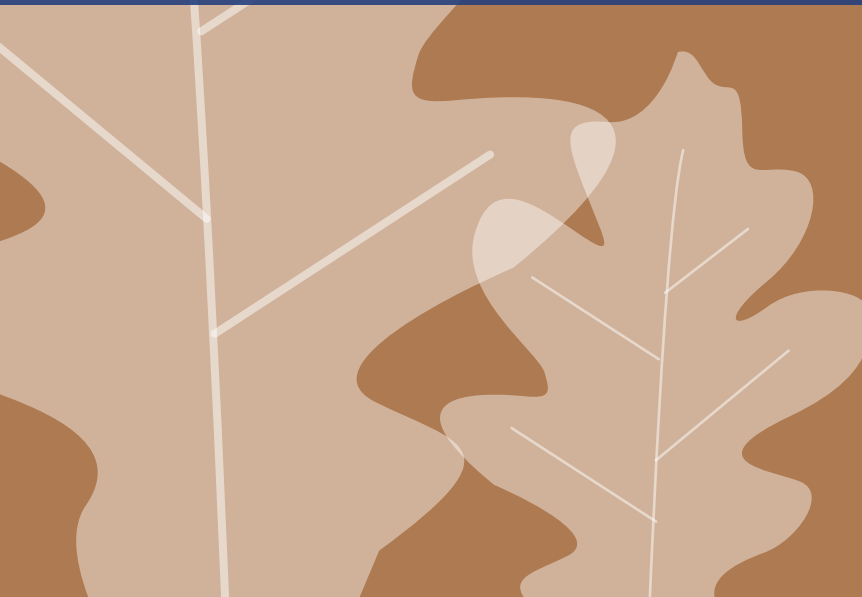




Innovative Finance Project for a Sustainable White Oak Supply

Interview Results Summary Report to the American Forest Foundation (AFF)



Report prepared by :



November 2021



Executive Summary

With funding provided by the Innovation Finance for National Forests (IFNF) Grant awarded by the U.S. Endowment in 2019, the goal of this project is to assess the feasibility of an outcomes-based financial model to support the restoration work needed to ensure a sustainable white oak supply in the future. Interviews were conducted with a subset of White Oak Initiative (WOI) partners in August 2021 to gain further insights and perspectives of stakeholders involved with the Initiative. Interviewees represented a diverse array of expertise and geographical representation, and individuals with knowledge and experience related to silvicultural, social, and financial aspects of white oak management and family forest lands.

As a result of these interviews, seven recurring themes emerged and are summarized in this report:

1. Mid-Story Removal
2. Cost is a Barrier
3. Markets are Essential
4. Technical Capacity Lacking
5. Models of Success
6. Information Sharing
7. Innovative Approaches

These themes represent observations shared across geographies about critical considerations for white oak management. Interviewees also expressed agreement and enthusiasm for the need to develop an outcome-based financial model for estimating the costs associated with white oak restoration at scale.

Key recommendations resulting from this work include the following which are further described in the full report:

- Focus, Prioritize, and Act. Continue to focus on a small set of priorities for the establishment, impact, and early-successes of the WOI.
- Figuring out the Math at Scale. More data and financial analysis will be needed to define opportunities for replication and greater impact.
- Expect Change and New Information. New efforts are underway and following up with partners to gather emerging information may be an important strategy.
- Be Ready to Go Big! Ensure systems are sufficiently robust to serve and engage new partners and work across the full white oak range.

These results help highlight how the WOI can focus and prioritize near term efforts and prepare for long-term impact as new information continues to emerge.

Background

American Forest Foundation (AFF) White Oak staff are currently working on a project funded by the Innovation Finance for National Forests (IFNF) Grant awarded by the U.S. Endowment in 2019. The goal of the project is to assess the feasibility of an outcomes-based financial model to support the restoration work needed to ensure a sustainable white oak supply in the future.

Currently work is underway to develop and shape a model that estimates the outcome of management activities and costs to achieve the necessary impact via these activities. AFF has subcontracted with Katie Fernholz (Dovetail Partners, Inc.) and Dave Bubser (Cambium Consulting LLC) who are working with AFF White Oak staff to accomplish the project outcomes. Katie and Dave conducted interviews with White Oak Initiative (WOI) partners to learn more about insights and perspectives of stakeholders involved with the Initiative. This report provides a summary of the results of the interviews.

Methods

The consultants collaborated with AFF staff to identify a targeted list of interviewees from among the WOI partners and to develop the list of interview questions. Attention was given to diverse areas of expertise, geographical representation throughout the white oak range, and individuals with knowledge and experience related to the financial aspects of white oak management and family forest lands. Invitations were distributed in July and interviews were conducted remotely between August 2 - 18th, 2021. Appendix A includes a copy of the invitation message, the interview questions, and the list of interviewees.

Results

A total of 11 interviewees were identified and invited to participate, and a total of 10 interviews were completed. One interviewee did not respond to multiple scheduling requests. One interviewee was not able to schedule an interview time but was able to respond to the questions via email. Five (5) of the interviewees provided written responses (via the online survey tool) and also participated in a live interview.

The content of the interviews was almost entirely qualitative information and a summary of the responses to each of the questions is provided in Appendix B.



Table 1. Themes Identified through the Interview Responses

Theme	Description	Risks	Opportunities
1. Mid-Story Removal	Removal of mid-story (understory) identified as key in advancing white oak regeneration success across many regions	Without appropriate light levels reaching the forest floor, white oak seedlings do not develop into competitive saplings, and forest converts to shade tolerant species.	Multiple benefits for wildfire risk reduction, recreation, water quality, etc. to support partnerships, innovation, and collaboration.
2. Cost is a Barrier	Practices for successful white oak management are expensive, require multi-year commitment and specialized expertise.	Family forest owners are particularly susceptible to market drivers and incentives working against oak management, leading to lost opportunities for retaining white oak.	Policy advocacy (federal and state) is needed to expand supplemental funding and other incentives. Expand cost-share rules to include broader range of white oak management practices. Adequate cost-share subsidy is vital.
3. Markets are Essential	Viable markets for low-grade and small-diameter hardwood are not consistently present throughout the white oak range.	Key practices such as mid-story removal can be cost prohibitive in regions without markets for small-diameter and low-grade hardwood.	State and federal economic development incentives and partnership programs for incentivizing utilization of low-grade material are important strategies to promote and replicate.
4. Technical Capacity Lacking	Foresters lack confidence in white oak management, other service providers are lacking (e.g., herbicide applicators), service forestry staff are under-resourced.	Particularly for family forests, a lack of professional expertise and technical service capacity can lead to poor management outcomes.	Develop technical resources for foresters, loggers, and landowners. Present workshops and trainings. Increase funding for service foresters.
5. Models of Success	Limited awareness or existing examples of successful white oak management, especially on family forests	Myth creation: white oak management is difficult, it isn't being done, and/or only happening on public lands (where the economics are different)	Develop case studies, share information, and offer virtual and in-person tours of white oak management activities to highlight and share success stories and build confidence
6. Information Sharing	WOI as a community of practitioners	Duplication of efforts, competing agendas or projects, and missed opportunities for greater impact	Create spaces for communication and information sharing (formal and informal) through a library of resources, symposium events, networking, etc
7. Innovative Approaches	Livestock grazing, agroforestry, Rx fire, new and pilot programs that recognize white oak management can be complicated (repeat entries, weak returns, etc)	Unknowns, early-days of understanding and development of some white oak efforts, and what we know/ believe now may change	Establish systematic, regular, and periodic mechanisms for collaboration, reporting and monitoring of developments, and sharing of initiatives and findings among WOI partners

As shown in the responses summarized in Appendix B and reflected in the themes shown in Table 1, the interviewees represented a wide range of experiences and depth of expertise relevant to understanding white oak management and financial innovations. Also, as shown in the responses, some key themes emerged and are summarized in Table 1 (previous page).

The theme of midstory removal was an important learning from the interviews and was expressed throughout many parts of the white oak range. Although midstory removal is a well-known practice, many of the interviewees called it a “critical step” and ranked it as a higher priority than planting and harvesting. As one interviewee stated, “In the end it comes down to money and comparison to alternatives. Incentives for white oak management are key.” Another comment was, “Let the high grading go; pay to get the understory out.”

Mid-story removals improve light conditions and remove competition for developing oak seedlings. The economics of midstory removal treatments will vary depending on the timing, understory conditions, available markets, and other factors. The discussions recognized and articulated the need for the white oak in the pole and sapling size classes to be able to grow. Midstory/understory removal is one of the three “Highest Opportunity Levels” being recommended in the WOI Assessment and Conservation Plan (A&CP).

Several themes address the issues of economic viability and adequate resourcing. Financial constraints may be particularly limiting for private forest owners who represent the overwhelming majority (79%) of forests within the 20-state white oak range. Financial trade-offs are particularly acute for many family forest owners who represent an important subset of private landownership and are a significant proportion (56%) of the total forest ownership within the 20-state white oak range. Enhanced resourcing to support restoration of white oak forests is consistently recognized as a fundamental element of success. Most of the observations involve increasing investments in existing strategies such as direct cost-share subsidies, development of markets for low-grade material and boosting technical capacity among service providers. Additional opportunities exist in emerging finance mechanisms (e.g., ecosystem service markets, impact investing, blended financing, etc.), and innovation in this space can have significant positive impact on overcoming short term economic hurdles. These needs and opportunities may create connections between the work of the White Oak Initiative and other areas of activity within AFF and its partnerships.

The theme of “Models of Success” relates to comments that include a perception among some interviewees that “no real tangible examples of successful white oak management currently exist”. There are many factors that contribute to this perception, including interviewees that are not directly engaged in forestland ownership or management and potential timing factors in terms of an individual’s awareness of the outcomes of restoration activities (i.e., monitoring and reporting of long-term results of efforts). Regardless of the cause, it is counterproductive, and may hinder the WOI impacts if this perception leads to a lack of confidence among partners or an inaccurate sense that “we are starting from scratch”. The reality is that many examples of successful white oak management do exist and can be models for replication. Efforts to increase awareness and understanding of these models can help address this theme.

Another important aspect of this theme around “Models of Success” is the recognition that a paradigm shift may be needed to overcome the existing economic incentives inherent in the current supply chain model that work against restoration of white oak (and long-term sustainable forest management in general). For example, loggers, procurement foresters, consulting foresters and even landowners are incentivized by immediate financial pressures. One of the interviewees noted, ‘it’s hard to manage for retaining or restoring white oak when there’s a bounty on it’. This perception can be overwhelming and lead to a sense of despair and misses the reality that there are examples of white oak management that are also economically feasible and realistic although not yet widely recognized (i.e., thousands of acres of successful white oak management and regeneration occur every year; also see Q4 in the interview summary in Appendix B addressing successes).

The opportunity for collaboration, communication and information sharing across the white oak range is something that AFF White Oak staff are aware of, and the WOI has goals aimed at connecting partners and stakeholder (also see the Assessment & Conservation Plan). As described by the interviewees, there may be an appetite for formal and informal methods of information sharing, including further development of online resources, research symposium events, and other networking opportunities.

Recommendations

As reflected in the interview results, there are a few common themes that provide priorities for WOI activities and actions and inform the development of the financial model. These themes also speak to the early stage of development that the WOI is currently in and the strong potential that exists within the partnership.

Key recommendations resulting from this effort include:

- **Focus, Prioritize, and Act.** Continue to focus on a small set of priorities for the establishment, impact, and early-successes of the WOI. The identified themes in this work (and results of other prioritization activities) provide more than enough work for the near-term. With this information in hand, the work of the WOI appears ready to pivot from information gathering to action and implementation. There is far more to be gained at this point from trial and refinement than from additional analysis. The priorities that have been identified can be reassessed periodically or as necessary (i.e., annually or every 2-3 years).
- **Figuring out the Math at Scale.** The economics of white oak management can be challenging, including direct management costs, available markets and cost-share programs, and trade-offs. For people that are doing white oak management, these factors are known. For others, the information may be available but there are gaps in awareness and access or sharing of the details. As a result, practitioners are challenged to coalesce around a common shared understanding, barriers are confronted in silos or with limited coordination, and the investment gap isn't being addressed at scale. Without additional information gathering, stakeholders don't yet know what it will take to reconcile the financial gaps and where to focus those resources. A starting point in figuring out the math for scaling up white oak management is to gather and consolidate the available financial information to create a more holistic picture of the economics of white oak management throughout the range (as is being initiated with this project).

There are starting points for this effort that illustrate what is working in regions with strong, diversified markets, and where cost-share supports are adequate both in terms of financial measures and available technical assistance providers. To move forward, more data will need to be collected and groundtruthed and the examples of where the numbers are pencilling out will need to be highlighted and analyzed so opportunities for replication can be pursued.

- **Expect Change and New Information.** Recognize that materials developed now (including financial modelling) are likely to change over the next 6-18 months as pilot efforts in several states and regions develop additional economic insights (including work in Virginia, Kentucky, and Missouri). To support information management and the success of the WOI, regional strategies will need to be developed in addition to actions that encompass the whole range of white oak. Following up with partners in the near-term and periodically (i.e., annually or semi-annual) to gather new information may be an important strategy that could be supported through meetings, workshops or symposium (virtual, in-person, formal and/or informal) as well as through a repeatable survey mechanism (i.e., annual invitation to share information or a more formalized reporting system). The information that is gathered through these means can support an understanding of local and regional needs as well as identification of broadly shared and should be made available through direct distribution to WOI partners and/or used to generate a summary report (i.e., annual partners report).
- **Be Ready to Go Big!** Plan and design for success of the WOI by ensuring systems will be sufficiently robust to serve and engage new partners and work across the white oak range. The work and interests of the WOI have the potential to be very large in terms of geographic coverage, economic impact, policy needs, and other measures. To reach this potential it will be important to ensure that what might be of modest scale now has the engineering built-in to be expanded and right-sized overtime. This can include the appropriate and effective use of technologies (communications, GIS, etc) and sufficient staffing and funding levels.

Conclusion

Interviews were conducted with White Oak Initiative (WOI) partners to learn more about insights and perspectives of stakeholders involved with the Initiative and to inform the project. Interviewees represented diverse areas of expertise, geographical representation throughout the white oak range, and individuals with knowledge and experience related to the financial aspects of white oak management and family forest lands.

As a result of these interviews, seven recurring themes emerged and are summarized in this report:

1. Mid-Story Removal
2. Cost is a Barrier
3. Markets are Essential
4. Technical Capacity Lacking
5. Models of Success
6. Information Sharing
7. Innovative Approaches

These themes and the resulting recommendations represent observations shared across geographies about critical considerations for white oak management. Interviewees also expressed agreement and enthusiasm for the need to develop an outcome-based financial model for estimating the costs associated with white oak restoration at scale.

These results help inform the further development of the current project and highlight how the WOI can focus and prioritize near term efforts, be prepared for change and new information to continue to emerge, and plan for long-term success and potentially significant growth and impact.

Acknowledgements:

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Appendix A: Invitation Message, Interview Questions, and List of Interviewees

Hello!

We are contacting you to schedule an interview time (30 minutes) to get your input into the development of the innovative finance project being led by AFF White Oak staff (more background information is provided at the end of this message).

Please complete this appointment scheduler to select an interview time that works for you:

<https://doodle.com/poll/xxxxxx>

Note: Please enter your name in the poll and just select one time period. After selecting your appointment, you can put it on your calendar. We will follow up with a Zoom link to confirm (feel free to let us know if you have another preferred meeting format). Please respond to the scheduler by August 6th or earlier.

To prepare for the interview discussion:

The questions we will cover in the interview are provided in this online survey

<https://www.surveymonkey.com/r/AFFWOI21>

(The questions are also available in a Word document accessible here):

Feel free to review and/or complete the online survey (or fill in and return the document) at your convenience. You do not have to complete the questions in advance, but if you are able to, it will allow the interview to focus on the “whys” and other details behind your responses in greater detail.

If you have any questions or concerns, please contact Katie at katie@dovetailinc.org or 612.414.8041 or Dave at davebubser2@gmail.com or 507.301.8313. Thank you for the opportunity to work with you on this effort and we look forward to hearing your thoughts and ideas!

Sincerely,

Katie Fernholz

Dave Bubser

katie@dovetailinc.org

davebubser2@gmail.com

612.414.8041

507.301.8313

More background information about the project:

Innovative Finance Project

AFF White Oak staff are currently working on a project funded by the Innovation Finance for National Forests (IFNF) Grant awarded by the U.S. Endowment in 2019. The goal of the project is to assess the feasibility of an outcomes-based financial model to support the restoration work needed to ensure a sustainable white oak supply in the future. Currently work is underway to develop and shape a model that estimates the outcome of management activities and costs to achieve the necessary impact via these activities. AFF has subcontracted with Katie Fernholz (Dovetail Partners, Inc.) and Dave Bubser (Cambium Consulting LLC) who are working with AFF White Oak staff to accomplish the project outcomes. Katie and Dave are reaching out to learn more about insights and perspectives of stakeholders involved with the Initiative. If you have any questions about the project, please contact Chelsea Wilson at cwilson@forestfoundation.org.

B. List of Interview Questions

(The questions covered in the interview and listed below were also provided to interviewees via an online survey <https://www.surveymonkey.com/r/AFFWOI21> and in a Word document accessible via Google Docs.)

AFF White Oak, Innovative Finance Interview Questions

- 1) Please describe your background, experience with white oak management, and/or role within the White Oak Initiative.
- 2) What components or activities of the White Oak Initiative are having or will potentially have the greatest impact in your opinion? What does success look like for the initiative, in your opinion?
- 3) What is your experience with white oak management and/or supply chains?
- 4) What examples of white oak management success are you aware of?
- 5) What examples of white oak management risks or pitfalls are you most concerned about?
- 6) What do you know regarding the actual costs of white oak management in different situations? Are there other sources of this information that you can refer us to?
- 7) What resources can you share that define appropriate white oak management alternatives and associated costs within your state/region?
- 8) Are there any additional white oak experts that you recommend we speak with?

Thank you!

C. List of Interviewees

- Dave Apsley - Natural Resources Specialist, The Ohio State University, Jackson, OH
- Jared Calvert - Forest Silviculturist & KY-NRCS Shared Forester, Forest Service, DBNF
- Brian Emerson - Natural Resources Staff Officer, Forest Service, DBNF
- Rob Farrell - State Forester, Virginia Department of Forestry, Charlottesville, VA
- Alex Finkral (Executive Committee) - Chief Forester, Forest Land Group, Chapel Hill, NC
- Justine Gartner - State Forester, Missouri Department of Conservation, Jefferson City, MO
- Kevin Hudson - Senior Vice President, Forest Resources, Westrock, Atlanta, GA
- Barbara Hurt (Executive Committee, Chair of WOI) - Executive Director, Dendrifund, Louisville, KY
- Garret Nowell - Director of Log Procurement, Independent Stave Company, Columbia, MO
- Jeff Stringer (Executive Committee) - Professor and Chair Department of Forestry and Natural Resources, University of Kentucky, Lexington, KY
- Christopher Will, Consulting Forester, Central Kentucky Forest Management (CKFM)
- Elizabeth Wise (Executive Committee) - Senior Vice President, Government Affairs, Sazerac Company

Appendix B: Summary of Interview Results

Interview Question	Summary of Responses
<p>1 Please describe your background, experience with white oak management, and/or role within the White Oak Initiative (WOI).</p>	<ul style="list-style-type: none"> • Forest Silviculturist for the Daniel Boone National Forest. Have been working with NRCS, KDF, KDFWR, NWTf staff and have provided training on forest stand improvement and other NRCS practices for work completed as part of NRCS contracts with private landowners and to encourage stand improvement marking strategies that benefit/encourage the growth and recruitment of white oak. • Consulting forester in Kentucky. Many of my clients implement practices to promote oak regeneration on their woodlands. Also, I'm a former WOI Steering Committee Member. • District Extension Specialist covering all of Southeast Ohio, primary focus is woodland owner education; getting landowners engaged in woodland management. • State of MO state forester, with department for 32 years • I represent the Southern Group of State Foresters (SGSF) on the WOI. • Co-founder and current chair of the WOI. Have worked at several environmental non-profits in fundraising, currently the Executive Director of the DendriFund. I bring expertise in governance and strategy related to an interconnected network of people. • I work for a liquor company heavily invested in bourbon. I run their Government Affairs Department. • Registered forester and wildlife biologist, Miss State -16 years experience; procurement in pine industry previously; with staves industry since 2014; largest barrel manuf. in the world • Consulting for 21 years. Prior to consulting, 15 years as a procurement forester and doing veneer sales. • Chief Forester of The Forestland Group, owner of the largest private portfolio of white oak in the US. On the executive team of the WOI.
<p>2 What components or activities of the White Oak Initiative (WOI) are having or will potentially have the greatest impact in your opinion?</p> <p>What does success look like for the initiative, in your opinion?</p>	<ul style="list-style-type: none"> • Focus on policy, markets, and economics. Success looks like more timberland owners managing sustainably with the return on investment (ROI) necessary to continue doing so for generations. I expect the high value of white oak will be one way of supporting the financing, among others still to be identified. • Educate more practitioners about oak ecology and management. • Success has to be measured by acres of forest improved, specifically acres of adequate, desirable regeneration established. This means on-the-ground implementation at the local level. WOI can support this work by creating resources to guide forest management practice implementation and to encourage landowner participation. • The WOI can serve as the library to share resources developed by the partners and case studies of success so effective processes can be shared, emulated, and adapted by others. • Education and outreach are having impact (initially) - on-the-ground implementation and meetings/collaboration with the partners. High level of interest in learning more and important to respond to that mindset. • Success looks like much greater public awareness and interest, eventually resulting in more acres managed for white oak, especially regeneration. • Would like to see white oak raised to the same stature as long leaf pine. 20 years ago, long leaf was not a big deal - but today it is a mainstream concern, investment is occurring, etc.

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- Want to raise awareness and incentivize/motivate changes in behaviors and activities. It is more than just an issue of education (people know about white oak, but more than information is needed to change outcomes).
- Two things: 1) awareness to attract family landowners and landowners in general to being part of solving the problem and 2) eventually we won't have to worry about it
- Step 1: make landowners aware of the white oak, oak/hickory forests. White oak is among the most valuable species. Exceptionally diverse wildlife habitat for deer, turkeys, migratory birds, etc. A lot of landowners are motivated by wildlife habitat for deer and turkeys. Step 2: what are landowner expectations for the next stand/forest and who will own it? Establish objectives.
- Education, building capacity and expanding reach (of forestry professionals); keep it simple and economically feasible. Landowner education is #1. Encouraging proactive management before and after harvest.
- I think we need to get the word out that these trees are important and precious; more growing of white oak is needed; and then the actual development of healthy white oaks too.
- The greatest impact can potentially be seen by increased proper forest management (i.e. sound silviculture) that encourages the regeneration and recruitment of white oak forest communities on a landscape level scale. Success for the initiative should show measurable outcomes related to this impact in terms of an increase of the quantity and size of advanced oak regeneration as well as an overall increase in acceptable white oak growing stock across all size classes.
- WOI is about the whole forest and needs to go way outside of forestry to develop an economic model and beyond white oak. Need to raise funds in other ways (sportsmen, wildlife benefits, carbon) and need innovative finance to reduce risk (foundations can absorb risks).
- In VA, we are intentionally making the initiative as broad as possible, i.e., not focused on a single species. The habitat folks are bringing a lot of excitement and energy to the initiative.
- In outreach and education, promote oak more broadly, rather than a single species like white oak. E.g., what's good for oak, is good for white oak and may be easier for landowners to align with. There are potential dangers in having "poster species"

<p>3 What is your experience with white oak management and/or supply chains?</p>	<ul style="list-style-type: none"> • I have developed and marked stands for silvicultural treatments that benefit white oak regeneration/recruitment that led to white oak being delivered to local mills through timber harvests. • Manage trust funds that utilize timber harvest revenue from timber sales and place them back into essential reforestation activities such as site prep for natural regeneration and other important silvicultural treatments. • Very involved with selling white oak timber and have developed business relationships with distillers using our clients certified white oak. • I have primarily worked on the marketing and brand strategy side of the spirits industry - and understand the dependencies of the entire bourbon industry on white oak - as well as a variety of supply chain factors that cause price volatility and inability to access white oak. • Work throughout white oak range - eastern half of the US. Key thing is understanding that harvesting isn't a bad thing, they do grow back and we currently have a lot of old stuff. Important to not just cut the best and leave the rest (high grading). 10-12" white oak and 16" white oak are probably the same age. Select for the right species, not just the right diameters. • We own a stave mill and a distillery that uses white oak. Operating across 3 states - labor issues may be more of a concern right now than white oak supply. • Pallet market is spotty - better in South-Eastern and South-Central part of MO. Not able to move small diameter material in other parts of the state. In those areas the treatments tend to not occur (put off, hoping that markets will change). • Specs are individual, different from other markets - go with 7 foot to 30 foot logs with one foot increments (6" of trim) - smaller lengths don't work in the mills anymore. Scaling for staves is pretty unique from other products/markets. • Staves only require 3' of clear lumber, and only 2' for headers, and have to be made from heartwood (can't use sapwood for staves). Variable widths of ~ 2" to 4". Losing an opportunity for better utilization when industry is focused on 8' and 16' lengths? May be able to utilize smaller diameters and lower grades. May not be optimizing for staves when bucking logs. • Sourcing from tree cutting services/arborists is not unheard of (if someone calls with white oak, will generally consider/explore the potential). Over 4,000 suppliers in the network. • What is the real issue? - less white oak, less quality white oak, something else? - and who should pay for that? The spirit industry is interested in white oak and high quality white oak. What role might they play in paying for the resource, even buying the land and managing for white oak (fully integrated supply chain from forest to barrel manufacturer). Could just pay to get management done now and pay to supply their future needs.
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4 What examples of white oak management success are you aware of?

- The two-aged deferment prescription was initially developed to work with severely degraded stands. University of Kentucky (UK) research has refined it to the point that it works well in retaining oak in the stand and addresses the opportunity cost to the landowner represented by retained trees without compromising ecological integrity and future options for oak regeneration. They have stand level guidelines and individual tree guidelines.
- The 10 management strategies provide “the playbook”. A lot of foresters know what they would like to do in oak stands - but landowners aren’t that enthusiastic when they are aware of the trade-offs. For example, white oak management may require a mid-story removal and an expense of several thousand dollars when the benefit isn’t realized for decades, and it doesn’t “make sense” in an economic way.
- Tend to do crop tree release with selection harvest and cut heavy to open up the site. Target basal area: 15-20 sf. Clearcut on poorer sites to start over.
- No artificial planting. Rely on an established base of regeneration - stump sprouting is the key (acorns are nice but not the main regeneration source). Haven’t yet had to think about thinning stump sprouts - slower growth is okay for quality they seek.
- Regeneration is a crucial part of management. Once a cohort of oak is established there is room to work with it for 70-80 years+. 2-cut shelterwood is a good pattern for success - start with removing mid-story and then remove canopy.
- Have had great oak regeneration occur in areas of accidental fire - would like to be able to use fire more effectively.
- Work with a logger at the time of harvest to consider regeneration goals. Avoid diameter limit harvests where everything under 10” stays and hinders white oak development in the long-term.
- Focus on drier sites, consider more feasible slope aspects, etc - areas of greater success as a starting point (where you might have “accidental success” with regeneration).
- Lot of failures in trying to regenerate oak on the wrong sites. Modest success on more xeric sites. Knowing the characteristics of appropriate sites, and access to good management advice, usually leads to successes. Once established on a site, not hard to keep it going well.
- #1 strategy - REMOVAL OF MID-STORY - if this is all you do, you have improved your chances of success.
- We use Oak Shelterwood Method to improve white oak seedling vigor and Crop Tree Release to recruit oak to the overstory.
- Development of biomass, wood pellet markets can be beneficial but needs to be within boundaries (just like other forest product markets).
- USFS offered MO a wood innovation grant to increase utilization of short-leaf pine and lower value hardwoods in the state. Working with a partner on developing the contract - includes a resource assessment, exploration of utilization opportunities, and demonstrations of product opportunities.
- Call Before You Cut program (built out of Ohio program) - MO has grown it out and uses the program to funnel calls out to consulting foresters (expands upon limited state staffing) - a way to grow the workforce/capacity. Level of advertising impacts the level of interest in the program and the number of phone calls, etc. Has been a great, successful program.

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- The Sustaining Family Forests Initiative (TELE program) and the “Call before you Cut” initiative were piloted in OH, and both have had a positive impact on forest owner education and behavior. Funding for the Call Before You Cut program came from USFS S&P funds. States involved: WV, IN, IL, OH, MO, IA.
- One learning from the TELE folks is that if you want to have impact quickly, as an alternative to a broad marketing and education campaign, find people already doing the things you want to promote and help them take it to the next level. Use them as models and ambassadors. “Bell cows” that show other family forest owners the way. ODNr and OSU Extension are now starting to identify specific landowners (experiencing some setbacks related to COVID). Developing a flyer and mailer; hope to target specific family forest owners
- Landowners don’t wake up thinking about oak regeneration. As a consultant, I show my clients’ management outcomes to other potential clients, to show them what they are doing and the results they’re getting. Equally important is educating other foresters and practitioners - showing other foresters what can be done and fit within a business model – oak management can be economically feasible.
- MO has 60 foresters available to meet with private landowners (free services, free planning services, and timber sale services). Also have a landowner cost share docket (similar rates to NRCS programs). Have funds for activities ranging from Rx fire, planning, cattle exclusion/fencing, planting, etc. Landowners could double-dip with state and federal funds. But the funds are limited (i.e., not a ton of money to go around - all of the money gets spent and pot of money isn’t growing - forestry has to compete with ag practice funding).
- Conversation about oak management starts with a conversation about wanting to manage for deer and turkey.
- The best habitat work in Virginia is being done by TNC, improving forest health. Forestry provides wildlife habitat.
- The assessment completed by the University of Missouri (Ben Knapp) identifies how many acres and where practices are needed. It summarizes white oak in various categories e.g., seedling, sapling, pole-sized, etc. and identifies regeneration deficit.
- The assessment and Conservation plan provides information about white oak management, including indigenous practices (fire was included) as well as more costly select harvest type practices.
- Hunting leases help with managing wildlife damage
- Partners in Tennessee are aware of challenges with white oak and have been talking about intersections/opportunities related to ginseng grower interests - could ginseng be an interim crop with white oak production? Is there an agroforestry opportunity?
- The Cold Hill Phase II Silvicultural Assessment on the London Ranger District of the Daniel Boone National Forest focused on an “oak shelterwood” prescription that involved the regeneration of mature closed canopy white oak forest types after midstory removal and preharvest site prep with herbicide treatments. The regeneration harvest was completed by a tracked feller buncher, which led to scarification of the ground and additional establishment of oak regeneration. The project was featured at the 2019 National Silviculture Workshop and the paper titled “Managers and Scientist Unite to Adapt a Shelterwood Prescription to Shift Stand Dynamics for Competitive Oak Reproduction”.

4. con't

- Southern Research Station (SRS) work on the Cold Hill Silvicultural Assessment examined methods to encourage oak regeneration and recruitment and reduce susceptibility/vulnerability to oak decline and gypsy moth. Continued work with SRS examines the best silvicultural treatments to enhance the size and quantity of large advanced oak regeneration and other treatments that increase the vigor and health of white oak such as midstory removal, crop tree release, stand improvement, scarification, thinning, prescribed fire and regeneration harvests.
- Not directly related to white oak, but there is the parallel example of the rye fund to restore rye production in Kentucky - focused on removing risk from the system (reducing farmer/landowner uncertainty) - some lessons learned may be relevant, including the recognized need to build the whole system at one time (not a linear process like the development that occurred with wheat production and markets) and need to work within current policy environment as well.
- Missouri is a good example of successful white oak management - soil type helps, good logging force, and landowner engagement. Loggers in MO do a better job of harvesting the timber the way it needs to be done to regenerate white oak. Kentucky does a good job too in areas with management - but some parts of the state do no management. Need to engage landowner and logger to get the desired outcomes - those are the two parties that matter
- Most of the successes with white oak are on public lands. Very few examples on private lands.
- Most of my direct exposure is limited to demonstration sites on our state forests.
- An Ohio interagency management team involving ODNR, USFS, OSU, NRCS is focusing in a 17 county area (contains approximately 43% of Ohio's forests). Oak dominated forests are 66% of the total forest area in Ohio. Within that larger group, there is a smaller subset of 4 - 5 counties clustered around NFs and large state forests where they are able to do some cross-boundary work around shared stewardship goals. Federal funding to work across ownership boundaries, including recruitment of FFO adjacent to public lands.
- ODNR has worked with USFS and brought the SILVAH framework from PA and adapted it for oak management. Very good for educating foresters from a variety of agencies as well as private consultants.
- Newton Forest is doing some good oak research. Previously owned by Mead.
- A lot of work with prescribed fire (OH). 50 acre units; 3 state forests. Midstory canopy of red maple preventing oak establishment. The problem is they are just now figuring out fire on public lands and are a long way from getting it figured out for private lands. There are only a few prescribed fires in OH that can be considered successes. Tough to pull off; expensive, risky, high technical expertise, small windows. All of these challenges are amplified on family forest lands.
- What new practices can be used that mimic fire and are both low risk and economically feasible? Livestock grazing? Black oak and white oak survived best.
- Use fire to get rid of invasives before harvest. Rare to do fire after a thinning. Fire is more about prairie, savanna management.
- 83% private land ownership in Missouri. Typical of private land ownership - apathy, passive ownership. Tend to manage for mixed species, more of a biodiversity and wildlife interest. Deer and turkey management favors a mix of red and white oak. Most of the cutting doesn't include a forester; no legislation that requires professional/license/etc. Common scenario is a logger knocks on the door to buy the wood.

4. con't

- MO has an oak hickory forest, mixed with short-leaf pine; therefore, generally don't manage just for white oak. Tend to favor white oak because it grows better than red oak - therefore, remove more red oak than white oak component.
- RARELY plant, rely on stump sprouts almost completely. 10-15 years after harvest will do some TSI to favor species mix.
- Pre-commercial treatment - commonly chemical treatment (hack and squirt) rather than mechanical (due to bat restrictions, etc).
- NRCS is heavily involved in the work with landowners. EQIP is very important for supporting FMPs, specific practices. Intensive management practices to reduce midstory and increase vigor of oak seedlings methodology works to economically get necessary practices implemented on small private lands. Fall injections of low volume Arsenal (imazapyr) taking out beech and maple in midstory removal. 98% success and gets the treatments done within the NRCS cost share amounts. The results are predictable, which lends confidence to his methodology. Now, they have high quality oak regeneration. Then they completely remove the overstory, selling into prime markets (staves, veneer). They also leverage their ATFS certification and get a premium for that. They're working with an international group based in Ireland and are currently supplying production of the only certified whiskey barrels coming from the US. Carrot for landowners is ATFS premium (via PEFC CoC). Beyond the ATFS certification, the customer knows they are also using practices that regenerate oak/hickory and could maintain the white oak into the future.

5 What examples of white oak management risks or pitfalls are you most concerned about?

- Forest Inventory Analysis (FIA) and Forest Vegetation Simulator (FVS) analysis has been done looking at growth and drain using high and low harvest scenarios of white oak, including a price sensitivity model on depleted white oak stocks for an economic analysis. Same result as for all commodities. Bottom line, we'll never run out of white oak, but it will eventually price itself out of current markets as stocks are depleted.
- Fire is the toughest of the 10 management practices, especially for family forests. White oak needs several repeated burns followed by a period without fire to allow the seedlings to develop some height, and then another burn to set the competition back. They've only just been figuring out how to effectively use fire for white oak at the landscape scale. Too much for most private landowners to commit to with liability, tight windows, small tracts, etc.
- Difficult for a contracting forester to get insurance to cover offering Rx fire services. Just last legislative session some regulation was passed to clarify liability and make accessing insurance better (more attractive for insurance companies to offer coverage).
- University of Kentucky (UK) has not included costs of specific practices. How much funding is needed and where? Where are the greatest opportunities for white oak and what will it cost? Need to go to the states and get average costs for each practice.
- Mid-story shade is the main problem for oak establishment. Not taking overstory oaks out. Leaving lots of white oak. Not cutting out understory to create the right light levels.
- "Partial cuts" let in too much light and don't reduce low shade. Pre-established oak isn't big enough to respond and competing species will take advantage of increased light and out-pace the oak.
- Rare to do commercial thinning because of a lack of market for small diameter hardwoods.
- Challenging to justify some of the prep costs economically, in light of long rotation lengths. Just does not fit with the experience of most private landowners.
- The long-term nature of it all - we won't know if results are good or bad until it is too late.
- I am concerned that we are already too late.
- I am also afraid that our efforts are going to be too late for some of our constituents. It seems like we are developing a 60-year solution to a 30-year problem.
- The current lack of management today concerns me.
- Most concerned about lack of advanced oak regeneration prior to harvest being conducted on private lands with no additional treatment, which is leading to an increase in mesic species (i.e. mesophication) in upland oak stands.
- The majority of white oak we currently have is 60 - 80 year old mature or maturing sawlog stands.
- In recent years the growing demand for white oak has been met by the market and haven't seen a dip in supply in the short-term, but 40 years out? As we work through the old stuff we currently have, the supply may change.
- Some support from industry for WOI. But they also currently see lots of resource. Supply of white oak timber is good for the next 20 - 25 years. Mill procurement is not worried; everyone is working in the current paradigm. Need a new way of doing things.
- High grading is too common. Management is primarily driven by markets; leads people to high grade. The current paradigm drives high grading to maximize profits. Need to create a new model for service providers. Create forest health contractors.
- Most harvests are not sustainable and a very small percentage 10% - 25% - involve a forester. The first high grade sets oak back, the second high grade takes oak out.

5. con't

- The quality of the wood is changing due to high grading - ie., what is veneer now vs. what was veneer in the past is changing. Stave mill can deal with a little lower quality log - but could be a problem in the future
- Most foresters don't know how to manage oak. There is a very low knowledge base among foresters regarding oak management practices. These issues can't be fixed with a paint gun. Most foresters don't think the economics justify the required work. Many don't have the information they need. Very important for NRCS to do this work. The disadvantage of hardwoods is a long rotation age, but with prices the way they are now, it pays.
- Invasives can be spread during management activities (with equipment, etc). Can turn landowners off and create negative perceptions of forest management by creating problems that weren't there prior to activity.
- Need to keep everything healthy and in balance - have we done soil testing to make sure the treatment that kills the competitor trees is not negatively impacting the soil and other plants? Also, I am told the removal of trees will not reduce the forest diversity as the others grow back so aggressively - but is there a check for any tipping point we/a timberland owner needs to watch for to ensure all stay within a healthy balance?
- I hate to repeat what everyone else is saying, but markets for low-quality hardwood are the key. Forest management (or mismanagement) has always been driven by available markets. The economic incentive is critical to get both landowners and contractors engaged. If we don't have markets we will have to create an entirely new paradigm to spur proper management. For instance, convince landowners that they should pay to have trees removed in order to create habitat. This can be done but it presents an additional huge hurdle to overcome. The other big problem is that if we are successful at getting lots of additional acres treated, those additional acres are going to be further exposed to invasive plants. It will be a game of whack-a-mole where we keep creating more holes.
- Pricing (for white oak buyers) right now is a challenge - it continues to go up and dips are only temporary. Prices are higher than they have ever been. Prices for staves are just below the veneer market but now facing competition from lumber demand. Expect strong demand and pricing trends continuing for the next 5 years. Exports are starting to come back (after tariff impacts) - expect a return to past peaks.
- Staves are 3% of the overall hardwood market; 10% of the white oak market
- Lack of resources is currently a limiting factor. Generally, managing for white oak is a long term commitment. Costs associated with non-harvest practices (prior to and after harvest) are significant. EQIP funding does not come close to paying for practices like tree planting, prescribed fire and herbicide treatment. Foresters and landowners are generally not using prescribed fire for white oak management, particularly in the northern states. There are very few companies doing herbicide applications e.g., hack and squirt for midstory removal.
- One of the frustrations we have and that we try to address through the Farm Bill is market development to address other species (like beech). EQIP mechanisms for forest management plus other programs that assist with white oak management and stewardship.
- Unrealistic to maintain historic levels of white oak in the overstory. Currently experiencing an historic peak in white oak sawtimber inventory.
- Need to move white oak from regeneration state into recruitment into the canopy.

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- Oak management is all about getting the right amount of light to the forest floor at the right time to create 'competitive oak seedlings', e.g. get the tap root established. Sometimes it's multiple burns. A research project (OH) going back to 2001 with burns every five years has done 4 -5 burns now and can see the scales tipping toward oak and hickory understory establishment.
- Managing for white oak is a long-term commitment that may be beyond the capacity of most family forest owners. Active management is required for oak regeneration. Prescribed fire is very expensive. Midstory canopy removal and/or herbicide treatment is a big, expensive undertaking for FFO. EQIP funding doesn't come close to covering costs.
- White oak needs time to develop a deep tap root. Oak seedling germination is not the problem. There are lots of little seedlings, but it's rare to see competitive oak seedlings. So much midstory shade develops – if oak seedlings don't get adequate light within 5 – 10 years, they fall out. Need to knock back the red maple and yellow poplar saplings and small pole-sized trees.
- The 10 defined oak management practices may be overwhelming and too much for family forest owners. Maybe focus on two practices and try to have some incremental success to build upon.
- Getting foresters and landowners to design harvests that encourage oak reproduction with the right light levels, and few are following up with the additional practices needed post harvest. Foresters are not well versed in oak management and are not trained in use of prescribed fire. Most landowners don't think about managing their forest until the logger knocks on their door. They don't have the resources to make informed decisions or to fund oak management practices.
- The majority of the research funding is focused on prescribed fire. But use of fire is not common on privately-owned lands. Family forest owners are not accustomed to seeing fire in their woods.
- In OH, they don't have enough DNR foresters on the ground to address the oak issue and consultants are involved in only a small percentage of harvests
- Need increased awareness within the state legislature to incentivize and/or subsidize the practices necessary to sustain oak on the landscape. Need state and federal funding to get more people and more resources on the ground. Need more education at the local level.
- Generally a lack of vendors to do the work associated with oak management, for example herbicide application. Trying to encourage loggers to package services, but it's more lucrative for them to focus on timber sales.
- It's hard to establish a sustainability framework when "there is a bounty on white oak".
- Access to markets for small diameter and low grade material can be a challenge. There is only one paper mill left in OH (Pixelle in Chillicothe). It's tough for non-oak material to pay its way out of the woods.
- Planting is rare (nursery in NE corner of MO has a root pruning technique that provides a good seedling, but expensive).
- We have the technical information we need to manage white oak - but it is more of a financial challenge with private landownership and the decisions that need to be made over a long-time frame to successfully maintain/retain white oak.
- We have a pretty good playbook. This is more of a social issue with private landowners and economics.

5. con't	<ul style="list-style-type: none"> • First 5-10 years and getting to 6' high with oak regeneration. Even just one fire can make a difference. Once there is a pretty dense stand of young oak that is 4-5-6' high it seems to maintain itself from there on out. White oak doesn't compete well with tulip poplar, etc on mesic sites - regeneration failure experiences. • Need to mark harder in timber sales - lighter marking favors the more shade tolerant species and leaves stands stocked or overstocked. CFI data shows the bulk of sawtimber sized trees in the inventory.
<p>6 What do you know regarding the actual costs of white oak management in different situations?</p> <p>Are there other sources of this information that you can refer us to?</p>	<ul style="list-style-type: none"> • I have completed analysis for costs of management for white oak within my silviculture certification project paper for the Cold Hill Phase II Silvicultural Assessment. In addition, cost analysis is completed for some projects that involve white oak management on the Daniel Boone National Forest. Information is also available about costs/incentives for various NRCS cost share forestry practices for private landowners. • Virginia is currently developing a new hardwood management incentive program so we will begin gathering cost data as practices are implemented. Virginia was able to get \$350K in cost share funding to create landowner incentives. Funds also made available due to natural gas pipelines creating fragmentation - led to \$5 million for forest enhancement to mitigate/offset impacts of pipelines • Virginia assessment tool; piloting it now. Not just measuring acres; it provides a qualitative score for the forest. The forest condition score is based on landowner objectives. Spend less \$\$ to get more benefit. Close match with the WOI. Lays out a 10 year plan, cost share for 1 year, and shows the need for funding in the future. Shows the status of hardwood forests. V1.0 is currently being piloted with some DOF foresters and contractors. • Challenge for landowners is to defer harvest and associated income, and invest additional money in an oak stand that will be 60 - 80 years out from harvest/income. • On a great field day at Alex Richman's farm (WOI SC member) she teamed up with Candace Dinwiddie (also WOI SC) - they had participants value the tree stands ... the tree I valued was only worth \$40! It was overwhelming to think of the cost of harvest and number of acres one would have to harvest to get any return ... assuming there was a market for all the timber within those acres of course. • Can livestock management be compatible with white oak management (grazing as an economic element and part of the management design)? • The most crucial step in white oak mgmt, which may be tied to costs, is final harvests in mature oak stands. Plenty of information out there...but the recommended recipes for success may cut into timber sale profits. • Private forest landowners often have access to Farm Bill money through NRCS EQIP contracts. This coupled with a knowledgeable consulting forester can reduce costs and improve oak management success. • Rare cases where a well-intentioned landowner has the means to defer timber income and has access to a consulting forester and contractors capable of doing good work. • Cost of midstory removal: \$100/acre if done at the time of harvest. If done as a special contract could be much more (more like costs for fuel treatments out West, i.e., >\$500-1600/acre).

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- Planting in the understory is very difficult (i.e., 50% survival) and therefore may be cost prohibitive. Field planting cost estimate: trees, planting, site prep - \$175-200/acre with cost-share available to cover costs (i.e. 50%). CRP planting of white oak - 15 year contracts in Mississippi River bottom (also WRP) - did about 4,000 acres worth - re-enrolled for subsequent 15 year contracts; requirement to retain a certain number of trees post harvest. Can layer cost-share and CRP.
- Landowners can/should compare oak management financial returns and economic trade-offs to stock market returns - i.e., long-term investment opportunities with competitive ROIs.
- Knowing where to invest is key. For example, mesic bottomlands without advanced white oak regeneration are economically infeasible as it will cost too much to overcome competing species.
- Sites on south and west facing slopes, lower productivity, less competition are cheaper and easier for oak establishment and provide the biggest bang for the buck.
- Would help to be paying a premium for white oak to incentivize family forest owners to invest in necessary management practices.
- Mid-story competition as the main concern in management - and the presence of competitive species (i.e., red maple - less valuable and not valuable for wildlife)
- Would like to see a modest infusion of money at that harvesting time to cover inclusion of regeneration considerations (i.e., removal of mid-story and non-merchantable materials). Example, provide "several 1,000 dollars" to cover this cost which occurs even where there are some markets for small diameter materials. On a 40 acre timber sale - maybe \$5,000 to pay a logger to drop and drive over submerchantable material. Have done some of this where loggers are willing/able and where markets are good. Don't do any hack and squirt treatment. Work with loggers to have a shared vision (i.e., knock down competing vegetation as they move between trees to be cut). Do the midstory removal and up to 50% of canopy removal in the first stage of shelterwood and then remove remaining canopy with second cut. If you cut too fast/hard you get tulip poplar; not enough light you favor red maple and beech. In good scenarios some of that material can be sold.
- Have found an economic fit for oak management within their own operations - benefit from the scale of the operations - can "gray out" the costs of individual treatments across the portfolio and across many sales over the landscape and over time.
- The expansion of carbon markets may further hinder white oak management if the protocols favor maintaining full stocking.
- There are poor markets in VA for low grade hardwoods. They've lost mills in TN and MD. Domtar paper mill in Kingsport (TN) shut down (being repurposed to containerboard and reopened in 2023). They also lost the energy market (biomass plants) when the VA Assembly voted to go carbon free by 2050. They are looking into aviation fuel. Also research in WV, replace Appalachian coal. Nano technology and sustainable biomaterials is developing, but it's nano, so not much scaling opportunity.
- All mills pay a tax on wood passing through their gates (VA). For pine, the \$\$ goes toward reforestation. For hardwoods, there is a hardwood forest habitat initiative.
- 60% cost share for forest practices - NRCS 'not to exceed' (NTE) rates. Doesn't work out from a forest products model. Sell landowners on forest health and wildlife habitat models. May only work for certain landowners where timber income is not a primary driver.

6. con't

- I don't have numbers but can say that in certain situations other trees are winning the battle for sunlight, a market needs to be created for these trees.
- Landowners can take revenue, for example from cutting yellow poplar/regenerate yellow poplar stands. Then put some of that money toward oak management. Starting 15 – 20 years before harvesting in the oak stands. Since they are only doing intensive management in oak stands, costs can be viewed in context of the entire larger property.
- Program: MO Managed Woods - 15 year program meant to address taxes in the 1940s but not as attractive now due to low benefits (taxes aren't that high). Need a program that would help with urban-fringe areas to get property declared as a forest/ag and address taxes/land uses and make management commitment. There is an interested audience in these areas but the incentive isn't strong enough - not willing to give up a bundle of rights for a 15 year period.
- Revenue from near term timber harvests can provide \$\$ for oak management. Most of the work is needed on moderate sites. Don't need to do much on the poorer sites.
- If oak is present, there's an opportunity to get good results, economically. EQIP fully pays for midstory removal. Treats all stems from ½" to 7 – 8". Andy Zell at Mississippi State Univ developed a prescription for chemical application – Apply 1 ml of chemical per 3" of diameter. Wide spacing. He gets 3 – 5 acres done in a day, using 32 oz of chemicals per day.
- NRCS is paying \$261/ac for chemical midstory removal. \$240 - \$260 range for crop tree release. The first CRT is essentially the same treatment as the midstory removal.
- The midstory removal takes place 5 – 6 years in advance of harvest. It lets filtered light to the ground, through a complete overstory canopy. If too big an opening, too much light comes through and other species like yellow poplar take over especially on intermediate and better sites. There is often a cohort of existing, small and poorly developed oak seedlings. They need to develop more leaf area to be competitive. Germination of oak is not dependent on light; more a function of acorn volume. Once the midstory is diminished and the oak seedlings have increased in size, do the final harvest.
- Sensitive to the economics of a timber harvest. Wait till oak seedlings are developed, then do a single harvest. One-step removal. Can't afford a two-step harvest. More economical, and don't cause damage to regen and crop trees, epicormic branching, etc. Smaller clearcuts – 5, 10, 20 acre openings. Also, not a lot of young even-aged hardwood stands in KY. Creates woodcock, grouse, turkey, bobcat habitat. Estimate 6 – 8 MBF/ac and typically a total of 120 – 160 MBF sales. (average would be 20 acre units)
- Then, pre-commercial thinning of crop trees 7 – 15 years after harvest. For yellow poplar, 6" to 9" diameters after 8 – 9 years. Crop tree release is tough, but can get it done within EQIP rates using glyphosate injection.
- Typically work with 35 – 50 acre "work units. Typical clients own 350 – 2000 acres tracts.
- Haven't seen a good cost analysis of practices. No one is doing the work, so not much data/information is available. It would be very useful to develop. There are a lot of unknowns for the general forestry community.
- Foresters need to be incentivized too, to take them out of the standard timber marking mode, think about the understory, and do site prep work.

7 What resources can you share that define appropriate white oak management alternatives and associated costs within your state/region?

- University of Kentucky (UK) will be publishing research papers on both an economic analysis and a sustainability analysis for white oak (available late-2021). Also developing a paper on the socio-economic impacts of white oak, designed more for policy makers and elected officials.
- UK and partners coordinated completion of risk analysis (SWOT) for distillers, forest products industry and landowners to identify shared opportunities and challenges around white oak for all three demographics. Published just for KY; didn't have the resources to do it region-wide.
- There are several SRS/USFS papers and projects that define white oak management alternatives such as the Cold Hill Project for example. Some other USFS projects analyze costs, however they may not be specific to white oak alone. NRCS has cost scenarios for some of the practices that benefit white oak.
- We have 70 years of oak management literature.
- Outreach efforts for private woodland owners in Appalachian Ohio. <http://u.osu.edu/seohiowoods>
- College student at Purdue doing some work on "working it backwards" to demonstrate how logs get to the stove mill, i.e., show the practices associated with oak harvests.
- Mostly federal agency resources, widely available online. Otherwise, state extension foresters.
- Over the last 12-18 months have done more outreach with staff (MO) to raise awareness of urgency with white oak regeneration and over reliance on stump sprouts. Older foresters and younger foresters don't see things the same way? The younger group soaks up information but the older group needs to be shown the issues (i.e., FIA data analysis and state's CFI plots). Data shows a lack of white oak in the small size classes.
- Forestry Summit event this week (MO) - topics include "Status and Concerns of White Oak" with Ben @ MO State
- This whole conversation is very new - last 12-18 months - looking at conditions on state lands (MO) and the need to adjust management. Harvest 8-9 million Bd ft on state lands in the past - looking at 14 million bd ft as a target this year.
- Oak decline, rapid white oak mortality - forest health concerns that foresters are watching for.
- Issues with Rapid White Oak mortality starting 5-6 years oak were the #1 cause of raising forester interest and awareness of white oak issues. Built up relationship with U of MO in researching the issue/causes. Seeing dead and dying white oak was enough to get foresters concerned.
- Deer aren't as much of a problem as in PA - but CWD is also a problem with deer health/mortality.
- If the WOI is going to have success - it has to happen on private lands which means it has been phrased in a way that landowners see the problem/issue/urgency - messaging is important for the WOI.
- Small mini-grant for the state looking at outreach - considering engagement with loggers to increase their understanding and interest. Working with national woodland owners group on messaging efforts.
- One pet peeve - landowners receiving EQIP funding get a packet from NRCS with an insert from the 1970s. Very dated. Forest management knowledge has changed a lot since then. Sending the wrong message to landowners.
- University of Kentucky Forestry Extension

8 Are there any additional white oak experts that you recommend we speak with?

- Dr. John Lhotka; Research opportunities with Dr. John Lhotka regarding white oak recruitment strategies in response to different harvesting intensities.
- Dr. Callie Schweitzer
- Dr. Stacy Clark
- Dr. Tara Keyser
- Dr. Jeff Stringer
- Dr. Jacob Muller
- Alex Richman (WOI SC member)
- Candace Dinwiddie (WOI SC member), Executive Director, Tennessee Forestry Association. Nashville, TN
- Logan Nutt, Copperhead Consulting, Paint Lick, KY
- Stephanie Downs is ODNR-Division of Forestry, and works with NRCS on Forestry EQIP Practices
- Todd Hutchinson, researcher at the Delaware Lab in Delaware, OH (USFS State and Private). Has done quite a bit of work with prescribed fire and fire history in Ohio. He also is doing work with midstory removal of maple using herbicide injection.
- Cotton Randall, private lands forestry component of ODNR-Division of Forestry and lead on an white oak story map effort for Ohio which received funding through the WOI.
- Alex & Abby Kindler, Kindler Forest Management, private consulting forester in SE OH, worked with a private woodland owner and another consulting forester to conduct the first EQIP funded prescribed burn on private lands in Ohio.
- Terry Cosby, previously leading NRCS in OH is now leading NRCS nationwide is knowledgeable about oak management, use of EQIP funding and is an advocate.
- Rob Farrell State Forester in VA is also a good resource and a big proponent of incentives.
- Chris Will is a consultant in KY and has had some successes managing white oak on private lands.
- Jarel Bartig, Interagency Forestry Team Liaison, funded through the USFS and NRCS. She coordinates the team's focus on the management of oak dominated forests (of all ownerships) in SE OHIO.
- I would think it would make a lot of sense to expand the resource group to include experts on hardwood forests and all the species in that forest. In addition - money can be made through sportsman licenses, land easements, carbon markets, etc. etc ... I think it will take looking well beyond white oak specific people to come out with what is needed for white oak.
- I just read a book by Douglas Tallamy called the Nature of Oaks; he might be someone to speak with or that WOI uses to help get the message out.
- Engage with companies that use white oak - besides the spirits industry - other parts of the market that use white oak.
- Also interested in getting the word out in Congress, support for EQIP, etc.
- Have modeled WOI after the Long Leaf Alliance to some degree because of their perceived success.
- Mark Ashton at Yale University is fun to speak with. He's in the top 1% of Americans who think about white oak.
- Craig Harper at Tennessee works with individual landowners. Those landowners probably have the most direct knowledge of what it costs to get work done on the ground. Craig Harper knows what costs are on the ground.