter and his wife Jay have a Tree Farm outside of Helena. Peter and I will be going to the National Leadership Conference in February, and will look forward to the opportunity to learn skills to help us do a better job for Montana Tree Farm.

I want to thank our cadre of Tree Farm Inspectors also. These are the folks that visit your Tree Farms to review your Management Plans and confirm that they meet the standards and match the practices on the ground. They provide excellent professional forestry advice to all of us, and make timely suggestions on how we might better meet our management objectives. When you have the opportunity, please thank your Tree Farm Inspector for their service.

We also want to remember those Tree Farmers we have lost this year:

- Mary Naegeli of Trout Creek, a long time Tree Farmer, a longtime member of the Steering Committee and an early Chair of the Montana Tree Farm System.
- Dave and Janet Tawney of Missoula. Dave was a long time member of the Steering Committee, and they were early leaders in developing a Conservation Easement for their Tree Farm.

Our thoughts and prayers are with their families, but we know their legacies live on through the work they did with their Tree Farms.

I'm excited about where Montana Tree Farm is and where we are headed. I hope you share that excitement. I think Montana Tree Farm has a lot to offer small private forest landowners, and I would appreciate you sharing with your friends and neighbors what you find useful from Montana Tree Farm. You are our Ambassadors – and we appreciate it.

Montana Tree Farm includes over 500 Tree Farms encompassing over 167,000 acres. I presented that information at two Legislative Forestry Forums in Helena – and it gave me great pleasure to point out that those Tree Farms provide certified sustainable wood products, clean water and air, quality recreation and outstanding wildlife habitat for the benefit of all Montanans. I thank each and every one of you for your part in the Legacy of the American Tree Farm System in Montana. You all have a lot to be proud of.

Do you have questions, comments, or want more information on Montana Tree Farm? Please feel free to contact me at achrisman52@gmail.com or by phone at (406) 249-6130.



Montana Tree Farm: In Memoriam

Allen Chrisman, Montana Tree Farm Chair

We are saddened with the recent passing of two Legacy Montana Tree Farm members, and our thoughts and prayers go out to their respective families.



MARY NAEGELI

Mary passed away January 5, 2017 in Libby. Mary and her husband Don of 43 years ranched near Whitepine, MT raising Hereford cattle and trees. Mary was well known in the Whitepine and surrounding areas for leading a very active life. She was a pioneer in the Forest Stewardship program, served on the Glacier Tourism Committee and was active in the Montana Tree Farm program. Ranching, stewardship, education, family and friends were important to Mary. Mary and her family have welcomed many generations of children, adults and classes to the family ranch.

Mary and Don were among the first in the area to become certified in the Tree Farm program, joining in 1967. Mary was the first individual Tree Farmer to Chair the Montana Tree Farm Steering Committee in the 1980s after the Inland Forest Resource Council gave up their role in providing leadership to the Montana Tree Farm committee.

Mary and Don were honored in 1982 by being named Montana's Tree Farmers of the Year. In 1983 they were named Western Region Outstanding Tree Farmers of Year representing the 14 state Western Region, and were one of four finalists for National Outstanding Tree Farmer of the Year.

For many years Mary provided the beautifully engraved Tree Farm platters given annually to the Montana Tree Farmer of the Year.

After husband Don passed away Mary continued her active involved life with the help of son Bill and daughter-in-law Sarah, grandchildren and great grandchildren. The family has suggested that donations can be made in Mary's memory to the Montana Tree Farm Program.



DR. DAVID TAWNEY

Dr. Tawney passed away January 20, 2017 at St. Patrick Hospital in Missoula. Dr. Tawney practiced dentistry in Missoula for over 50 years. In addition to his interest in dentistry, Dave had a fond appreciation for the natural world.

Dr. Tawney was an avid fisherman, hunter, and hiker. He took his responsibility as a steward of the land very seriously and one could find Dr. Tawney thinning his timber stand in the Pattee Canyon area, piling slash or gardening. Dr. Tawney and his wife Alpha became Tree Farm members in 1978. Dr. Tawney served on the Montana Tree Farm Steering committee in the late 1990s and early 2000s.

Dr. Tawney and his wife were one of the first Montana Tree Farmers to place a conservation easement on their tree farm. He worked diligently with Five Valleys Land Trust to establish realistic rules for proactive forest management because in those early years of conservation easements, many land trusts were not familiar with the needs for managing forest land.

After the passing of his wife Alpha, Dr. Tawney married Jeannette Buchanan in 1986. Jeannette passed away on December 29, 2016. We are certain that Dr. Tawney’s legacy in the Tree Farm program will continue as his daughter and son-in-law Charles and Mary Lynn Eiseman are also Tree Farm members.

DENNIS SWIFT MEMORIAL

Tree Farm Inspector Recognition Award

Each year the Montana Tree Farm System recognizes the top Tree Farm Inspectors at the annual state tree farm meeting. These inspectors along with the many other Montana Tree Farm Inspectors volunteer their time, equipment and vehicle use in promoting the Tree Farm System through their certification and inspection activity.

Are you willing to support Montana Tree Farm Inspectors by contributing to the Dennis Swift Inspector Recognition Award?

YES, I would like to show my support in recognizing the importance of our Montana Tree Farm Inspectors in promoting the Tree Farm Program by contributing to the Dennis Swift Inspector Recognition Award:

\$ _____.

Please make your check payable to Montana Tree Farm System and return it with this slip to:
Montana Tree Farm System, Inc.
P.O. Box 17276
Missoula, MT 59808-7276

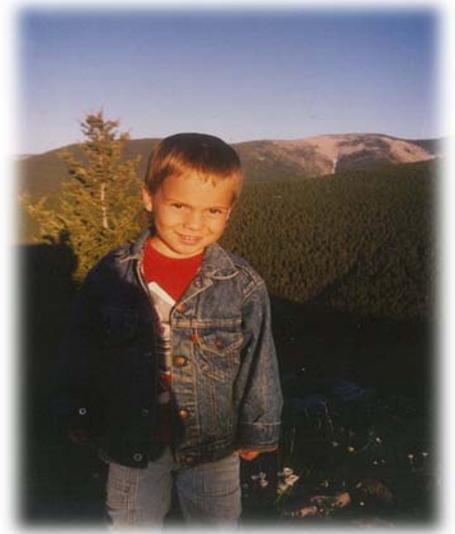
The Montana Tree Farm System is a 501 (C) (3) Organization

Lawrence Crofutt - 2016 Tree Farm Scholarship Recipient

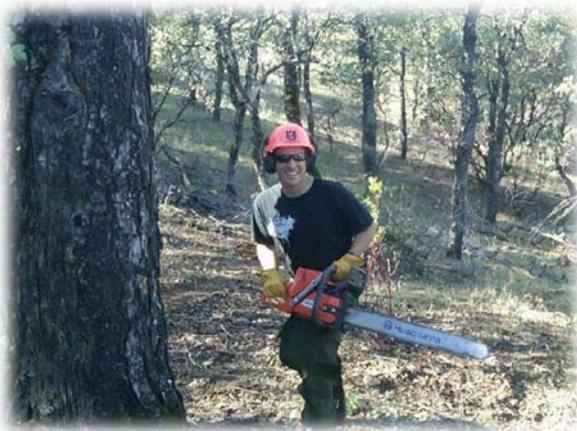
Cindy Peterson, MSU Extension Forestry

This year, Lawrence Crofutt was the recipient of the \$500 Tree Farm Scholarship. Lawrence is a junior in the W.A Franke College of Forestry and Conservation at the University of Montana. He will graduate in December of 2017 with a bachelor's degree in Forest Resource Management with a minor in Wildland Fire Sciences and Management.

Lawrence says, "I spent most of my childhood and adolescent years in central Montana, spending most of the summers, weekends, and hunting season in the great outdoors. My family homesteaded in the Judith Basin and the Big Snowy Mountains, where we still own property adjacent to the Lewis and Clark National Forest. In my short lifetime I have watched the Douglas-fir encroach on our open spaces, I have spent many days from a young age with an axe or a saw in my hand slowing their advance. These kind of experiences taught me that as stakeholders in the land, we must be proactive if we wish to maintain healthy and diverse ecosystems. This exposure during my development into an adult has been consequential in my pursuit of a forestry related career."



Lawrence (6-years-old) near the family cabin in the Big Snowy Mtns.



Lawrence falling a hazard tree on his father's property.

Lawrence has worked on trails, wildland fire, and most recently on a timber crew with the Forest Service. He says, "I believe that the future health and productivity of North American forests are dependent on active human management." He plans to pursue a career in forestry and consider positions with government agencies and in the private sector. He may apply for graduate school once he has more field experience and knowledge behind his bachelor's degree. Lawrence realized the importance of education and says he will, "take my professional experience and education

to my family and community to help enhance and preserve our natural and productive land, which is so often taken for granted."

Through the process of applying for the Tree Farm scholarship Lawrence has gained an understanding of the important part private forest owners and the timber industry have in conserving Montana forests through planning and management. He says, "Applying for this scholarship has been a

very informative process and has given me a new respect for the work being done to educate and facilitate wise forest management on private land. The shared knowledge, interests, and goals of an organization like the Montana Tree Farm System is inspiring. This process has helped me to gain new insight on the work being done to preserve our timber industry as well as accomplish landowner's management objectives."

Lawrence and his wife made a decision the he would return to school to finish a bachelor's degree without accumulating any debt. He says, "Making prudent financial decisions and taking advantage of opportunities to afford tuition and other expenses help us to reach this goal. Thank you for the opportunity to apply for the 2016 Montana Tree Farm Scholarship."

Congratulations Lawrence and best wishes in your endeavors, studies, and career.

Montana Tree Farm Scholarship

Montana Tree Farm offers a \$500 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 2.0 or above, and must demonstrate an interest in forestry. **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.

The objective of this scholarship is to help a student with an interest in forestry and also to provide information to students about Tree Farm and the family forests of Montana. Making a connection between future foresters and land managers can lead to the development of long term personal and professional relationships.

ATTENTION TREE FARMERS AND INSPECTORS

Your Montana Tree Farm Committee is looking for award recommendations for 2017. We'd like your help with nominating candidates for the Tree Farmer of the Year, Logger of the Year, and Educator of the Year. Please call Mark Boardman at 406-892-7014, or email mboardman@stoltzelumber.com

Please provide nominations by July 28, 2017.

2016 Tree Farmer of the Year Awarded to The Chrisman Family

Mark Boardman, Stoltze Land & Lumber Company



The Chrisman Tree Farm is a very well managed Tree Farm that demonstrates excellent sustainable stewardship. While the property was initially purchased in 1958 and 1959 by Allen's parents, ownership transferred in the 1990's to Allen and his wife Charlotte, and his sister Kari and husband Tim as a part of estate planning by his parents. Allen has been the primary force in Tree Farm activities because of his professional background in forestry, and more recently his retirement in 2008. Prior to certification as a Tree Farm, Allen laid out the lodgepole pine green salvage on approximately 150 acres in 1977. This included reviewing the entire 310 acres for need for treatment, flagging property boundaries, laying out road systems including creek crossings, designating logging systems and harvest units (horse logging was used around structures and a special management area, small crawler tractor for the rest), flagging streamside management zones, and preparing the contract. In 1997, prior to certification, Allen also laid out a 50 acre commercial thin including road location, contract preparation and administration using a state of the art cut-to-length system. During that summer on leave from the Forest Service, Allen also completed 25 acres of pre-commercial thinning, converting predominant lodgepole pine stands to a mixture of Western larch and lodgepole pine by favoring Western larch where possible. His work since certification and especially since his retirement in 2008 is outstanding and demonstrates a strong commitment to sustainable stewardship forestry. While he still has work to do on the 310 acres, Allen has successfully integrated forest management activities to achieve family objectives in continued use of the Tree Farm as a working Forest.



Their management objectives include: Manage the forest to reduce fuel loading and the threat of property loss; provide for healthy forests; aggressively treat and limit the spread of noxious weeds and invasive species; protect recreational and aesthetic values; provide for wildlife habitat over time; and provide for the long term yield of forest products. Much of the work is completed by Allen. On larger logging projects, Allen has contracted out the timber harvesting. On the fuels projects completed in 2009 and 2013 Allen did all the burning and some of the pruning and thinning. Allen has done all of the pre-commercial thinning, and nearly all of the planting and other timber stand improvement work. Since his retirement in 2008, Allen has had considerably more time to spend on stand treatments and maintenance of previous cultural treatments at the Tree Farm.

The goal of his recent harvesting was to remove the older shade tolerant species and leave high quality Western larch, Douglas-fir, Engelmann spruce and lodgepole pine, resulting in a commercial thin. The purpose of the harvest was for fire hazard reduction near structures, with emphasis on maintaining forest health. Income generated from the product was used to offset costs of removing unmerchantable material.

Planting for species diversity was initiated in 1980 with 1,000 bare-root ponderosa pine seedlings planted in the spring of 1980 following harvest of lodgepole pine killed by the mountain pine beetle. The ponderosa pine in this photo was one of the first seedlings planted by Allen. Excellent natural regeneration has occurred following all regeneration harvest activities. While lodgepole pine is the dominant species in natural regeneration on the site, pre-commercial thinning has been used to favor primarily Western larch where present to improve species diversity. His Tree Farm is well stocked and has a vast diversity of species, and size and age classes.

Fire protection is a very high priority for Allen. His forest practices to reduce fire spread include mowing and weed eating roads and trails that can be used as fuel breaks throughout the Tree Farm. In addition, for long term fire hazard reduction he thins and prunes younger trees along access roads. In the last 5 years he has pre-commercially thinned and pruned 9 acres of 20-30 year old regeneration from his 1978 logging. This is in addition to 25 acres he pre-commercially thinned in 1997, and 9 acres pre-commercially thinned in 1991.



Allen has done experimental planting (and replanting) of 30 red osier dogwood cuttings along a stream course to increase wildlife browse, and has systematically brush-cut older decadent willow, red osier dogwood and other shrubs to stimulate new browse production for deer, elk and moose. In 2012 he conducted an experimental prescribed burn of an established stand of reed canary grass to reduce organic material to provide a seedbed for more desirable grass species and reduce fire hazards. The pre-commercial thinning units include wildlife leave thickets and constructed brush piles for small mammal habitat. In the thinning units Allen also girdles occasional trees to leave as snags for wildlife species. In aspen groves, Allen has removed encroaching conifers to reduce competition and in 2000 underburned a small portion of one stand to stimulate aspen regeneration. The Tree Farm is visited regularly by grizzly and black bears and Allen has identified and protected two bear “rub trees” on the Tree Farm. It is common to see western larch trees that have been girdled and killed by bears which Allen reluctantly embraces as “future high-quality firewood.” Large diameter Western larch snags (20” DBH and above) are retained for wildlife purposes, as pileated woodpeckers and other snag dependent species

regularly use the property. Allen has used cultural treatments (thinning, pruning) to increase sight distances along roads and trails frequently used by family and friends to reduce the potential for unexpected encounters with bears, wolves and mountain lions that use the property. The Tree Farm adheres to strict rules to minimize attractants for bears and other predators – which apply to use by family members, friends and contractors.

Allen is very active within the North Fork of the Flathead River Community. He is a director on the North Fork Landowners Association (NFLA), and co-chair of the North Fork Fire Mitigation Committee. Allen is currently the Chair of the Montana Tree Farm Steering Committee. In addition he has been a proud member of the Society of American Foresters since 1980. He was recently awarded the 2016 Presidential Field Forester Award at the 2016 SAF National Convention in Madison, WI. He was also the Society of American Foresters “Montana Field Forester” in 2015. Allen hosted one of the tours during the fall 2014 Montana Tree Farm Annual Meeting. He has taken many of his neighbors on informal hikes throughout his Tree Farm to show them the results of his forestry practices, and discuss with them the objectives for his Tree Farm, and which objectives and treatments might be appropriate for them. He has made reciprocal visits to neighbor’s property to provide them professional advice and consultation at no cost on forest management, fuels treatments, and noxious weed identification and control. He regularly makes presentations to the Annual North Fork Firewise Day, the Lincoln County Firewise Day, the Flathead Forest Fire Media Day, and the Flathead Valley Community College class that he helps instruct – FORS 230 – Forest Fire Ecology and Management.

Timber Harvesting Video for Private Landowner

There is a new video that was produced collaboratively right here in Montana to help private landowners as they consider timber harvest as a management tool. Please enjoy and share it with your friends. See it on our Montana Tree Farm Facebook page <https://www.facebook.com/MTTreeFarm/> , or go to <https://vimeo.com/200241679>

A Montana Tree Farmer's Cheat Sheet for Acing the ATFS Assessment

Angela Wells, Montana Tree Farm Certification Coordinator

Being a member of the American Tree Farm System (ATFS) means that your land is certified under a set of objective and independently-vetted standards, the ATFS *Standards of Sustainability*, as opposed to a set of obscure rituals or a secret handshake. Every few years, Montana undergoes a third-party assessment of its program by an independent entity, PricewaterhouseCoopers, to ensure that our program as a whole is meeting the standards. At the same time, it is our opportunity to showcase the excellent management of Montana Tree Farmers.

In 2017, Montana will once again participate in the ATFS third-party assessment. Notifications have already gone out to the 15 Montana Tree Farms selected as part of the 2017 assessment sample. However, it's important that every Tree Farmer feel confident in his or her ability to represent the program in this capacity, should he or she be chosen one day. This cheat sheet is designed to prepare you to ace the assessment.

Assessment Tip #1: Know the location of your plan.

Although Tree Farmers' management goals are as diverse as the land uses across our great state, one common factor unites all Montana Tree Farms: a management or stewardship plan. This is a prerequisite for all new Tree Farm sign-ups and a criteria to maintain certification, and is also one of the elements Montana Tree Farm is required to provide as part of the third-party assessment. Knowing where your management plan is also sets you up to address the next most important criteria, covered in Tip #2.

Assessment Tip #2: Update your plan as goals and objectives change or management activities are implemented.

The *Standards of Sustainability* state that the, "Management plan shall be active, adaptive and embody the landowner's current objectives, remain appropriate for the land certified and reflect the current state of knowledge about natural resources and sustainable forest management." To ensure that your management plan is active and adaptive, pull it out once a year (or more!) and record any recent activities or changes in objectives. Your inspector will also help you do this during your recertification visit (see Tip #3), helping you to incorporate the latest in knowledge about sustainable forest management.

Assessment Tip #3. Participate in the recertification process.

Every 4 to 6 years, Montana Tree Farmers receive a visit from a Tree Farm inspector to recertify their properties. During the recertification process, the inspector will take a walk through your woods with you, answer any management or other technical questions you might have, and help you update your plan to the most current standards. Our Tree Farmers consistently cite this visit as one of the most

valuable benefits of membership. This year, the Montana Tree Farm program will conduct 70 recertification visits. If you were selected for a visit this year, your inspector should be contacting you soon to set up a visit. Jump on this chance to capitalize on free technical advice and an opportunity to get help updating your management plan!

Assessment Tip #4: Learn to Know and Love the Montana Natural Heritage Program

One of the definitions of sustainable Tree Farm management is that your activities do not adversely affect threatened and endangered (T&E) species. During an assessment, one of the questions that usually comes up is, “How did you determine the presence or absence of threatened or endangered species on your property?” Although it may be tempting to reply, “Because it’s pretty obvious there’s no dang grizzly dens on my 20 acre woodlot!” the A+ answer is, “I consulted the Montana Natural Heritage Program website.” The website can be found at <http://mtnhp.org/>. A quick and easy way to verify the presence or absence of T&E species is to query the “Species Snapshot” link on the homepage, which will provide you with a list of Species of Concern. The 3rd column over, “USFWS” will contain a code, LE for “listed endangered,” and LT for “listed threatened.” This table also tells you in which counties the species occurs. If there are occurrences in your county, consult with your inspector or service forester to confirm their presence or absence on your property.

If you do have T&E species on your property, your management plan should list them and any mitigating activities to avoid adversely affecting them. A simple statement such as, “My management activity includes maintaining hiding cover for lynx and avoiding all operations in wetlands known to contain water howellia,” is sufficient to satisfy this criteria. REST ASSURED: The contents of your management plan is kept private and not subject to scrutiny by agencies responsible for enforcement of wildlife laws. Disclosing presence of T&E species in your management plan does not equate to a rallying cry for environmental lawsuits!

Assessment Tip #5: Identify Special Sites

The *Standards* state that, “Forest management activities shall consider and maintain any special sites relevant on the property.” Special sites are defined as those with historical, archaeological, or cultural significance. They may also be places which only hold special meaning to you, such as a wild honeybee hive or favorite pet’s final resting place. The best way to identify special sites on your property is to know it intimately. Walking it with and without your inspector, studying it on maps and aerial photos, and asking local “old-timers” about its history are good places to begin. Let’s say you find a homesteader’s cabin on your land. Check with Montana’s State Historic Preservation Office to see if the cabin is registered. If not, there is no Tree Farm requirement that you register the cabin; simply mark it on your management plan’s map and include a statement in your plan indicating how you intend to preserve it. Again, this information is private and Tree Farm does not share it with any entities with oversight responsibilities for these types of sites. If asked by an assessor how you identified your special sites, the textbook answer is, “I walk my property regularly and am very familiar with all its special features. When I found the homesteader’s cabin, I consulted _____ (my inspector/a trusted local historian/the Montana State Historic Preservation Office) to verify its status as a special site, and included mitigation

activities to protect it in my plan.”

Assessment Tip #6: Know the Skinny on FORI

The 2015 to 2020 version of the *Standards of Sustainability* asks Tree Farmers to maintain and enhance Forests of Recognized Importance (FORI) where applicable. FORI are defined landscapes which represent globally, regionally, and nationally significant areas of exceptional ecological, social, cultural, or biological values. Currently, there are no FORIs recognized on private forest lands in Montana. If asked by an assessor how you determined whether the FORI standard was relevant to your property, the correct answer is, “I consulted the Montana Department of Natural Resources and Conservation and found that no FORIs are designated on private lands in Montana.”

Assessment Tip #7: Have Confidence in your Good Stewardship - You Earned It!

If you have been selected for the assessment process this year, you may be feeling like you’re about to take a test that you haven’t studied for. If you feel nervous, don’t. The assessment is not an exam full of “gotchas” and trick questions. You will find the assessor to be congenial and eager to hear the story of your Tree Farm. You can rely on help from your inspector and Tree Farm Steering Committee personnel both before and during the assessment process. Prior to the assessment, we will work with you to make double-sure your plan is updated, your maps are correct, and your memory is refreshed on the major details of certification. Your inspector or a Tree Farm steering committee member will be sitting next to you when you are interviewed by the assessor, ready to provide clarification and support as needed. Most important is the fact that you ARE a good Tree Farmer. During the initial sign-up and certification process, you demonstrated that you are deserving of your certified Tree Farm status by having a qualified management plan and implementing it. We don’t certify just anyone in Montana. Be confident in your good stewardship.

Montana’s third-party assessment will take place the week of June 26th. A representative from ATFS, an assessor from PricewaterhouseCoopers, and a member of the Montana Tree Farm Steering Committee will be visiting 15 Tree Farms selected in the 2017 sample. Congratulations to those who have been selected, and for everyone else, keep up the good work. You too may one day have the opportunity to ace the assessment!

American Tree Farm System National Leadership Conference, Greenville South Carolina

Allen Chrisman, Montana Tree Farm Chair



The opportunity to attend the ATFS National Leadership Conference is an outstanding experience, and Greenville South Carolina was an excellent setting. The difference from cold, snowy Montana was evident the moment Peter Pocius, Vice Chair, and I stepped off our respective flights. Lush vegetation coming out of winter dormancy abounds. Fragrant flowering shrubs and the first spring flowers signal the start of spring.

The Conference started with a Walk through the Piney Woods with Walt and Bill McPhail, National Outstanding Tree Farmers of the Year in 2012. Their intensively managed loblolly pine forests provide a very predictable revenue stream with closely scheduled planting, thinning, commercial thinning, and herbicide and fertilization treatments. Their Tree Farm also hosts a wide variety of wildlife habitat and improvements, and is leased for hunting as well. They even had a prescribed burn they conducted the night before to show us the effects of that common management practice in the South.

The Conference continued with Plenary Sessions and Breakouts to highlight topics of interest to many. Current updates were given on the exploration of a partner organization to help support Project Learning Tree, and discussion of the No Harassment Policy that we need to commit to as volunteers. The Inspectors of the Year from each Region were awarded, as well as the National Inspector of the Year. The National Outstanding Tree Farmers of the Year, the Defrees from Eastern Oregon were recognized.

During the Breakout Sessions several things made it obvious that we have much to be thankful for in Montana Tree Farm Program. Our MOU with Montana DNRC is one of those things. Other states requested a copy of our MOU, and were very envious of the support we got from our state agency. Our Inspector Corps with 50 Inspectors is the envy of many states, including Idaho which is struggling to manage over 700 Tree Farms with 13 Inspectors. Our Steering Committee, while we know we would like more Tree Farmer representation, is the envy of many whose Steering Committee is comprised entirely of Industry or Agency folks.

While we continue to look for ways to strengthen our State Program, it was obvious to both Peter and I that Montana is a shining star in the American Tree Farm System. Our thanks go to those leaders who have positioned us so well – Angela Mallon Wells, Mark Boardman, Paul McKenzie, Gary Johnson, and the others who have led Montana Tree Farm so effectively.

At the end of the session ATFS CEO Tom Martin announced that the 2018 NLC will be held in Albuquerque, New Mexico, January 31 through February 2, 2018. Let us know if you are interested in attending!



Montana Forest Owners Association Moves Forward

Jody Christianson, MFOA

Montana Forest Owners Association, Inc. (MFOA) was organized in 1995 for the primary purpose of being a voice for non-industrial private forest land owners. MFOA is a respected advocate for the family forest landowners and plays an important role in legislative issues. MFOA is a tax exempt organization under 501(c)(6) of the Internal Revenue Code.



Recent forestry-related events have highlighted the new MFOA logo and banner

To get more exposure, MFOA raffled a Stihl chain saw from its booth at the 2016 Forest Landowner Conference in Helena. The conference was sponsored by the Forest Stewardship Foundation and Northwest Management, Inc. Notice the grin on the face of winner Dave Atkins of Missoula.

MFOA is raffling ANOTHER Stihl chain saw on April 21, 2017, at the 2017 Forest Landowner Conference in Helena. Stop by our table and purchase some raffle tickets before the winner is drawn at the end of the day. Winner need not be present to win.

This year the Montana legislature is in session. Members of MFOA have stayed busy monitoring the bills which may impact family forest owners. MFOA's purpose is to actively participate in the process by supporting or speaking against important items. Please keep MFOA apprised of matters important to you.

Northwest Woodlands Magazine, a hard copy of which is distributed to MFOA members, contains articles pertinent to forest owners in Montana, Idaho, Oregon and Washington. Starting with the Spring 2017 issue, Northwest Woodlands Magazine will contain a President's Message from MFOA's President Mike Christianson.

MFOA is a membership organization. Any person interested in furthering MFOA's purpose is eligible to become a member. To join or renew, simply go to www.montanaforestowners.org and click on JOIN/RENEW or use the QR code.



Do Burn Piles Need Rehabilitation?

Peter Kolb (PhD), MSU Extension Forestry Specialist

Burning woody debris piles to treat excessive fuels that result from thinning a younger stand (left below) or a commercial logging operation (right below) is an effective practice for landowners and forest managers.



Fig 1. A burn pile (left) consisting of fine loose fuels from precommercial thinning and a pile (right) composed of larger fuels from logging cleanup).



The composition, size and timing of when they are burned can have strong influences on the impacts that burning has on the soils beneath the piles and how quickly these areas recover to support native vegetation. “Fire severity” is the term used to assess how much heat was imparted on the soil surface, or how much damage was caused to the vegetation where the fire burned. This is not the same as “fire intensity,” which denotes how high the flames burned out of the pile. For the purpose of burn pile rehabilitation we are less interested in fire intensity—which is of greater concern when we are actually burning the piles because tall flames will determine how far the fire effects will travel to surrounding vegetation, or how far burning embers will be thrown into the distance, possibly igniting surrounding fuels and allowing for a fire to escape.

Fire severity is caused by heat from the fire either damaging soil or the vegetation it comes in contact with. It is driven by both the amount of energy released, and how long energy (heat) occurs in any location—also known as fire duration. Somewhat counter intuitive to what we see when a fire burns, a slow smoldering fire can cause much greater damage to soils and vegetation than a fast explosive fire because heat moves downward into the soil very slowly. For example, Figure 1 shows the results of two very different debris piles. The fire on the upper left was from a loose pile, stacked 10ft high with dried dead and green branches that threw flames 20 feet into the air and burned out in about 3 hours. The fire on the upper right consisted of fine branches, larger branches, and logs that had no market value. It only threw flames 10 feet into the air, but burned for almost 6 days. The impact to the underlying soil is seen in Figure 2. The upper picture shows minimal impact to the

Fig 2. Three levels of burn severity with low severity on top and high severity middle and bottom.

soil from the loosely stacked pile of fine debris (upper left fire) and the lower two pictures are from fires that burned increasing concentrations of large fuels for multiple days (analogous with the upper right picture of Figure 1). What you see are ash layers (ranging in color from white to tan and orange) of different depths, covering the darker mineral soil underneath. Intact organic matter and fine roots in the mineral soil under the ash indicates little heat damage, whereas lighter colored dusty mineral soil indicates heating and baking.



Fig 3. Rehabilitating a burn pile with a small tractor can take less than 1/2 hour.

Ash color is dependent on the heat and duration of the fire. Black charcoal is the result of incomplete combustion, low temperatures, and low oxygen levels often found along the lower edges of the fire. Charcoal can be a good soil amendment because it is highly porous and can trap and hold moisture and nutrients that plants can extract and use. It also is an indicator that organic nitrogen from the organic material burned has not been turned into a gas, and remains in higher concentration in the surrounding soil. Some studies indicated that charcoal can persist in or on the soil for thousands of years. White ash is completely combusted organic material where only the basic non-organic elements are left behind. It can be rich in macronutrients such as phosphorus, potassium, calcium and sulfur, which is why ungulates such as deer and elk like to lick it. Orange or tan ash is organic matter that has been heated to the extent that chemical changes occur to the inorganic components such as iron oxidation, and is the same process that converts clay into pottery. The original plant based macronutrients may not be as available in this material, reducing its value for nutrient recycling. All ash is initially quite alkaline, which ties up nutrients and makes them unavailable for plants.

Ash from a burn pile has another challenging characteristic: it has all of the water driven from its mineral particles which initially can make it very resistant to water penetration and absorption. Once it has been rewetted, such as after a winter snowpack, it exhibits an opposite effect. It absorbs water very quickly, but holds onto it very tightly preventing water from moving through it into the mineral soil. Thus the ash can maintain a gooey consistency with dry soil underneath. Thick ash layers from a burn pile presents a medium that can be very hostile to native plant revegetation and large burn pile sites may persist for 30 years or longer. Unfortunately, noxious weeds tend to have the best ability to colonize such sites and they typically become thistle, hounds tongue and mullein hot spots. Alternatively, they can easily be treated and offer the opposite—sites with exceptional productivity for understory plant or tree growth. To achieve this result, the ash layer simply has to be broken up and lightly mixed with the underlying unheated mineral soil layer. Forest soil is typically slightly acidic, which neutralizes the alkalinity of the ash. The mixing with mineral soil also breaks up the water impervious layer that ash tends to form, and when combined actually improves the water and nutrient holding capacity of the mineral soil. Mixing can be accomplished with a shovel, or more quickly with a small tractor as seen in Figure 3. On average, rehabing 12 piles took me about 20 minutes per pile. The easiest technique was to use a “push-pull” tactic where the bottom of the bucket edge was placed about an inch into the mineral soil and then pushed through the burn area. Then the bucket edge is placed over the pushed-together pile and dragged back through the

pile while slightly bouncing the bucket up and down to create an irregular surface of mixed ash and mineral soil. This is done from different angles until the burn area is treated in its entirety. Note, it is important to spend 10 minutes prior to tractor work piling larger remaining woody debris into a small adjacent pile to burn again at a later date as such pieces can greatly inhibit soil mixing with a blade. Also, do not make burn piles on top of stumps. Fresh stumps will not burn, and are most unpleasant to hit with your tractor or to maneuver around.

The final step is to plant seedlings and/or seed the rehabilitated burn piles. Natural tree seedling germination is often abundant on such disturbed sites if you are willing to wait a few years. An irregular soil surface that has not been driven over too often by a tractor is a great seedbed and fairly resistant to erosion. If a pile is burned in late fall, spring is the time to rehab when the soil has thawed and dried slightly as water saturated soils can easily lose their structure and be compacted. Typically 40-100 seeds per square foot are recommended for adequate occupancy of new grass seedlings. As a trial I seeded Dutch white clover, Paiute orchard grass and native Mountain brome (Figure 4) on random quarters on 12 rehab piles. These species are used by a variety of wildlife, well suited for such sites, and easily purchased. After one summer I found varied results, with orchard grass consistently performing the best, Dutch white clover providing surprisingly good cover on the mildly shaded and moister sites, and very poor responses from the Mountain brome (Figure 5). Seed size is very different for these three species with clover providing 24 tiny seeds to every 12 of orchard grass and 1.6 seeds of mountain brome. The large size of the mountain brome seeds may have led to a lot of predation from a local flock of wild turkeys, since this species has a good reputation for germination. It also proved more expensive to purchase because to cover the same area as the other two species, more pounds were needed. A “no-treatment test” was also seeded on a valley bottom burn-site without rehab and resulted in virtually no seedling recruitment.



Fig 4. Seed size comparisons for white clover (top), orchard grass (middle) and Mountain brome

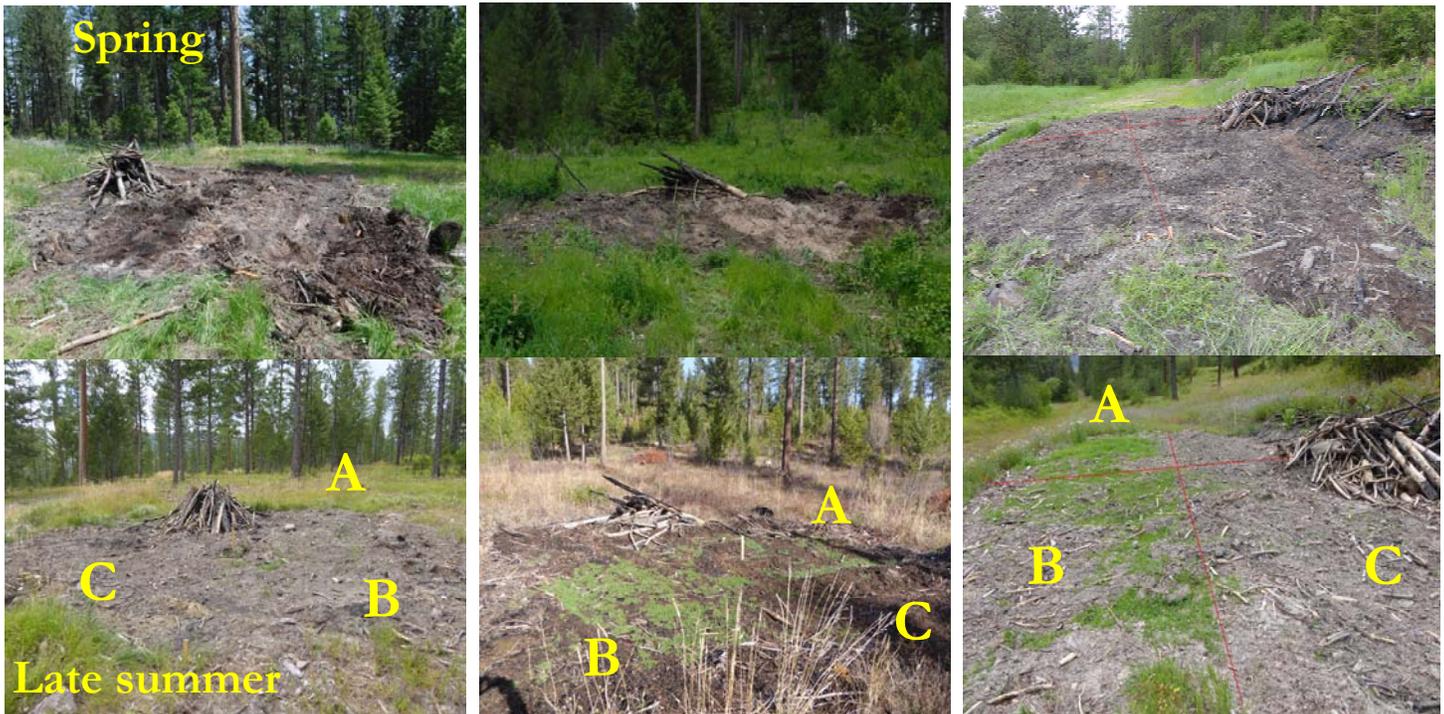


Fig 5. Burn pile location and conditions varied from a dry ridge top (left), mid-slope (center) and valley bottom (right). The dry ridgetop site showed the poorest response though wild turkeys frequently used the site as a dust bath. North and east aspects and the higher humidity in the valley bottom showed good responses from orchard grass (A) and Dutch white clover (B) with poor response from Mtn brome (C). An important consideration is that herbicides cannot be used over clover to control weeds.



Forest Stewardship Foundation

Ed Levert, Chair

By now most of you know about the Montana Forest Stewardship Foundation so I won't bore you with a bunch of details. We simply support those good things that are happening in the way of providing education for forest landowners and others. Of course, we can't do much without financial help from you, so give us your support by becoming a member.

2016 has been a good year for the foundation. We had a great forest landowner conference in Helena as a co-sponsor with Northwest Management and the Society of American Foresters. We are already planning for the April 21, 2017 conference. In conjunction with this year's conference we once again sponsored a Ties To The Land Workshop on successional planning for passing properties on to the next generation. On April 22, 2017 there will be another workshop on this subject in Helena.

Getting out the word on good forest management has been a constant motivator of our efforts. Besides the bi-annual Forest Steward's Journal that goes out to over 1200 we are now in the process of launching an exciting new web site. Here you will be able to read the journals, keep track of upcoming events, view pictures and videos of forest activities, sign up for membership and much more.

What got us started in the first place almost 25 years ago was the forest stewardship workshop program and we continue to support that program to this day. We are prepared to offer financial support to the workshop program if they experience any significant deficits. Another activity we are helping support in the amount of \$500 is the video being jointly sponsored by Tree Farm, DNRC, F. H. Stoltz Land and Lumber and others on how to go about conducting a timber sale; who to contact, the benefits associated with a timber sale and other valuable information for the forest landowner.

The final planned sponsorship for our foundation is a \$250 contribution to the upcoming Montana Forest Collaboration Network's December 5-6 conference in Helena. We support efforts to find collaborative solutions to issues on natural resource issues.

So in summary we have had a very productive year and look forward to an exciting 2017. I encourage you to become a 2017 member of our foundation by sending \$25 to the Forest Stewardship Foundation; PO Box 1056; Libby, MT 59923.



SAVE THE DATE

April 21, 2017



2017 Montana Forest Landowner Conference

Radisson Colonial Hotel
2301 Colonial Drive
Helena, MT 59601

Ties To The Land

April 22, 2017

For more information and registration form is available at: <http://mtlandowners.com/>

Montana Master Forest Steward Program— An Advanced Curriculum for Forest Landowners

Martin Twer, BioEnergy Associate Specialist; MSU Extension Forestry

One of the primary and most consistently offered forest-landowner oriented educational programs has been the Montana Forest Stewardship Program. The goal of this program is to help landowners assess their forests, develop short and long term objectives for their lands, and write a plan that reflects their personal objectives and resource potential for their land.

The initial Forest Stewardship Program is complemented by the multiple-workshop Montana Master Forest Steward Program (MMFSP). To gain the status of “Master Forest Steward,” landowners are required to complete seven core courses and three elective courses for a total of ten courses. Landowners who complete this program will be recognized with a certificate.

Each course provides participants an opportunity to find out about a new subject, study a familiar topic in more depth, interact with and learn hands-on from professionals as well as fellow landowners, and complete a subject-specific supplement to their existing Forest Stewardship Plan. While most of the classes are one-day, some are offered as two days, either back-to-back or with a week in between to allow landowners to conduct an inventory of their land regarding a specific topic, and return a week later to discuss their findings and hear about possible management considerations.

Since we are still in the process of scheduling our workshops for 2017 please visit our online educational calendar <http://www.msuextension.org/forestry/calendar.html> for the most current information.



From an educational perspective we think it is important that landowners who enter the Master Forest Steward Program workshop series are presented with the approach that the initial Forest Stewardship Workshop is a first step in caring for their forest, and that additional information and knowledge is offered as they continue to learn about their land and adjust their management plan to meet new expectations and changes to their forest. By offering a Master Forest Steward curriculum we not only give landowners the opportunity to pursue more in-depth training, but will also present them with an acknowledgement of their commitment, and achievement.

For more information on this program see online at <http://www.msuextension.org/forestry/mmfsp.html> or contact Martin Twer (MSU Extension Forestry BioEnergy Associate Specialist) by phone (406) 243-2775 or email martin.twer@cfc.umt.edu.

The Next Generation of Family Forest Landowners and Natural Resource Professionals

Martin Twer, BioEnergy Associate Specialist; MSU Extension Forestry

For over 25 years, the Montana Natural Resources Youth Camp (<http://mnryc.org>) has provided young people an opportunity to study in an outdoor classroom the scientific principles, economic realities, historical heritage, and social perspectives of natural resource management today, to help future leaders in their quest to gain a perspective that is informed and progressive.

Campers spend one week (July 9-14, 2017) in the rustic setting of The University of Montana's Lubrecht Experimental Forest learning about Montana's natural resources. The accommodations are comfortable, the food is great, and the instruction and friendships are the best!

The camp is open to all youth ages 14-18. The full cost of the camp to students is \$300 which includes meals, supplies, and lodging. Campers are encouraged to contact their local Conservation Districts, which usually offer significant scholarships to our camp.

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

Student teams also compete in a land-use simulation game where they manage a 3,800 acre ranch for 20 years. As in real life, teams must make hard choices between profits and conservation ethics, especially if they face poor commodity prices. Most students enjoy the competition and have the typical reaction of, "Wow, I never knew that making a living by managing land was so hard."

An advanced level curriculum, the Conservation Leadership School, is offered for returning campers (fee \$350), including an overnight camping trip into the mountains.

For more information contact Martin Twer, Camp Director, phone (406) 243-2775, email director@mnryc.org, or visit the camp website <http://mnryc.org>.



Keeping up with the Climate

Peter Kolb (PhD), MSU Extension Forestry Specialist

The rhetoric about climate change continues to keep us on our toes as differences in opinion about this phenomenon exist within the general population, legislators, and the academic world. So who and what do we believe? Science is often touted as the only credible source, yet that term defines a process, not an institution. In other words, the process of defining a question, developing experiments to test cause and effect relationships, and interpreting the data into something that may be meaningful to better understand the initial question is “science”. The process is messy because we may ask the wrong questions and test the wrong relationships, and there may be assumptions that are wrong and really interfere with the experimental tests we develop. Yet over time, with multiple tests, critical review and more tests, this process builds on proven knowledge and has given us a basic understanding of how the world works according to physics, chemistry and biological principles. This has allowed technologies to develop that our grandparents never dreamt possible, but also show us that the world is a very complicated place.

The Earth’s climate, and how it functions is the whopper of messy and complicated processes. Those working on how oceans, landmasses, atmospheric gases, solar output, cosmic radiation and biological organisms interact have developed some pretty good understandings of how each of these factors influences our global energy budget, which in turn creates the climatic differences across continents. Each has its areas of knowledge that are well understood, and areas of knowledge where there is less confidence. Combining all of these different and complex data and knowledge pools into models that predict when the mix in the pot we call Earth boils, remains daunting but not impossible. This is also why just about every research institute across the world that deals with climate has developed data and theory based models, and the most recognized of these (90 independent models in total) all show a warming Earth with greenhouse gases as the main driver (See Figure 1). However, there is tremendous variability among models how much and how fast the Earth’s surface and atmosphere are predicted to warm.

Several years ago, Dr. John Christy, a climate scientist at the University of Alabama in Huntsville, and one of the lead scientists to develop a satellite monitoring system of the Earth’s temperature, published a news release where the actual temperatures he measured did not seem to reflect the models predicted temperature increases (Figure 1 lower dotted lines). This revelation caused an uproar in the Climate Change community and started a feud that persists today, notably between Dr. Christy and Dr. Gavin Schmidt of the NASA Goddard Space Institute who claims the models and measured temperatures are showing the same trend.

So who is correct? This is a hard question to answer for reasons that go back to the earlier statement of: “it’s complicated!”. First off, most of the climate models are what are called “relative process models”. Their value is that they are based on mathematical formulas that predict different chemical and physical relationships. For example, most of the radiation that penetrates the Earth’s atmosphere is in the ultra-violet and visible light spectrum with specific wavelengths being blocked and others reflected by molecules of different size in the atmosphere. Hence short wavelengths (blue) might be reflected by gaseous nitrogen and longer wavelengths (red) are reflected more by larger molecules (water and dust) which

respectively gives a clear blue sky, or a red sunset when a storm or cold weather (ice crystals) are approaching. You may recall that ozone absorbs the most dangerous of the ultra violet wavelengths. How concentrations of nitrogen and water in the atmosphere interact with incoming solar radiation can be measured and modeled with mathematical equations most of the time, except that the atmosphere is not a perfectly uniform goldfish bowl full of water, but more of a swirling whitewater stream where concentrations and temperatures vary with low pressures and high pressures, solar flares, cosmic radiation, and even changes in our own Earth's magnetosphere that influences how many charged particles can enter the Earth and where. (Google "changes in the Earth's magnetic poles" for more information on this topic). Now add to this simple relationship the mathematical equations that predict how different wavelengths reach the Earth's surface, their warming

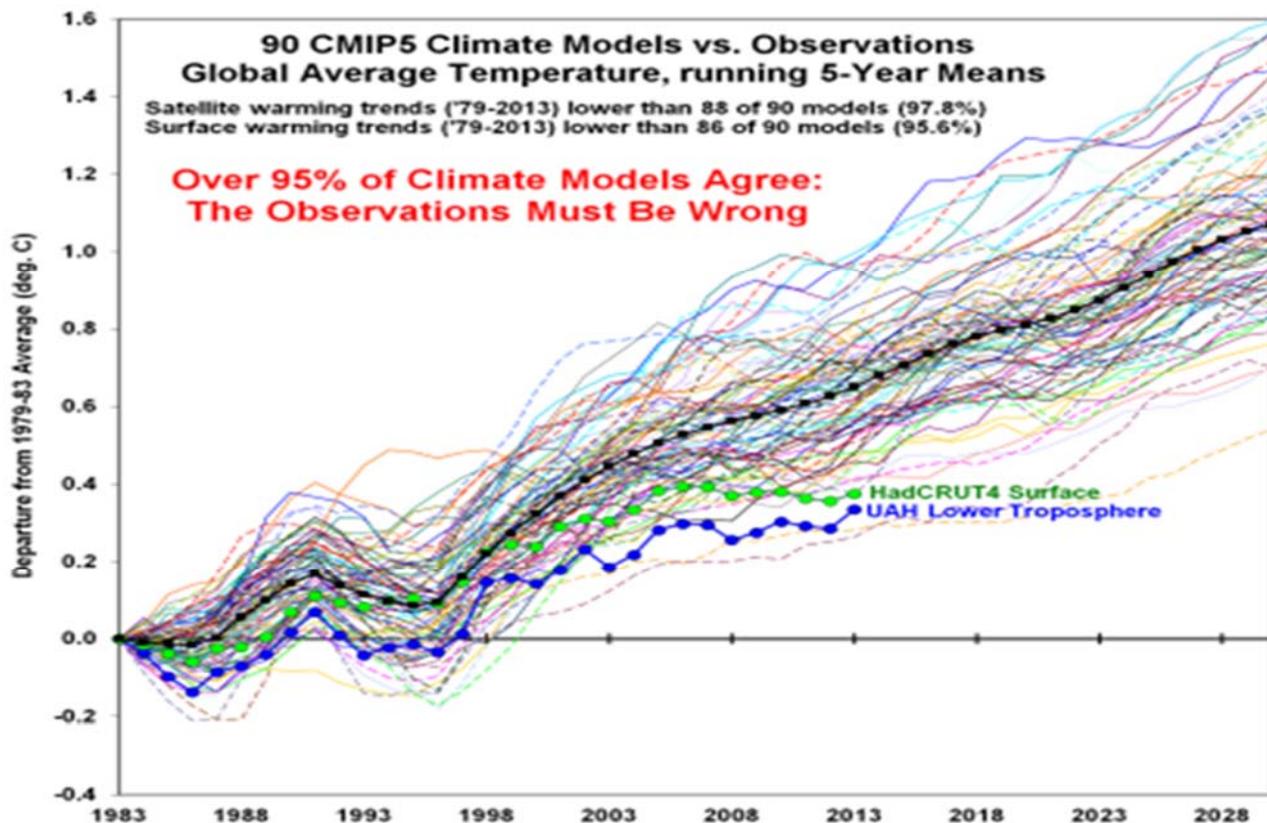


Figure 1. Climate predictions for the future using 90 independent climate models (continuous lines). Dotted line shows average future prediction, and dotted lines ending in 2014 show actual measurements according to Dr. John Christy.

effect on different surfaces (water, forests, rangeland, dry plowed fields, wet plowed fields, etc.) and how much radiation is reflected or reemitted back into space. Next, how much of the reflected or reemitted radiation is absorbed by the different components of our atmosphere, and reradiated back to Earth. Did you know that water vapor is by far the most abundant greenhouse gas? (This is why cloudy days are often not as hot in summer or cold in winter.).

Teasing out how much of an effect increasing Carbon Dioxide concentrations have on this energy exchange ping-pong game going on between our atmosphere and the Earth's surface is very difficult. It requires millions of data inputs from around the world, and relies on the robustness of each

mathematical model that predicts how any one of the hundreds of variables will affect the other variables. The climate models that do this are extraordinary feats of mathematics and physics that can only be accomplished with supercomputers that analyze millions of data inputs and variations, and their strengths are to allow us to play the game of “what-if” we change any of the variables. Their weakness is that they work on averages and probabilities defined by the mathematical equations that describe each individual phenomenon. This means that there is tremendous error in such complex modeling when it comes to predicting absolute future numbers, such as the temperature in Missoula in July of 2035. There is too much variability associated with every average value used to compute an outcome considering the number of input values required. However, there is a difference between being able to predict an absolute value and a trend. Trends show that even with the variability associated with each calculation, running millions of possible data sets through the models, an overwhelming number of results indicate more energy will be retained in our atmosphere with increasing greenhouse gases. The fact that all the models predict a warming trend should be taken very seriously, even if there is disparity between how fast and how much this will occur.

So back to reality. Who is correct and who is wrong in this debate among the experts? Nobody knows, because it all depends on inputs such as what starting temperature do you use? When do you use them? How are the starting temperatures even calculated? Thus when these models are recalibrated to other starting temperatures such as in an article Dr. Schmidt presented (Figure 2) the actual temperatures are actually much closer to the reality of the Earth’s temperature. So whose calculations are correct you might ask? Does it really matter? Each graph shows an increasing temperature, and that trend is where the real applied value can be derived when considering the long-term character of tree growth and forest survival. Warming temperatures mean an increasing probability for future drought, wildfires and insect pests.

Models and data are also continually being improved, so don’t lose confidence in the scientific process yet. Several years ago the issue of the Sun’s output was brought to the attention of one of the most prominent climate change physicists, Michael Mann, when he was on a trip to Montana. He dismissed the question as “unimportant”. Today, the issue of the sun’s lesser output is being used in part to explain (Figure 3) why the models’ predictions overestimated warming, along with the impacts that aerosols and volcanic ash have on blocking solar radiation from entering the Earth’s atmosphere.

So what do we know about this next year? Over the past several years weather models (compared to climate models) have shown themselves to be fairly accurate in predicting the future year for NW United States. The west coast transitioned from a “super El Nino” (warm Pacific ocean surface and warm weather for us) to a “La Nina” this last fall and winter and thus we had cooler temperatures and more snow. All of this was forecast about a year ago by NOAA experts using a variety of data sources and weather models. Predictions for the upcoming summer and next fall, however, show a perfect split between weather models, with some indicating a continued weak La Nina and other predicting a weak El Nino. Thus we are supposed to have an average summer, with some drought, some rain, and some hail. (Plus or minus a tornado and summer snow-storm. It is after all, Montana!)

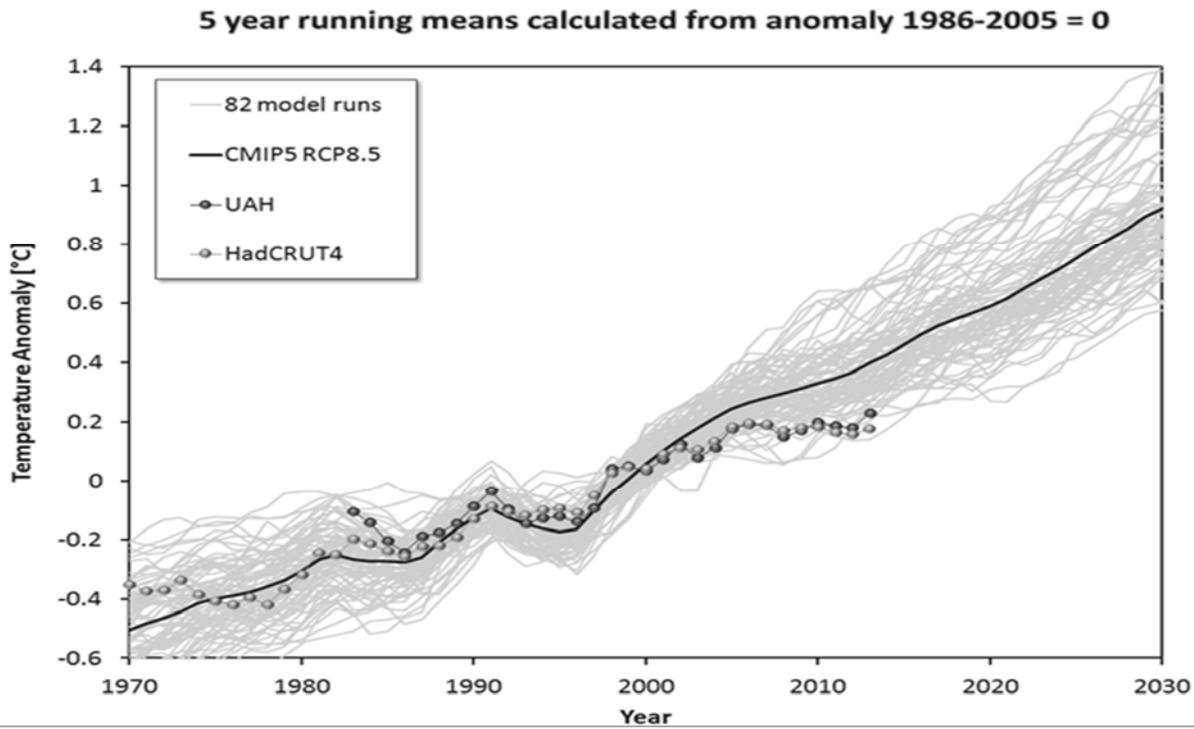


Figure 2. Corrected actual measurements of climate (dotted lines) compared to 90 climate model predictions (solid lines) according to Dr. Gavin Schmidt.

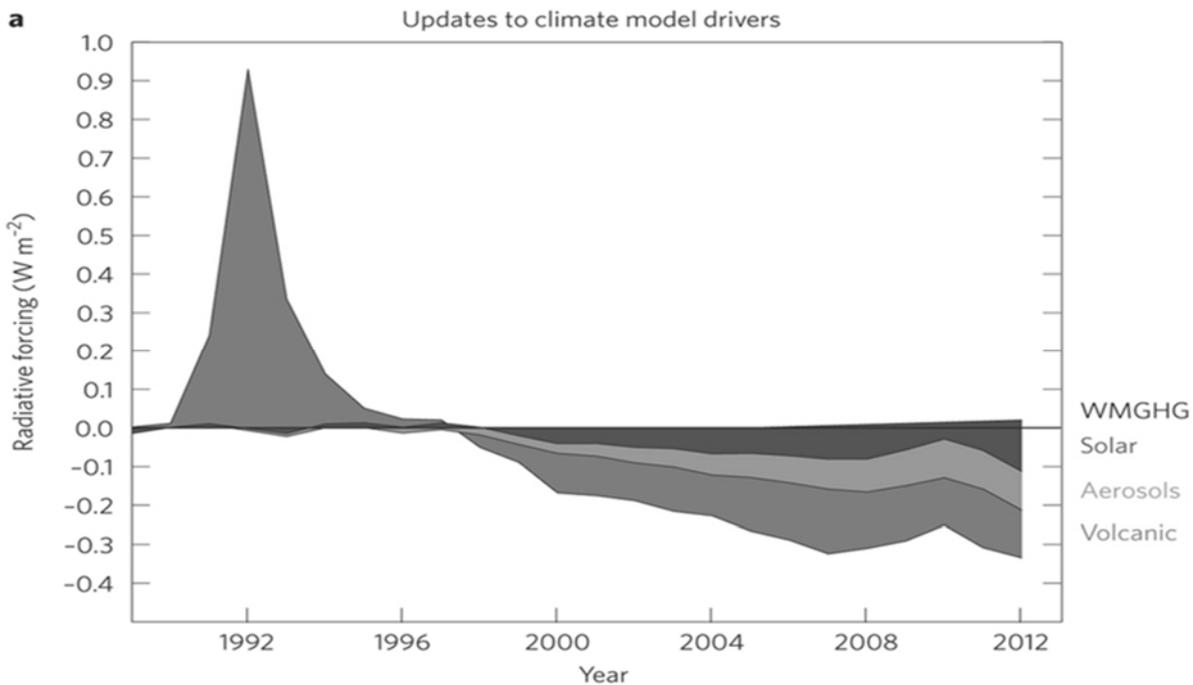


Figure 3. Impacts of various inputs on Earth's temperature with Carbon Dioxide impacts represented by the peak on the left, and combined impacts of diminished solar output, aerosols and volcanic ash on right. These inputs are now used to correct climate change models and get them closer to actual measurements of the Earth's temperature.



Transferring Joint Tenancy Real Property Without Probate

Marsha A. Goetting, Ph.D., CFP®, CFCS, Professor and Family Economics Specialist; Jackie Rumph, MSU Yellowstone County Family and Consumer Sciences Extension Agent; and Keri Hayes, MSU Extension Publications Assistant

Whose name appear on the deed of the forestry land you own? If there is only one name on the deed, the property is held in *sole ownership*. Property titled in sole ownership must pass through probate in the district court to assure that it is legally distributed either by the deceased's will or Montana's statutes on intestacy (dying without a will).

If your deed is worded as "John Jones and Mary Jones," with no mention of a joint tenancy, Montana law defines the ownership of the real property as *tenants in common*. If there are two owners, each has an undivided interest of one-half; three owners, an undivided interest of one-third and so on. When a tenant in common dies, his/her interest must pass through probate to assure that it is distributed either by the deceased tenant's will or Montana's statutes on intestacy (dying without a will).

Joint tenancy with right of survivorship (JTWRS) is a form of co-ownership in which two or more persons own the same property. A joint tenancy in real property can be held between married couples, siblings, parents and children, or persons who are not related. JTWRS is the most popular way of titling property in Montana

The typical wording used to create a joint tenancy in real property is "*John Jones and Mary Jones as joint tenants with right of survivorship and not as tenants in common.*" The word "or" between the owners' names is not typically used on a title or deed for real property.

When real property is owned in joint tenancy with right of survivorship, upon death of one of the joint tenants, the property passes automatically to the surviving joint tenant(s). Even if the deceased had written a will naming someone other than the surviving joint tenant to receive the real property, it automatically transfers by Montana law to the surviving joint tenant. No probate is required.

Example A: Donna and Jim owned their forestry lands as "*Donna Chambers and Jim Chambers as joint tenants with right of survivorship.*" Later Jim wrote a will leaving the land to his son from a prior marriage. Jim's son did not receive the property. Donna automatically became the owner because the land was held in joint tenancy with right of survivorship between Donna and Jim.

Removing deceased joint tenants name

The transfer of ownership to real property held as joint tenants with right of survivorship is often overlooked until the surviving joint tenant (*very often the surviving spouse*) or beneficiaries of the surviving joint tenant decide to sell it or encumber it (*for example, use the real property as collateral for a loan*). At that point they may be faced with the time consuming and expensive process of proving one or all joint

tenants are deceased. Closings can be delayed while beneficiaries submit proof of the death of the joint tenants.

Although property held as joint tenants with right of survivorship passes automatically to the surviving joint tenant or tenants without passing through the district court probate process, the Montana legislature has provided a way for the public records to reflect such a transfer. The surviving joint tenant(s) can file a document with the clerk and recorder in the county where the real property is located. The surviving joint tenant provides the following information:

1. A statement that one holder of the joint tenancy interest is deceased, the date of death, and that the deceased holder's interest in the property is terminated; and,
2. A legal description of the real property held by the deceased person and surviving joint tenant or tenants.

An example document, *Acknowledged Statement of Termination of Joint Tenancy* is available at the Senior and Long Term Care Division, Department of Public Health and Human Services website: <http://dphhs.mt.gov/SLTC/aging/legalservicesdeveloper/legal-forms>.

The Acknowledged Statement must be signed and acknowledged before a notary before it will be accepted by the clerk and recorder in the county where the property is located. The recording fee for the Acknowledged Statement is \$7 per page if it meets the legislative "standard" format. The form at the Senior and Long Term Care Division website meets the legislative "standard."

The surviving joint owner must also present a completed *Montana Realty Transfer Certificate (Form 488)* to the clerk and recorder. This confidential tax document is required by the Department of Revenue from any party transferring real property. The form is available at any Montana county clerk and recorder's office or online www.revenue.mt.gov, Search "Realty Transfer Certificate" or "Form 488."

After the *Acknowledged Statement* is recorded, title to the property will appear in the name of the *surviving joint tenant(s)*, typically the surviving spouse. Future real estate tax bills from the county treasurer's office are sent to the surviving joint tenant(s) who now hold title to the property.

A similar procedure to update the public record ownership of real property on the death of a *life tenant* without probate has also been provided by the Montana legislature. A life estate is the right to the possession, use and income from a property for the duration of a person's life.

Example B: Jane had a house titled in her name only. In her will Jane left the house to her husband, Jack, for his life, and then at his death to Susan, her daughter from another marriage. That wording forms a life estate with Jack as the life tenant. He cannot sell, gift or leave the house to someone else in his written will. As the life tenant he is responsible for paying property taxes, insurance premiums, and needed repairs on the house. At Jack's death the property passes to Susan, who is termed the remainder man. Susan can file a document indicating the life tenant is deceased and the property passes to her as the remainder man.

Further information is available in the MSU Extension MontGuide: How to Transfer Real Property Owned in a Joint Tenancy or in a Life Estate Without Probate. <http://store.msuextension.org/publications/FamilyFinancialManagement/mt201606HR.pdf> or contact your local Extension office to



Managing for Changing Site Conditions

Cameron Wohlschlegel, Forester, F.H. Stoltze Land & Lumber Co.

What is a Montana Tree Farmer to do when the weather seems to swing in extremes? From really hot to extreme cold, record drought to record rains and record snowfalls. Experts seem to agree that climate change is happening. Atmospheric, ocean temperatures, and Carbon Dioxide levels are on the rise. But what does that mean to Montana weather and Montana forests? When talking tree management you always have to think long-term. As a region we're forecasted to receive most of our moisture in the form of snowfall and generally have an increase in temperature. However these "regional" models cannot forecast our microclimates. As a forester for F.H. Stoltze Land and Lumber I plan on using a combination of monitoring, continuing education, and the future predictions of climatologists as tools in helping plan forest management.

I recently was able to attend a class on Climate Change and Forestry in Coeur d'Alene Idaho. This presentation was given by a leading climatologist from Virginia. His models suggested that we are going to see more snow in the winter and less moisture in the summer. Also, what I thought was interesting was he was able to label my observation of increased storm intensity due to an increased vapor pressure deficit. This means with increased temperature our atmosphere has the ability to hold more atmospheric moisture; which leads to higher intensity rain events. We also discussed adaptability of trees. Leading experts believe that Epigenetics will play a role in the survival of tree species to a changing climate. Epigenetics in relation to climate change refers to drought stressed trees ability to produce more drought tolerant seedlings.

When I think of forest management and climate change I think of changing site conditions. We all know how important it is to match the right tree species to the right growing site. Hot and dry sites could become intolerable to trees, while super saturated wetlands could become suitable for commercial timber species. In general what does a warming climate mean and how can a tree farmer plan ahead? I believe educating yourself on the latest trends and models of the climatologists is good as they are always changing becoming more complex with increasing variables. I also think you as a Tree Farmer need to know your forest; know your soils, know your tree species, and in specific learn your micro climate. Are you in a snow belt? Do you receive the majority of your moisture in the winter or spring? What aspect does your property face? What elevation are you at? The answers to these questions and what it forecasted to come could help you in estimating how a changing climate could affect your specific site.

With all this unpredictability of climate change and changing site conditions it appears to me that we need to cultivate a super tree or develop improved native species stock. These trees will be able to handle variable extremes in temperature and moisture on an annual basis. While we are at it let's throw in insect, disease, and fire resistance as well. This tree will also be square with no bark and grow on any site and at all elevations...perfect. OK, so we don't have this super tree. What we do have is our native species own genetic adaptability and a theory called assisted migration.

What is assisted migration in relation to trees? Assisted migration is the practice of moving trees from one area to another. In the case of a warming climate we can actually use seedling stock from 2° Latitude to the south and transplant that growing stock north 2°. This is in prediction to the shift of warmer and potentially dryer site conditions. Also, we can migrate low growing stock to higher elevations. This is the general theory of assisted migration; take trees that have already been adapted for a warmer climate and migrate them to your location in anticipation and long-term planning that someday your micro-climate and site conditions will mimic where those trees came from. With the use of assisted migration we can maybe help mitigate the impacts of climate change on our forests and help impart some genetic diversity into our forests through the use of these preadapted specimens.

This also raises questions about adaptability and epigenetics. How will my local trees respond to accelerated climate change? Is there enough genetic adaptability built into their DNA? I believe that yes some trees will die, we may even see some sites not tolerate certain species as these warming trends occur over time. However, there are always winners and losers. The survivors to the changing climate and all the stressors that come with it may possess some of those super tree genetics and adaptations we talked about earlier which will make your forest stronger and more resilient.

There are a lot of questions and theories associated with forestry and climate change and what the future will hold. I believe the best way a Tree Farmer can plan forest management activities with a changing climate is to continually monitor your forest for changing conditions and educate yourself with the latest theories and models. I've talked about some of the forest management challenges climate change could bring, but could our forests potentially benefit from this change? A potential positive outcome of climate change could be a longer growing season and increased growth. Warmer temperatures and a carbon rich atmosphere with sufficient rainfall could have the makings for better growth on some sites. The most important aspect of growing trees is matching the right species to the right site. With monitoring, continuing education, and an understanding of your microclimate I believe you as a Montana Tree Farmer can manage for changing site conditions.

The Wildlife Page

Peter Kolb (PhD), MSU Extension Forestry

Forest landowners value wildlife as much as they value their trees—at least so say the many landowner surveys conducted across many different states. An addition to our annual newsletter will be the “wildlife page” where we hope to share wildlife tips and stories that all of you have to offer. If you live in the forest long enough, you will encounter wildlife, and quite often those encounters will not be the fleeting glimpse of a critter high-tailing it through the trees. Animals are wary of anything new, but unless discouraged by us will often get comfortable with us and our activities before we know it. Sometimes they get too comfortable with us! So please share your stories with us so we can collectively learn to live with, and even enhance the lives of the critters we share the forest with. We will give you full credit for your story, or keep your experience anonymous, whatever your preference. If you want help telling your story we will help you write it. We also plan on purchasing several game camera’s that we will loan you for a month at a time so you can capture your wildlife neighbors and share your pictures. All stories will be archived on our web page under the heading “The Wildlife Page” and eventually we will publish a book called “Montana landowner wildlife stories” that we will sell to help support the Montana Forest Stewardship Program. Since my family and I have lived on 20 acres of forest these past 21 years I will start the series off with some of our encounters.

Bobcat in the Barn

This past fall I was fortunate enough to tag a small whitetail buck the last weekend of the general hunting season. As most people do I hang this critter for several days to let natural processes tenderize the meat a little, though the main reason is it typically takes me a little time to get around to the butchering task. My open air hay-barn is the natural place where I can hang it from a beam high enough to keep it out of reach of my dogs and out of sight of the ravens that frequent our place. And then the -10F weather hit and the deer turned into a solid frozen block. Several days after hanging the critter I noticed something was chewing on the carcass and it looked like it had canine teeth. After carefully questioning my dogs, they managed to convince me that it was not them, but I decided to follow the “trust but verify” axiom I had learned from some famous person and set up my game camera to catch the villain in the act. What I captured surprised and delighted me, and upon thought also gave me reasons of concern. I did not mind sharing some meat with this skillful hunter, but I did mind him taking the best cuts and worried about the potential impact





Caught in the act!

he might have on my daughters two mouser kitties and wife's flock of chickens that not only provided us with eggs but endless entertainment as they wandered around the yard in search of bugs. So how to discourage such behavior? Of course the obvious answer was to remove the deer, but it was still frozen solid and I did not have the immediate time to thaw and butcher it. I tried putting a role of wire under the deer as discouragement but he just jumped over it. My final solution was to set out several old muskrat traps underneath the deer and cover them with several layers of thick cloth. The concept was not to hurt the bobcat, but simply to pinch and scare him so that our barn was not a comfortable place to be, hence the thick cloths over the traps that

I tested many times with a stick to ensure the cat (or our dogs) would not get hurt. On hindsight mouse traps might have even worked better. The end result was that the cat set an Olympic record in high jump as a trap snapped (caught on camera), and my strategy worked as he fled the barn and never came back —though I also removed the deer carcass a week later. Of course he is still around and has been picking off members of our overwintering wild turkeys—having reduced the flock from 50 down to 32 over the past 3 months. But then again, we had too many of these goofy (and messy) birds around anyways. Both my wife Robin and I have seen him several times, and he is a beautiful (and well fed) specimen. Now if he would only focus more time on the over abundance of squirrels we have around!

The waterhole

Although we have a pond and a creek running through one end of our property, the backside is high and dry with the exception of a small depression that holds snowmelt water for a month or two in early summer. In the past 20 years I have witnessed a tadpole crop in that little depression only once. Thus in an effort to keep water in it a little longer for better frog habitat, I used the bucket on my tractor to scoop it out a little deeper ending up with a depression 1 1/2 feet deep and a rectangle about 8 x 16 feet in dimension. I seeded the smoothed out fill and depression with Kentucky blue grass. After one season the grass filled in nicely, and the little “pond” holds water about a month longer into late July, but the water has remained muddy. Clearly the deer, moose, bear and coyote tracks indicated animals were using it but why was the water remaining so muddy? Placing a game camera next to the pond soon revealed the cause. Several does were bringing their fawns to the depression to drink, but I guess kids are the same in every species — they love to play in water and mud and did so exclusively in the little pond, for hours and hours, every day.





Root Disease Effects on Stand Structure and Forest Succession

Kathleen McKeever, Forest Pathologist, Montana DNRC, Forestry Division

Tree diseases and insect pests influence how our forests change over time in a process called succession. A successional stage of a forest at a given point in time is defined by the structure (stem size class & density), and the cover type (species composition).

Root disease pathogens are generally gradual influences that encourage stable forest succession. In the interior west, the majority of root disease is caused by four pathogens, *Armillaria* spp., *Heterobasidion* spp., *Phellinus weirii* (laminated root rot) and *Phaeolus schweinitzii* (brown cubical rot). Although they are biologically different, these fungi cause common patterns of mortality and influences on forest succession. In general, they are long-lived (potentially > 1,000 yrs!), can kill both living trees and persist on dead tissue in decaying stumps, and are often found working in concert on a given site. Douglas-fir and grand fir are among the most susceptible conifer species to root disease in the interior west; however, nearly all species of native conifers are susceptible to at least one of the four fungi.

Root disease infestations can have a few different successional outcomes with varying structural characteristics and species arrangements. If a stand is composed mostly of small-diameter trees, root disease may act to sustain a small-diameter structure by continuously killing trees before they are able to mature. Another successional outcome in stands with severe root disease may be evidenced as a reversion from pole or sawtimber sized trees back to a small-diameter successional class due to the loss of the larger-diameter trees. This is especially common when root disease occurs in conjunction with natural beetle outbreaks where larger-diameter trees are more frequently attacked. Moderate root disease infestations may allow stands in a seedling/sapling stage to progress to pole-size or mature trees, but the structure of the remaining stand may have poor stocking density and fragmented canopy cover. Fire suppression may augment the effects of root disease in a given area by preventing the generation of natural openings that favor more resistant pines, resulting in a condition where susceptible conifer species remain.

Although pathogens can act as pests that affect our forest productivity and economic gains, it is important to remember that natural systems are dynamic and that mortality is an important part of ecosystem function and succession. As forest owners and stewards, we have learned to adapt by embracing new timber species, introducing controlled fire regimes, and implementing restoration to insure the longevity of our resources.



Save the Date

April 21 & 22, 2017

**Forest Insect and Disease
Workshop in Trego, MT**

To register, contact Michael Justus at
406-293-2711 or MJustus@mt.gov



Weyerhaeuser is proud to do business with Montana tree farms, and to practice sustainable forestry on our timberlands in northwest Montana.

GROWING A TRULY GREAT COMPANY

 **Weyerhaeuser**
www.eyerhaeuser.com

(406) 933-5981

FAX 933-5921



MARKS-MILLER POST & POLE, INC.

We purchase standing timber and/or purchase logs.

P.O. Box 125
Clancy, MT 59634

Pressure Preserved Wood Products
www.marks-miller.com

Gary D. Marks
gary@marks-miller.com
Cell (406) 439-4210



Our professional **forestry, wildlife and range** staff has provided service to forest landowners across the **Inland Northwest since 1984**. Let our experience work for you.

- Western Spruce Budworm Control
 - Mtn Pine Beetle Prevention & Mgt
 - Wildfire Hazard Reduction
 - GIS/GPS Mapping & Analysis
 - Timber Harvesting
 - Timber Cruising
 - Forest Inventory
 - Reforestation
 - Expert Witness
 - Forest Stewardship Planning
 - Slash Disposal
 - Forest Management Auditing (SFI, FSC)
- www.consulting-foresters.com**

Helena Office:

(406) 442-7555

nwmanageMT@nmi2.com

Moscow, ID Office:

(208) 883-4488

nwmanage@
consulting-foresters.com

Deer Park, WA Office:

(509) 276-4699

DeerPark@
consulting-foresters.com

• **FREE initial
consultation**

F.H. Stoltze Land & Lumber Co.

Services We Offer to the Landowner:

Forest Tract Planning
 Tree Selection & Marking
 Harvesting and Marketing
 Improve Aesthetics & Recreational Opportunities
 Reduce Wildfire Hazards
 Homesite Clearing

Forest Stewardship for the Private Landowner



IMPROVE the health of your forest

PROTECT your home and forest from fire

MANAGE your land for the future

ENJOY your forest and the wildlife



Purchasing Logs and Stumpage We Specialize in Meeting Landowners Stewardship Goals!

We are actively purchasing Ponderosa Pine, Lodgepole Pine, Engelmann Spruce, Alpine Fir, Grand Fir, Douglas-fir and Western Larch. We offer competitive prices for logs, standing timber and timberland. Let our professional foresters help you meet your land management objectives.



406-892-7005

Serving Northwest Montana since 1912



TRICON TIMBER

BUILD AMERICA STRONG, SUPPORT THE AMERICAN TIMBER INDUSTRY
ST. REGIS, MONTANA WWW.TRICONTIMBERLLC.COM (406) 649-2485

We have over 125 years of experience in helping land owners manage their forests. Call today and talk to one of our Forest Professional for an assessment of your land.

Foresters Information:

Eastern Montana/Helena Area: Curtis Cochran 406-370-6579

Email: curtis Cochran@tricontimber.com

Western Montana: Mike Lilly: 406-396-8367

Email: mike.lilly@tricontimber.com

Western Montana/Idaho: Ken Carter: 208-290-2543

Email: ken.carter@tricontimber.com

2017 Calendar of Workshops and Events

Workshop/Events	Date	Location	Information
MT Forest Landowners Conference	April 21	Helena	http://mtlandowners.com/
Ties to the Land	April 22		
Forest Stewardship	May 11-12 & 19	Great Falls	Register by April 28th
Forest Stewardship	June 15-16 & 23	Libby	Register by June 2nd
Forest Stewardship	July 13-14 & 21	Columbia Falls	Register by June 28th
Forest Stewardship	August 10-11 & 18	Thompson Falls	Register by July 28th
Forestry Mini-College	February 2018	Missoula	
MT Natural Resource Youth Camp	July 9-14	Lubrecht Experimental Forest	www.mnryc.org
Traveling Presentation "Era of Megafires"	April 7	Bozeman	http://www.msuextension.org/forestry/calendar.htm#mfsp
	April 24	Missoula	
	April 25	Kalispell	
	April 26	Helena	
	April 27	Seeley Lake	
Master Forest Steward	TBA	TBA	http://www.msuextension.org/forestry/calendar.htm#mfsp

Registration information <http://www.msuextension.org/forestry/calendar.htm#mfsp>

Follow us on our Facebook page at <https://www.facebook.com/MSUExtensionForestry/>

We would like your Feedback?

If you like/dislike certain things about this newsletter. 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



Watershed Consulting provides:

- Complete Land Stewardship Services
- Forest Assessments and Management Plans
- Light-on-the-Land Forest Work
- Arborist and Orchard Services
- Riparian Restoration
- Revegetation and Custom Growing
- Aerial Surveys and Mapping Services
- Floating Islands and Clean Water Solutions

To Learn More, Visit our Website:
www.watershedconsulting.com
(406) 541-2565

Serving Western Montana for 20 Years!

Tree Survival in Times of Environmental Uncertainty

Peter Kolb (PhD), MSU Extension Forestry Specialist

In almost all situations where a pest, pathogen or environmental stressor such as drought occurs, some plants survive and others perish. This has been the topic of research for decades now and some new tantalizing results are starting to emerge. The back cover picture is of a largely Douglas-fir forest at 5000 feet near Rogers Pass. This area is known for drought, and extreme wind and cold that along with shallow soils would not be considered super productive, but that still grows a decent forest of lodgepole pine and Douglas-fir with a few limber pines and spruce thrown in for good measure. Severe wind driven wildfires have also been known to be part of the natural history. Over the past decade the defoliator, spruce budworm, has ravaged the area along with mountain pine beetle on the lodgepole pine, and also pockets of Douglas-fir bark beetle and various other lesser pests and pathogens. What has been left is an interesting patchwork of dead and live trees, which begs the question: why did some survive and others die? This also has real relevance when trying to implement forest thinning or restoration. How do we decide what tree to leave and what tree to take?

Competition for light and water has been shown to elicit a very strong growth response for most plants. In other words, the ratio of shade to sun causes plants to produce growth hormones that stimulate energy allocations towards fast and tall growth such as long leaders in trees. This very characteristic is often used to select what we might consider the best trees for the site. Likewise soil water stress causes root growth stimulus, though this might be harder to see. Alternatively, wounding from herbivores or abiotic factors such as fire can stimulate a tree to produce various defense chemicals that make them less palatable to insects or fungi, or growth characteristics such as longer or shorter needles and thicker bark. Each tree species has different abilities to develop what are called “plastic responses”, or changes in growth as a response to some external stimulus. In addition, within a species, such as the Douglas-fir on the back cover, there may be different abilities among individuals to adjust.

There is, however, a conundrum that all trees as species and individuals must overcome. The accepted theory is that most plants will only do one at a time: grow or defend. Since a plant such as a tree only produces a certain amount of carbohydrate from photosynthesis, and competition with other trees is the most common stressor, most trees growing in a forest are stimulated to put all their energy into growth. This then is compounded when too much competition found in a dense stand not only stimulates growth, the tree lacks the ability to utilize the energy allocated to the tree crown for growth because there is not enough water and essential nutrients to metabolize that energy. Thus trees in this situation find themselves full of starch and sugar for growth, no defense chemicals, and the inability to grow because of the lack of water. Studies looking at sugar and starch loading in drought stressed trees has found large pools of these substances in the tree crowns, and this is the place where most insects first attack. A crude analogy might be backpacking in the desert with a pack full of sandwiches and no water. The coyotes will not only find you too weak to defend yourself, but with lots of additional food in your pack to make you twice the meal.

When we revisit the back page and look at the pattern of mortality, we may be seeing the impacts of several mechanisms. The individual genetics of each tree, the influences of local competition on those genetics (note trees on the edge of a meadow may have better survival than those within denser clumps), and the selection of insects for the weakest, but most nutritious trees (those that were growing quickly and are suddenly stressed). When we combine all these theories into a tree description, the most susceptible trees would be the tallest trees within dense clumps of trees. Open grown trees would not have been stimulated by competition to turn off their defenses to grow faster, and thus may just be bigger because they are reaping the benefits of getting enough light, water and nutrients. In such a situation, a surface fire, or manual pruning of lower branches might actually stimulate their defense genes to kick on even stronger, especially when faced with an epidemic of pests.

Alternatively, all the fuel created by this natural selection process, that left the most “defense oriented” trees on site alive and killed off the defense compromised trees, could allow for a stand replacing fire to develop that would kill the survivors, and thus reverse the entire selection process that just occurred. Some food for thought.



MSU Extension Forestry
W.A. Franke College of Forestry and Conservation
32 Campus Drive
Missoula, MT 59812-0606

NON-PROFIT ORG
U.S. POSTAGE
PAID
MISSOULA, MT
59812
PERMIT NO. 100

