

MISSOURI SOCIETY OF AMERICAN FORESTERS

2021 FALL NEWSLETTER

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From the Chair

By John Kabrick, MOSAF Chair

Serving as MOSAF Chair during the past two years sincerely has been an honor and a privilege. I will soon hand the reins to Michael Bill and I will move on to my next role as MOSAF Past Chair. I have known Mike for several years now and I know that he will do an outstanding job.

As of this writing, elections for Chair-elect and Secretary are in full swing. I thank Jim Barresi and Kristen Goodrich for running for Chair-elect and Angela George and Mike Norris for running for Secretary. Regardless of the outcome, MOSAF will have two outstanding new officers!



This is a good time to reflect on the things that we have done during the past two years to increase accessibility and membership in MOSAF. During the pandemic, we hosted virtual technical tours and business meetings to make sure that we could still “get together.” This past summer and fall we hosted single-day, in-person technical tours and business meetings, which eliminated the need for overnight travel and reduced an attendance barrier. We reached out to nonmembers and welcomed them to join or participate in our technical tours. We hosted monthly virtual “meet a forester” sessions with the Mizzou Chapter so that students could visit with foresters to learn more about what they do.

Connecting with students and new professionals have been important themes for MOSAF for many years. It is incumbent upon MOSAF members help students see the value of membership and mentor them as they transition into professional life. We continue to look for better ways to connect with students and mentor new professionals.

House of Society Delegates (HSD) Meeting

Mike Bill and I attended the virtual HSD meeting on November 2nd and here are a few highlights:

- Executive Director Terry Baker shared the good news that SAF membership nationally has increased a little this year. There were increases in the number of new members as well as increases in the number of renewals.

- Audrey McLennan, SAF Board of Directors Young Professionals Representative, has recommended that local chapters should nominate a “Young Professionals” representative or committee chair. She explained that this person’s role would be to help early career members to become more engaged in their local chapters. She defined “young professionals” as those younger than 40 years old or with less than 5 years of professional experience.
- Lori Rasor, SAF Director of Awards and State Society Relations, discussed the next steps towards incorporation. SAF is requiring each state chapter to become incorporated as a nonprofit. Mike Bill and I met virtually with Lori on November 19th to review our records. While preparing for this meeting, we were able to dig a little deeper into our chapter’s status and found that MOSAF is already registered with the Missouri Secretary of State as a nonprofit corporation. So, we were further along in the process than we realized. I have contacted David Larsen, the MOSAF Historian, to see if he can locate more information about our incorporation. We are still looking for the Articles of Incorporation. Mike and I will keep you posted as we proceed.

News from the SAF National Convention

One of the plenary talks at the virtual SAF convention that caught my attention was presented by Zack Parisa, the co-founder and CEO of NCX (<https://ncx.com/>), a “forest carbon marketplace.” Zack delivered his talk from Glasgow, Scotland, while he was also attending the COP26—the Conference of Parties on Climate Change—which included 45 nations discussing how to address climate change.

Zack explained that carbon storage by forests and the means for accounting for it were among the most discussed topics at COP26. Zack believes that carbon markets are the best option for managing carbon and that foresters are needed to identify the best metrics and management systems for accounting for and storing carbon.

Zack also noted that there is emerging interest in other types of forest crediting programs. For example, markets may develop for credits for maintaining specific kinds of forest habitat, biodiversity, water yields in forested watersheds, or for levels of reduced fire risk in forests. This interest is likely to increase the importance of credentialing like the SAF Certified Forester program.

During the Fall Technical Tour, Jason Deschu presented on how carbon markets are working for the Shannondale forest. Also, MOSAF is sponsoring a Carbon Market Workshop at the 2022 MNRC in February so there are opportunities to learn more.

Final thoughts

Once again, thank you for allowing me to serve as MOSAF Chair for past two years. I look forward to seeing you at the MNRC and at the Winter Business Meeting. Remember, it’s a great day to be in forestry! It’s a great day to be a MOSAF member!

Technical Tours Highlight New Technology and Carbon

By Michael Bill and Lynn Barnickol

As the Spring of 2021 still had Missouri dealing with COVID-related issues, the typical spring technical tour was delayed until July. The theme for the summer tour was “Advancements in Forest Management Tools and Techniques” and was held near Williamsburg at the Prairie Fork Conservation Area.

Angela George did a great job hosting the event and gave some background about the unique cooperative agreement at the area and discussion of forest management that has recently occurred to help promote the woodland structure.

Luke Miller works for USDA-APHIS in the feral hog program and is a certified drone pilot. He presented on his use of drones in feral hog elimination work. Weather conditions held out and Luke was able to fly a drone and discuss how thermal imaging drones used in cooperation with helicopter shooting teams is making a big impact on reducing feral hogs on the landscape.

Continuing in the theme of drones used for management, Tyler Bradford with MDC, discussed his thesis research at MSU where he used a drone with a hyperspectral sensor to determine how to monitor seasonal effects within a forested landscape.



Luke Miller discusses his use of drones in feral hog eradication. Photo credit: Chris Lohmann.

Brad Graham, MDC Resource Scientist, demonstrated the Haglof® Postex and DP II computer caliper for stand inventory and mapping. Brad showed how to set up the system and demonstrated how it can be used for stem mapping in research plots. Brad plans to use this system on the MOFEP plots. This system will help provide more accurate data and will save time and labor.

Jason Green, Forest Manager at Pioneer Forest, discussed how Pioneer uses Haglof® laser calipers for their CFI plots. The calipers use green lasers to determine specific diameters along the length of the tree. They can then use a laser clinometer to determine the height at these predetermined diameters to accurately determine volume in the plot. Jason says this tool has helped them more accurately determine the volume of standing timber on Pioneer. This allows Pioneer to better manage the amount of harvest that can occur each year.



Jason Green discusses Pioneer's use of laser calipers with attendees. Photo credit: Chris Lohmann.

This tour gave just a quick overview of some of the tools currently available that can be used to collect more precise data for making management decisions. These advancements in technology will help us better understand forest health, stand dynamics, and forest management practices and will allow future foresters to manage forests more efficiently and sustainably by having accurate real-time data.

Fall Tour

The fall technical tour was held in the heart of the Ozarks near the “metropolis” of Timber, Missouri. The weather was great, and the fall color was near its peak. It was a great time to be in the woods with fellow foresters from around the state, with 49 attendees coming from USFS, MDC, MU, Fort Leonard Wood, NRCS, and MCFA. This tour covered a variety of topics including natural community management, production of lump charcoal, and discussion of carbon credits.

The first stop was the Virgin Pine stands on Pioneer Forest. Jason Green, Brandon Kuhn, and the staff at Pioneer Forest discussed past and current management at Virgin Pine and the challenges of dealing with fast-growing scarlet oak in prescribed burn units. They also discussed how early on they were very careful with the “Monarch” virgin pines in the stand that are over 200 years old. There have been other examples across the country where starting a prescribed burn program in areas that have been absent of fire for many years has caused damage and even mortality to old growth pine. The LAD foundation has also hired an ecologist, Rebecca Landewe, who will be helping Pioneer Forest meet their natural community management goals on several select areas. The virgin pines on this unit are impressive and give a glimpse of the size of the pine found

in the Ozarks in the 1800s. Pioneer's management style also provides the diversity of a shortleaf pine-oak forest that mimics the forest described by Schoolcraft in pre-settlement times.

The second stop was at the Timber Charcoal plant where the plant manager, Todd Hamilton, gave an excellent tour of their facilities and discussed the challenges of producing lump charcoal while meeting DNR emission standards. Timber Charcoal uses waste wood products, mostly slabs, and puts them into large concrete charcoal kilns. They are then slowly burned over several days under low oxygen conditions to make lump charcoal. Timber Charcoal then bags it and sends it to several vendors around the country.



SAF members tour Timber Charcoal plant. Photo credit: Chris Lohmann.



Kilns are connected to an incinerator that burns smoke and other byproducts and reduces emissions. Photo credit: Chris Lohmann.

Most lump charcoal is for barbecues in either lump form or ground for manufacture into briquettes. However, lump charcoal is also a source of pure carbon that is suitable for use in filtration, paints, and a variety of other uses and utilizes by-products sawing lumber and staves. It takes approximately six tons of wood to make one tone of lump charcoal.

Manufacturing charcoal once produced a heavy, pungent smoke and steam as the wood in the kiln burned. Now the kilns are connected by a series of double-piped tubes that feed an incinerator that burns the by-products of the smoke at temperatures approaching 1,800 degrees Fahrenheit. Today no pungent aroma nor smoke are emitted into the atmosphere.

The last stop was the Shannondale community church property. Shannondale is a 4,000-acre tree farm that was established in the 1940s. Jason Deschu is the consulting forester managing the forest, and presented on their experiences with a carbon credit program. In 2016, Shannondale

Interested in learning more about the Missouri's charcoal industry? Check out the book, *Black Gold: A History of Charcoal in Missouri* by Robert Massengale. Available on Amazon.com.

enrolled in a carbon credit program through Finite Carbon and was able to sell carbon credits. The contract is for 100 years with an additional 100-year monitoring period. This sale has allowed Shannondale to help better financially support the property and ensure the land is managed sustainably.



Jason Deschu discusses the carbon credit program on Shannondale Forest. Photo credit: Jon Skinner.

It was interesting to learn more about the challenges and opportunities of managing a carbon program from one of only two large-scale Missouri properties that have sold carbon credits. Shannondale's early adoption of a carbon credit program will help other Missouri property owners better understand how to manage forests for carbon. Jason stated that one of the main challenges of managing a property for carbon is ensuring that you do not overcut and impact your carbon credits, which is a special challenge with many stands of aging red oaks. Other challenges include the high initial cost of getting certified and the regularly changing protocols of the CFI plot designs, which required relocation and remeasuring of plots.

To learn more about carbon programs, be sure to attend the MOSAF-sponsored workshop at the 2022 MNRC where we will have speakers from across the country discuss carbon markets!

Graduate Student Spotlight

By Lauren Pile, Forest Science Committee Chair

Welcome to the Spotlight on Missouri's Forestry graduate students. Each newsletter, we will provide an update on the new and current forestry graduate students across Missouri highlighting the incredible and diverse work they are doing. This list is not exhaustive. Please send profiles and updates to lauren.pile@usda.gov.

Be sure to say hi to these graduate students at the 2022 MNRC!



Seth Chrisman (top right)

Seth is a master's student at the University of Missouri. His thesis project is focused on plant community response during establishment of a woodland silvopasture in the Meramec River Hills, at Wurdack Research Center near Cook Station, Missouri. He is currently performing preliminary analyses, preparing to apply treatments, and enjoying fall mushroom season.

Advisor: Ashley Conway

Hope Fillingim (bottom, second from left)

Hope Fillingim is a PhD student at Mizzou studying shortleaf pine regeneration. Her current projects include shortleaf seedling survival and sprouting following prescribed burning at the Peck Ranch Conservation Area, and shortleaf seed response to heat and smoke. She is currently in her 4th semester at Mizzou.

Advisor: Ben Knapp

Jacob Grochowski (bottom, second from right)

Jacob is a first-year graduate student and will be researching mixed oak-pine forest regeneration at Boggy Slough Conservation Area in east Texas. His research will focus on how the competitive dynamics between desired species and aggressive species such as yaupon, sweetgum, and Chinese tallow are influenced by management strategies including prescribed fire and herbicide application. He has made one visit to the research site, and planning for the next trips and data collection.

Advisor: Ben Knapp

Trystan Harpold (bottom left)

Trystan is a graduate of New Mexico State University and a master's student at the University of Missouri. His current research is focused on measuring effects of site characteristics on trends in seedling and sapling abundance in oak-hickory forests of the Missouri Ozarks. His work is being conducted at Pioneer Forest in Southeastern Missouri and utilizes continuous forest inventory data started in 1957. Currently, he has compiled and cleaned all longitudinal data from 450 plots at Pioneer Forest and is working to collect data on site characteristics such as sunlight levels, topographic indices, and soil characteristics, both in the field and through GIS.

Advisor: Ben Knapp

Isaac Hayford (top left)

Isaac obtained his master's degree in Forestry from Michigan State University in August 2017 as a Mastercard Foundation Scholar. His master's thesis focused on the impact of climate (climate moisture index and temperature) on the growth of oak and other competitor species such as red maple and black cherry in Michigan. He is currently a third-year doctoral student in Natural Resources with Forestry Emphasis at University of Missouri, and working on ecology and management of oak regeneration (natural and artificial) in bottomland hardwood forests in Missouri. Isaac will be completing his final round of data collection in spring and summer 2022.

Advisor: Ben Knapp

Abby Huffman (top, second from left)

Abby is currently a first-year graduate student at Mizzou. She is studying oak regeneration at the Baskett Research Center.

Advisor: Ben Knapp

George Jensen (top, third from left)

George Jensen is a graduate student working in collaboration with researchers from The Jones Center at Ichauway, where his project has two main focuses. The first focus is on how regeneration domes of longleaf pine influence fire behavior. Results suggest that dense regeneration domes forming within gaps alter fuel composition and moisture in a way that reduces fire intensity and effects and may play an important role in fire resistance in early stages of longleaf pine development. The second focus is on how climate-adaptive silviculture treatments affect overall fire behavior and effects. Results

show that while treatments may be altering fuel structure and loading, having a regular fire return interval may be the most important treatment mechanism in the longleaf pine ecosystem.

Advisor: Ben Knapp

Dacoda Maddox (bottom, third from left)

Dacoda Maddox is graduate student at Mizzou and a graduate of Missouri State University. His current project involves an oak savanna reconstruction in a restored prairie and a woodland restoration in a degraded wood lot at Prairie Fork Conservation Area. Currently he is finishing his third season of sampling and continuing his thesis writing process. Dacoda is also a full-time forestry research technician of the Forest Service, Northern Research Station, located in Columbia.

Advisor: Ben Knapp

Carrie Stephen (bottom right)

Carrie is a second-year master's student at the University of Missouri in the Biological Sciences Department. Her research looks at how repeated prescribed fire over 20 years affects ground flora diversity and stand structure in glades and woodlands in the Missouri Ozarks. Her research is in the Current River Watershed and is being conducted in partnership with the Ozark National Scenic Riverways. Currently she is in the data analysis stage of her project and learning the joys of statistics and coding. Her other research interests look at collaborations between natural resource managers and researchers.

Advisor: Lauren Sullivan

Save the Date!

Missouri Natural Resources Conference



February 1-3, 2022

Margaritaville Lake Resort

“Contagious Conservation”

Registration is now open at <https://mnrc.org>. Conference agenda coming soon.

Evaluating Hack & Squirt Methods for the Most Effective & Efficient Solution in the Central Hardwoods

By Matt Arndt, Owner, Matt's Healthy Woods & Wildlife

Currently in Missouri, as in many parts of the country, the felling of trees in a Forest Stand Improvement (FSI) thinning is restricted to certain portions of the year, depending on presence and proximity to known colonies of endangered bats. By using the Hack & Squirt method, FSI can still be conducted during the no-cut period, providing bats with necessary forest openings and forest managers with an additional 7 months to conduct non-commercial thinning, because the Hack & Squirt method does not involve the felling of trees. Herbicides with high soil activity, such as imazapyr, can be released from the roots of certain species and kill or injure non-target vegetative plants and trees (Kochenderfer et al. 2001), while the same dose can be insufficient to kill other closely related species. The author has observed this action resulting in significant injury to trees adjacent to bitternut hickory treated with 1 mL 20% Arsenal AC per 3" DBH, while shagbark hickory stems treated with the same dose remained alive. Other species can be reliably controlled with a dose much less than the labelled rate (e.g., ironwood can be readily controlled with 1 mL 5% Arsenal AC per 3" DBH). However, most herbicide-specific knowledge and information on required hack spacing and below-label dose requirements for individual tree species are lacking. The goal of this study was to determine the minimum dose of herbicides with minimal soil activity required to reliably kill the tree species most commonly targeted by the Hack & Squirt method in Missouri, so that injury to non-target adjacent trees and herbaceous vegetation can be minimized to maintain healthy soils and a vigorous forest system.

Methods

The two herbicides selected for use in this study were Rodeo (glyphosate, isopropylamine salt) and Vastlan (triclopyr, choline salt). Both have minimal soil activity in comparison to imazapyr (Shaner 2014). The methods and species in this study listed as controlled on each respective label are shown in Table 1. Species groups targeted in this study were blackgum (*Nyssa sylvatica*), elm (*Ulmus spp.*), hickory (*Carya spp.*), ironwood (*Ostrya virginiana*), maple (*Acer spp.*), red oaks (*Quercus (Erythrobalanus) spp.*), and white oaks (*Quercus (Leucobalanus) spp.*). All applications in this study were at below-label rates. Treatment locations were selected based on target species abundance on private properties for which the author had previously written a Forest Management Plan. Some locations contained multiple target species in one or all treatment blocks. Application methods included applying 1 mL of 25% and 50% v/v concentrations of herbicide diluted in water to 1 hack per 1" DBH and 1 hack per 2" DBH, as well as an untreated control block for each application site. A treatment with a combination of both herbicides was originally planned, but the two chemicals proved incompatible. When test-mixed, they would very quickly gel and form a solid. Each tested dilution was mixed immediately prior to application, and all equipment flushed prior to refilling with a new mixture. The water used for dilution was adjusted to a pH of

Table 1: Summary of labelled control by species group (Corteva 2019, Corteva 2020)

	Rodeo	Vastlan
	Apply 1 mL per each 2-3 inches DBH as undiluted or 50% concentration to spaced cuts or a continuous frill	Make slightly overlapping hacks around the trunk; apply ½ mL undiluted or 1 mL 50% concentration to each hack
blackgum	suppression ¹	control
elm	not listed ²	control
hickory	(suppression) ¹	not listed
ironwood	not listed	not listed
maple	suppression (<i>Acer rubrum</i> only) ³	control
oak	control	control
¹ Listed as being controlled by foliar application ² Listed as being partially controlled by foliar application ³ <i>Acer</i> spp. listed as being controlled by foliar application; <i>Acer rubrum</i> listed as being partially controlled by foliar application		



Figure 1: (top) Measuring small diameter trees from the lower tip of the hatchet blade using a ruler engraved/painted on the handle.
(bottom) Measuring larger diameter trees using an engraved/ painted Biltmore-stick-style scale on the opposite side of the hatchet handle.

6 using ammonia and/or vinegar immediately prior to mixing to ensure consistent and reliable herbicide activity. A plastic-handled hatchet was modified to include both a ruler for measuring diameter of small trees from the lower tip of the blade and a custom Biltmore-stick-style scale for measuring diameter of larger trees (Figure 1). An Arborjet QUIK-Jet injector calibrated to deliver 1 mL per pump was used to apply the herbicide (Figure 2). Applications were made from September 20 to October 4, 2019.

General Results

Hack spacing proved to be more important for reliable kill than herbicide concentration, with the 1 mL 25% concentration per 1" DBH treatments consistently outperforming the 1 mL 50% concentration per 2" DBH treatments for both herbicides. Surviving trees treated with Rodeo consistently showed symptoms of herbicide injury

throughout the remaining canopy (Figure 3), whereas the surviving trees treated with Vastlan showed mostly normally-formed and healthy foliage in the portions of the canopy that remained alive (Figure 4). Often, trees fully defoliated by treatment with Rodeo still showed live wood under the bark, and many had developed clusters of new bud sprouts on the bole and major limbs by the time of inspection in early fall 12



Figure 2: Applying herbicide in a hack wound with a QUIK-jet injector.

months following treatment (Figure 5). One treatment block containing elm and hickory was re-visited in June 2021 (21 months following initial treatment) to evaluate the survivability of these sprouts, and they still remained alive and had continued to develop as had been expected based on the initial inspection (Figure 6). A second treatment block containing oak and hickory was visited in August 2021 (23 months following treatment). The most vigorous of the resprouted trees continued to survive, while those that showed the most significant herbicide injury had died during the summer of 2021 (2nd growing season following treatment), although a significant portion had sprouted from the base. Many of the surviving trees that had been treated with Rodeo continued to exhibit symptoms of herbicide exposure, while none were present on those treated with Vastlan.



Figure 3: Hickory leaves showing herbicide injury following 1 mL 50% Rodeo per 2" DBH treatment.

Removal of the bark on surviving trees during the Fall 2020 inspection showed strips of dead wood associated with hack wounds (Figure 7). The dead strips were slightly wider in 50% concentration treatments than in 25% concentration treatments (Figure 8). On multi-stemmed trees in which at least one stem was left untreated (primarily in oaks), Vastlan showed no visible symptoms in the untreated stem, while Rodeo treatments consistently resulted in visible, often significant injury to the untreated stem

(Figure 9). This held true even for those partially treated trees that split well above ground level. Overall, nearly every treatment scenario resulted in at least some visible

injury to the target trees. The pattern of symptoms in those trees not fully killed is indicative of Rodeo being more mobile within the plant than Vastlan.

Ground flora response appeared to be directly correlated with canopy manipulation, and the resulting increase in sunlight availability at the ground. There appeared to be no effect from any herbicide treatment on ground flora abundance or composition.

Species Group Results

Blackgum was the only species in which Rodeo outperformed Vastlan in the tested treatments. Each of the 50% Vastlan treatments, the 25% Vastlan per 1" DBH

treatment, and the 50% Rodeo per 1" DBH treatments resulted in 100% topkill and/or defoliation, but there was much more visibly live wood remaining between and below the hack wounds in each of the Vastlan treatments than in the trees in the Rodeo treatment. The 25% Vastlan and 25% Rodeo per 1" DBH treatments each resulted in only partial topkill, with nearly 100% of treated trees still having live wood between and below hack wounds. The remaining treatments were not effective.



Figure 5: Developing cluster of bud sprouts on a shagbark hickory 12 months following treatment with 1 mL 50% Rodeo per 1" DBH.



Figure 4: Hickory leaves appearing healthy, but only present on a single branch, following 1 mL 50% Vastlan per 2" DBH treatment.

For treatments targeting elm, both the 25% and 50% Vastlan per 1" DBH treatments provided 100% kill, while the 25% and 50% Vastlan per 2" DBH treatments provided only partial control. All Rodeo treatments provided no effective control, with nearly all treated stems showing sometimes significant injury, but still remaining alive above the hack wounds.

Hickories were best controlled with the 50% Vastlan per 1" DBH treatment. Of the 3 sites with sufficient hickory abundance in that treatment block, only one location contained trees that survived the treatment. The surviving trees were all small diameter (1" DBH or less) treated with a single hack. 25% Vastlan per 1"

DBH provided partial control at each of 2 sites, and no other treatment method provided adequate control.

Ironwood was fully controlled by each of the 50% and 25% Vastlan per 1" treatments, and partially controlled by the 50% Vastlan per 2" DBH treatment. The 25% and 50% Rodeo per 1" DBH and the 50% Rodeo per 2" DBH treatments all provided successful topkill, but each resulted in nearly uniform basal sprouting from treated tress. Neither 25% per 2" DBH treatment provided control.

Red maple was fully topkilled by both the 25% and 50% Vastlan per 1" DBH treatments, but both resulted in significant basal sprouting (>90% and >75% of stems, respectively). The 25% and 50% Rodeo per 1" DBH treatments each showed topkill on at least 80% of red



Figure 6: Elm bud cluster sprouts on an upper limb that have survived and developed 21 months following treatment with 1 mL 50% Rodeo per 1" DBH.



Figure 7: Blackgum treated with 1 mL 50% Vastlan per 1" DBH. Live wood strips continue past the hack marks on one side of the tree (left), but stop below the hack marks on the other (right). The tree was fully defoliated.

maple stems, but each resulted in 100% basal sprouts. Each Vastlan treatment per 2" DBH showed partial topkill control (50% Vastlan was >80% topkill), and each Rodeo per 2" DBH treatment showed no control of red maple.

All four treatments per 1" DBH showed full control of red oaks at multiple sites, as did 50% Vastlan per 2" DBH. The remaining treatments did not result in reliable control. On partially treated multi-stemmed red oaks, the untreated stem on clusters treated with Rodeo showed obvious injury, whereas the remaining stem of such clusters treated with Vastlan was uninjured.

White oaks were fully controlled at multiple sites by all 4 Vastlan treatments and by the 50% Rodeo per 1" DBH treatments. The 25% Rodeo per 1" DBH treatment showed full



Figure 8: (left) 1" dead wood from edge of hack wound on elm treated with 1 mL 50% Vastlan per 2" DBH. (right) 3/4" dead wood from edge of hack wound on elm treated with 1 mL 25% Vastlan per 2" DBH.

control of white oaks at 2 of 3 sites, with the third site showing only partial control. The remaining Rodeo treatments did not show control. At all sites, the untreated stem on multi-stemmed white oaks treated with Rodeo showed significant injury; more so than in red oaks. Those multi-stemmed white oaks treated with Vastlan showed no visible injury symptoms on the untreated stem.

A summary of the observed results in all species groups for each tested herbicide concentration is given in **Error! Reference source not found.**

Discussion

Because there is seldom a single species being targeted, it is preferential to have the option to utilize a single herbicide mix for multiple species in a given treatment. Based on this study, the 50% Vastlan per 1" DBH treatment appears to be the most reliable overall method for multi-species Hack & Squirt. While the labelled application rates/methods were not directly tested in this study, the Vastlan label does include blackgum as being controlled with an overlapping frill treatment (Corteva 2020). The 25% Vastlan concentration should also be tested with an overlapping frill in hickories, maples, and blackgum. If those species can be reliably controlled with the lesser concentration, such a treatment would be preferred due to the lesser quantity of herbicide required. The ability to treat certain stems of multi-stemmed oaks while not injuring the untreated stem(s) is a highly desirable trait and a significant advantage to using Vastlan for Hack & Squirt over using Rodeo.

Other studies have shown that Hack & Squirt application using a triclopyr herbicide alone is insufficient for control of hickory (Turner et al. 2021), and Vastlan was unsuccessful in fully controlling resprouts in maple in this study. Each of these species, as well as blackgum and others, have been shown to be fully controlled by imazapyr (Rainer et al. 2012). Depending on the species composition of the forest being treated, it may still be necessary to include a small amount of imazapyr (or another herbicide) in the treatment mixture to ensure proper control of the target species. However, doing so will certainly result in the lost ability to selectively deaden only part of a multi-stemmed

tree. Past experience has also shown that black walnut (*Juglans nigra*) is highly sensitive to imazapyr, and can easily show significant non-target injury when adjacent trees are treated with imazapyr using the Hack & Squirt method. The tank mix utilized on every project should be customized according to both target and residual species in the stand being treated.



Figure 9: (left) Right 2 stems of a 3-stem northern red oak treated with 1 mL 50% Vastlan per 1" DBH. Left canopy is unaffected. (middle) Left stem of a 2-stem scarlet oak treated with 1 mL 50% Vastlan per 2" DBH; right canopy is unaffected. (right) Left stem of a 2-stem white oak treated with 1 mL 50% Rodeo per 2 DBH. Right stem shows significant herbicide injury.

The herbaceous response in all treatments was significant, and appeared to be directly related to the increase in sunlight availability rather than herbicide type or concentration applied. While no symptoms of injury were observed in ground flora in any treatment block, the lack of non-target injury even to connected stems treated with Vastlan is certainly an encouraging sign that the herbicide's use in Hack & Squirt treatments has no significant effect on ground flora.

Table 2: Summary of species group results.

	blackgum	elm	hickory	Ironwood	maple	red oaks	white oaks
50% Vastlan per 1" DBH	100% topkilled w/ live wood strips	Controlled	Controlled	Controlled	100 % topkilled, ~75% basal sprouts	Controlled	Controlled
50% Vastlan per 2" DBH	100% topkilled w/ live wood strips	Partial control	Not controlled	Partial control	~80% topkilled, ~95% basal sprouts	Controlled	Controlled
25% Vastlan per 1" DBH	100% topkilled w/ live wood strips	Controlled	Partial control	Controlled	100% topkilled, ~90% basal sprouts	Controlled	Controlled
25% Vastlan per 2" DBH	Partial control	Partial Control	Not controlled	Not controlled	Partial control	Not controlled	Controlled
50% Rodeo per 1" DBH	Controlled	Not controlled	Not controlled	Topkilled w/ basal sprouts	~80% topkilled, 100% basal sprouts	Controlled	Controlled
50% Rodeo per 2" DBH	Not controlled	Not controlled	Not controlled	Topkilled w/ basal sprouts	Not controlled	Not controlled	Not controlled
25% Rodeo per 1" DBH	Partial control	Not controlled	Not controlled	Topkilled w/ basal sprouts	~80% topkilled, 100% basal sprouts	Controlled	Partial control
25% Rodeo per 2" DBH	Not controlled	Not controlled	Not controlled	Not controlled	Not controlled	Not controlled	Not controlled

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Agency/Affiliate Group News

MU Extension

Expanding Forestry Efforts: CAFNR announces gift to create landowner engagement position in forestry

*Written by Kate Preston · Photography by Logan Jackson · November 9, 2021
(Reprinted from CAFNR Website)*

Barrels made from Missouri white oak truly represent a 100 percent value-added product from the Show-Me State. From landowners' woodlands, to master loggers harvesting mature trees, to the manufacturing plants assembling the barrels, white oak woodlands help sustain rural communities across Missouri. And not just white oak but red oak, too, ensures Missouri's \$10 billion forest products economic engine keeps humming along providing everything from flooring to veneer panels.

But the state's oak forests are threatened. Not from some exotic insect or disease, but from not enough landowners actively managing their woodlands.

"Currently, fewer than 1 in 5 landowners seek advice from a professional forester and less than 1 in 20 have a plan to care for their property," said state forestry Extension specialist, Hank Stelzer. Without proper care and oversight, forests can become overcrowded, which can lead to declining woodland health and productivity.

"It's like an unweeded garden. We all know what happens if one doesn't tend the garden."



Brad Boswell, CEO of the Independent Stave Company, spoke about the new position and its impact.

The School of Natural Resources (SNR) in the University of Missouri College of Agriculture, Food and Natural Resources (CAFNR) is hoping to help with that. With a major gift from Independent Stave Company, along with matching gifts from forest-related industries and organizations across the state, a new position has been created, Landowner Engagement Specialist, within SNR.

The position will be part of MU Extension's Woodland Steward Program, which engages and encourages woodland owners to become active stewards of the land. They will learn how to rehabilitate neglected woodlots, use best practices for management, and work in partnership with professional foresters and timber harvesters. The new specialist will also teach classes in the School's Forest Resource Management Program in sustainable harvesting operations.

"This position will greatly expand forestry outreach and efforts to Missouri's family forest landowners," said Rob Kallenbach, associate dean of CAFNR Extension. "These landowners own 83 percent of the state's 15.2 million acres of forest. This position is what Extension is all about!"

The creation of the new position, and the gifts helping fund it, were announced today at an event on the MU campus.

"It's been truly remarkable to see the broad spectrum of industries and organizations coming together to help ensure future generations will benefit from our actions today," Stelzer said.

"I am thrilled that I got to be part of the initiation of this partnership, and now we are seeing it come to fruition," said Christopher Daubert, vice chancellor and dean of CAFNR.

The position announced today will work closely with the larger multi-state White Oak Initiative, which Independent Stave Company supports.

"This is a relationship that will strengthen our forestry program in SNR," said Pat Market, director of the School of Natural Resources. "We are grateful for our partners and for the future. We look forward to the next 100 years of forestry education in Missouri."

"The cooperage industry relies on healthy, sustainable American white oak forests. It is important for us to develop partnerships, like the one we have with CAFNR and Hank Stelzer, to get as many landowners educated, with as many lands management programs in place as possible," added Brad Boswell, CEO of the Independent Stave Company.

"I believe the Missouri Woodland Steward program can and will move the needle in that endeavor. Industries, like ours, that depend on forest products need to work in conjunction with forestry initiatives, so we continue to have healthy forests for generations."

Missouri Consulting Foresters Association**MCFA Fall Technical Tour Highlights Silviculture Techniques**

By Lynn Barnickol, MCFA Executive Director

The Schmollinger Tree Farm and Honeycutt Properties LLC near Cabool, MO provided the sites for the MCFA Fall Technical Tour, held in mid-October. A total of 31 foresters and guests participated in the two-day tour that also included 11 MOSAF members. Max and Lois Schmollinger have been Tree Farmers since 1981. The 80-acre farm was acquired in 1977 and Schmalleger's immediately set to work on their 55-acre forest that had been high-graded by previous owners. At the time of acquisition Max was working as a silviculturist on the Mark Twain National Forest. Max put his training to good use by marking timber for sale and following up with TSI to improve the health of their forest. Since that first harvest there have been three more marked harvests each followed with TSI. A 14- acre Christmas Tree plantation was established, and with family assisting, the trees were tended and sold locally for approximately 24 years. When little leaf disease finally ended the Christmas Tree operation, the site planted soil compatible shortleaf pine.



MCFA members and guest tour shortleaf pine stands on the Schmollinger tree farm. Photo credit: Chris Lohmann.

The 1978 inventory showed approximately 51 MBF in mixed oak sawtimber. Total yield from the four harvests, 43 years later, produced over 226 MBF in oak sawtimber with approximately 147 MBF of remaining stave quality sawtimber. Applied forestry techniques included marked sawtimber harvests, chainsaw and herbicide treatments, site preparation, and tree planting. Time provided for significant tree growth. There is now more white oak sawtimber in the forest than when the farm was purchased! Additionally, there is a significant amount of white oak poles, saplings, and advanced regeneration that are growing toward future harvests. Max says he uses “stump time” on the deer stand contemplating his next projects that likely includes thinning the shortleaf pine stands. Forest management works and pays. Showcasing the practices used was the point of the tour. The Schmollinger’s were recently awarded 2021 Ozark Region Tree Farmer of the Year.

The 8,000-acre Honeycutt Properties LLC was the next tour stop that has been under management for years with MDC foresters providing guidance until the mid-1990s. Upon retirement from the MTNF, Max, and later Bob Cunningham, who retired from MDC, became the consulting foresters for the Honeycutt’s. Tour stops and discussions included:

- Stands of sawtimber dominated by white oak with a red maple understory. The maple had been treated with the thin-line basal bark method to reduce its abundance and encourage oak regeneration before a harvest.
- Stands of mixed oak and hickory poles of approximately 21 years old, all in need of thinning. Discussion centered on the timing and method of thinning to allow apical dominance to prevail and which practice to use—either crop tree release or a general pre-commercial thinning form below.
- A stand of declining mixed oak sawtimber.
- A brief review of the salvage operation of the 2020 derecho event.

At each stop the question put to the group, “what would you do to treat the stands?” It is heartening to observe the riveted attention being paid to the discussions by the younger group of foresters. Bob also presented a brief introduction to the process of determining the acreage and volumes of timber to be used for determining the basis value of the forest and represented a teaser for a topic in the upcoming Winter Meeting.

Thanks to Bob and Max for sharing their years of forestry expertise. Both have been forest managers on public land and are continuing to assist forest owners as consulting foresters.

MOSAF Business Meeting Minutes – 7/15/2021

1. Welcome: John Kabrick, MOSAF Chair

12:50 – start meeting

2. Minutes from last meeting: Ben Knapp

12:55 – motion (Guldin), second (Maddox), approved

3. Treasurers Report: David Vance

\$10,514

CDs - \$19K each

Money Market, project learning tree - \$11.5K

Due to COVID in 2020 we had no meetings so had no income

4. Announcements

- By Fall 2021 we need nominations for new chair elect
 - January 2022, Mike Bill becomes Chair and new Chair-elect comes in
 - Speak to Gus Raeker with interest
- Mizzou SAF Student Chapter officers for the 2021-2022 school year:
 - President: Taylor Hurley
 - Vice President: Owen Steins
 - Missouri State in process of forming a chapter
 - Efforts for interactions among the student groups
 - Kabrick – invite for professionals to attend meetings
- Forestry Summit, August 10 and 11, 2021, Hilton Garden Inn, Columbia (<https://forestandwoodland.org/2021-forestry-summit>)
- Jon Skinner: Missouri Community Forestry Council has conference in Branson mcfconference.com; registration in July

5. Committee Reports: Committee Chairs

- Audit (Megan Buchanan)
 - Nothing to report
- Communications
 - Website (Jon Skinner)
 - Hosting company Weebly purchased by Square, requiring making a Square account and a MOSAF email just for that account
 - Newsletter (Chris Lohman)
 - Spring newsletter out in Spring, will be one in Fall
 - With any upcoming events, please contribute (Pictures)
- Council, Fellows and Awards (Jim Barresi)
 - First call for Karkhagne, MO Outstanding Forester, etc. – deadline in December
 - Offer to attend student club meeting to promote scholarship
- Education (Mike Goerndt)
 - Not present
- Long Range Planning (Dan Dey)
 - Not present
- Membership (Hank Stelzer)

- Not present; membership is generally stable
 - National level, concerns with declining membership and how to increase
- Nominating (Gus Raeker)
 - Not present
- Policy and Legislation (Jason Jensen)
 - House Bill 369 – conservation omnibus
 - Included Feral Hog content
 - Definition of feral hog had previously made enforcement difficult
 - Increased severity of deterrent – first offense release is Class A misdemeanor; subsequent violations are Class E Felonies
 - Clarified relationship of Conservation Commission with State Statutes
 - Prescribed burn act
 - Missouri had no prescribed burn act to cover liability (one of five states with none)
 - Undefined liability
 - Contractors had difficulty getting insurance for prescribed burning contractors
 - Defines liability – simple negligence for landowner or certified prescribed burn manager; if trained with burn plan and following prescription, must be proven negligent if fire escapes and causes damage
 - Hope to create more favorable environment for conducting prescribed burning (increase use of fire)
 - Missouri Invasive Species Task Force
 - ‘Cease the sale’ campaign for 141 invasive species
 - Input sought from variety of organizations, including MOSAF
 - Assessed each species to rate placement on cease the sale list
 - Opposed some species because interest from ag community would likely create issues for approving list
- Program (Michael Bill)
 - Fall technical tour upcoming, maybe in southern portion of state
 - Potentially carbon credits at Shannondale
 - Likely one-day meeting
 - MNRC – looking for selected topics/ideas
- Special Funds (David Massengale)
 - Not present
- Tellers (Aaron Moore)
 - Not present
- Forest Science (Lauren Pile)
 - Central Hardwood Conference, April 6-8, 2022, West Virginia
 - Newsletter contribution featuring graduate students at MU or MSU
 - Encourage interactions with students
 - Potential synthesis of research in the state
- MNRC Steering Committee (Jon Skinner)
 - 2022 – Planning is underway
 - 2024 – hosted by MOSAF
 - do not have a full planning committee together yet

- Consider being willing to help out if asked
- Historian (Dave Larsen)
 - Not present

6. Old Business

Prescribed Fire Liability in Missouri (Jason Jensen)

- Covered during committee reports

7. New Business

Please share new business items

- Jim Guldin: new member just moved to MO
 - Silviculture Instructors virtual tour
 - Video contribution from Pioneer Forest will feature hardwood silviculture at Pioneer
 - Denise Vaughn will make the video
 - Will be available for the use in the Pioneer website

8. Agency/consulting firm/NGO/university News

- Pioneer: Jason Green
 - Greg Iffrig retired, replaced by Roger Still, working out very well
 - Strategic Plan two years ago included hiring an ecologist
 - Interviews next week
 - Designed to be very complementary position with foresters and ecologist; based in Salem
 - Maddox: What would the ecologist do (specific ideas)
 - Green: pine management area will have ecology driven by silviculture, will provide additions to management plans
 - In burn units, burn plan is only management plan, and this would provide management plan within burn units
 - Jason Jensen: will there be invasive species focus included?
 - Green: Yes that will be part of it
 - Guldin: the Board is interested in understanding ecological variability across large property and incorporating that into the management
 - Set targets for things like glade restoration and fire
 - Management for brown-headed nuthatch
- MDC
 - Mike Bill: Two forester positions open in the Ozarks (one from Van Buren; one from Eminence)
 - Megan Buchanan: Research project using LANDIS with MOFEP and Chilton Creek Data to simulate/model fire and landscape-scale management effects
 - Will incorporate wildlife models into this effort
 - Can contribute to long-term management plans to reach specific target conditions
 - Assessing role and improvements for future of MOFEP
 - Brad Graham: working with software improvements for these models to help optimize management
- MU (Ben Knapp)

- Students: numbers are up
- Faculty: Mike Stambaugh and Jeff Wood new tenure track faculty members
 - Converted from Research positions to include teaching
 - Mike Stambaugh to teach Forest Ecology and Forest Health
 - Jeff Wood to teach Tree Physiology
- Restructure of MOAES
 - There will be four hubs across the state
 - Mid-Missouri hub to include South Farm, Bradford, Baskett, HARC, Sanborn
 - All sites administered through CAFNR, MOAES
- Forest Service (Lauren Pile)
 - New Chief: Randy Moore
 - New Station Director: Cindy West
- Consulting Foresters (from Lynn Barnickol)
 - New manager of Call Before You Cut program
 - Forest management plans with NRCS
 - Fall technical session Oct 21-22 for consulting forester group, contact Lynn for additional information

9. Adjourn

Motion: Maddox

Second: Pile

Adjourned 1:50

Attendees:

Adam Osvath
Angela George
Ben Knapp
Brad Fuller
Brad Graham
Brayden Howard
Bruce Palmer
Caleb Blakely
Carl Hauser
Charlie Krasuski
Chris Lohmann
Dacoda Maddox

Darrel Dostall
David Vance
Erin Napoli
Gary Gognat
James Barresi
James Guldin
Jason Jensen
Jason Green
John Kabrick
Kristin Goodrich
Kyle Monroe

Kyle Petry
Lance Vickers
Lauren Pile
Megan Buchanan
Mike Bill
Paul Johnson
Steve Paes
Tod Kinerk
Tyler Bradford
Luke Miller
Joe Alley

MOSAF Business Meeting Minutes – 10/27/2021

1. John Kabrick called the meeting to order and started with a note of thanks to the tour hosts – Pioneer Forest staff, Timber Charcoal and Jason Deschu at Shannondale.
2. Motion to approve the spring meeting minutes was passed.
3. Treasurer's Report – David Vance
 - Approximately \$11,000 in bank account – the balance has remained steady with slight increases as meetings are planned and registrations received
 - Two CDs each with approximately \$19,000
 - Recently made payments for the fall meeting food, lodge rental, and affiliate dues to the Conservation Federation of Missouri
4. Announcements – elections are coming this fall and ballots will be emailed for Chair-Elect and Secretary
5. Committee Reports
 - Audit; Council, Fellows and Awards; Education; Long Range Planning; Nominating; Policy and Legislation; Tellers; Forest Science; Historian – not available
 - Communications
 - Website – Jon Skinner
 - site is still being updated as new information is provided, no major changes
 - Forms for Karkhagne and Outstanding Forester awards are available on the site
 - Newsletter – Chris Lohman
 - Articles are needed by mid-November
 - Membership – Hank Stelzer – 3 new student members, 166 total
 - Program – Michael Bill – send him ideas for MNRC or spring tour; 49 attendees registered for this fall meeting
 - Special Funds – David Massengale – donations are needed for the MNRC silent auction
 - MNRC Steering Committee – Jon Skinner
 - Going to be in person in 2022, but there may be some pre-recorded presentations for speakers that cannot attend in person
 - The call for papers was extended, so submit if interested
 - Registration will begin in November
 - AFS is chairing the conference this year
 - No known COVID restrictions known at this time
 - Need a Treasurer to assist when MOSAF chairs the conference planning
6. New Business
 - House of Society Delegates made recommendation for all chapters to become 501(c)(3)
 - SAF has legal counsel to help chapters
 - Starting the process this year and will continue for approximately 2 years
 - There was a discussion about potential rules on lobbying as non-profit
 - There was a discussion about current status of chapter and questions about any changes to our association with national SAF after becoming a 501(c)(3)
 - HSD also recommended chapters obtain officers' insurance
 - Two payment options presented

- Chapter also has the option to pursue its own policy
- More information coming at next meeting

7. Reports

- SAF Silviculture Instructors subgroup having a virtual tour with Pioneer Forest video as part of virtual conference; may also be at MNRC too
- University Extension
 - 4 feral hog educator positions to be liaisons between landowners, trappers and local soil and water districts; will be located in Ava, Houston, Potosi, Salem
 - New position that will be 70% extension and 30% teaching at the University – 5-year position, focused on oak regeneration, search will begin this winter and expect to be hired by 2nd quarter 2022
- MO Consulting Foresters Assoc.
 - Recent fall meeting with 20 members and 11 guests
 - Winter meeting in Feb, location and details to be determined
 - Fall 2022 will be in north MO
 - Lynn Barnickol shared a real estate advertisement that says, “Call Us Before You Cut,” posing as foresters; discussion to see if there was anything that could be done
- USFS
 - At this time, there is no vaccine mandate for federal timber purchasers
- MDC
 - 3 forester positions open
 - Michael Bill is changing jobs, and will be the Habitat Management Coordinator

Meeting adjourned at 2:25pm.

(The following article is for you to share with your local paper. Modify as appropriate for your locality.)

Improve your Health—Take A Walk in The Trees!

It is amazing what trees do for us. Most are aware of the various wood and paper products we make from trees, but did you know trees can help with your health? Over the last several years, researchers have been studying the mental and physical benefits we receive from trees. They have discovered we benefit when we are around trees.

These studies have revealed park users report urban forests and parks offer a place for reflective thought, resting the mind, and creative thinking even better than their homes. Tree-lined streets are more walkable, encouraging more active lifestyles which decrease obesity and improves heart health.



In one study, elderly people that had nearby parks, tree-lined streets, and space for taking walks showed higher longevity over a 5-year study period. Another study tested people's stress response, measured as elevated blood pressure, to long walks in various environments. Those who walked in a nature preserve showed a decline in blood pressure, while blood pressure increased for those walking in the urban environment. In addition, subjects walking in the nature reserve reported an increase in positive emotions, while those in the urban environment reported fewer such feelings.

There are other studies that reveal other positive benefits from walking in and near trees. When you consider walking for exercise or enjoyment, consider doing it with trees. Your health will improve because of it.

The Missouri Society of American Foresters (MOSAF) is a State Society of The Society of American Foresters (SAF). MOSAF and SAF is a professional society dedicated to sound forest management and conservation.