AUTHENTICATED
U.S. GOVERNMENT
INFORMATION
GPO

S. HRG. 117–90

FEDERAL, STATE, AND PRIVATE FORESTLANDS: OPPORTUNITIES FOR ADDRESSING CLIMATE CHANGE

HEARING

BEFORE THE

COMMITTEE ON AGRICULTURE, NUTRITION, AND FORESTRY

UNITED STATES SENATE

ONE HUNDRED SEVENTEENTH CONGRESS

FIRST SESSION

MAY 20, 2021

Printed for the use of the
Committee on Agriculture, Nutrition, and Forestry

Available on http://www.govinfo.gov/

U.S. GOVERNMENT PUBLISHING OFFICE
45–947 PDF WASHINGTON : 2022

COMMITTEE ON AGRICULTURE, NUTRITION, AND FORESTRY

DEBBIE STABENOW, Michigan, *Chairwoman*

PATRICK J. LEAHY, Vermont
SHERROD BROWN, Ohio
AMY KLOBUCHAR, Minnesota
MICHAEL F. BENNET, Colorado
KIRSTEN E. GILLIBRAND, New York
TINA SMITH, Minnesota
RICHARD J. DURBIN, Illinois
CORY BOOKER, New Jersey
BEN RAY LUJÁN, New Mexico
RAPHAEL WARNOCK, Georgia

JOHN BOOZMAN, Arkansas
MITCH MCCONNELL, Kentucky
JOHN HOEVEN, North Dakota
JONI ERNST, Iowa
CINDY HYDE-SMITH, Mississippi
ROGER MARSHALL, Kansas
TOMMY TUBERVILLE, Alabama
CHARLES GRASSLEY, Iowa
JOHN THUNE, South Dakota
DEB FISCHER, Nebraska
MIKE BRAUN, Indiana

JOSEPH A. SHULTZ, Majority Staff Director
MARY BETH SCHULTZ, Majority Chief Counsel
JESSICA L. WILLIAMS, Chief Clerk
MARTHA SCOTT POINDEXTER, Minority Staff Director
FRED J. CLARK, Minority Chief Counsel

C O N T E N T S

Thursday, May 20, 2021

Page

HEARING:

Federal, State, and Private Forestlands: Opportunities for Addressing Climate Change 1

STATEMENTS PRESENTED BY SENATORS

Stabenow, Hon. Debbie, U.S. Senator from the State of Michigan 1
Boozman, Hon. John, U.S. Senator from the State of Arkansas 2

WITNESSES

Dillard, Kedren, Forest Owner, Sustainable Forestry and African American Land Retention Network; Board Member, American Forest Foundation, Washington, DC 6
Harris, Troy, Managing Director of Timberland, Jamestown LP; Board Member, National Alliance of Forest Owners, Atlanta, GA 8
Orrego, Jessica, Director of Forestry, American Carbon Registry, Winrock International, Little Rock, AR 9
Fox, Joe, State Forester, Forestry Division, Arkansas Department of Agriculture; President, National Association of State Foresters, Little Rock, AR 11
Cheng, Tony, Ph.D., Director, Colorado Forest Restoration Institute; Professor, Forest & Rangeland Stewardship, Colorado State University, Fort Collins, CO 13

APPENDIX

PREPARED STATEMENTS:
Dillard, Kedren 34
Harris, Troy 39
Orrego, Jessica 44
Fox, Joe 50
Cheng, Tony, Ph.D. 74

QUESTION AND ANSWER:
Dillard, Kedren:
Written response to questions from Hon. John Boozman 78
Harris, Troy:
Written response to questions from Hon. John Boozman 80
Written response to questions from Hon. Amy Klobuchar 81
Orrego, Jessica:
Written response to questions from Hon. John Boozman 84
Fox, Joe:
Written response to questions from Hon. John Boozman 85
Written response to questions from Hon. Amy Klobuchar 91
Written response to questions from Hon. John Hoeven 93
Written response to questions from Hon. Charles Grassley 94
Cheng, Tony, Ph.D.:
Written response to questions from Hon. John Boozman 101
Written response to questions from Hon. Amy Klobuchar 102

Page

Cheng, Tony, Ph.D.—Continued
Written response to questions from Hon. John Hoeven 102
Written response to questions from Hon. Charles Grassley 103

FEDERAL, STATE, AND PRIVATE FORESTLANDS: OPPORTUNITIES FOR ADDRESSING CLIMATE CHANGE

THURSDAY, MAY 20, 2021

U.S. SENATE,
COMMITTEE ON AGRICULTURE, NUTRITION, AND FORESTRY,
Washington, DC.

The Committee met, pursuant to notice, at 9:37 a.m., via Webex and in room 301, Russell Senate Office Building, Hon. Debbie Stabenow, Chairwoman of the Committee, presiding.

Present or submitting a statement: Senators Stabenow, Brown, Klobuchar, Bennet, Gillibrand, Smith, Durbin, Booker, Warnock, Boozman, Ernst, Marshall, Tuberville, Grassley, Thune, Fischer, and Braun.

STATEMENT OF HON. DEBBIE STABENOW, U.S. SENATOR FROM THE STATE OF MICHIGAN, CHAIRWOMAN, U.S. COMMITTEE ON AGRICULTURE, NUTRITION, AND FORESTRY

Chairwoman STABENOW. I call to order the Senate Agriculture, Nutrition, and Forestry Committee. We want to thank everybody for joining us this morning to talk about the incredible potential of America's forests to help solve the climate crisis. We have a number of members involved in really important leadership work on this issue.

Covering more than one-third of the land area of the United States, our public and private forests already play an important role storing carbon, and with the right policies they have the potential to do so much more.

Mother Nature could not have designed a more effective mechanism for sequestering carbon and cleaning our air. America's forests currently pull as much carbon dioxide out of the air every year as eliminating 54 million cars from the road, according to the National Academy of Sciences. Just as a caveat, as somebody from a state which makes vehicles, we would still like you to buy vehicles. That is very, very significant, what our forests alone can do.

Climate-smart forestry policies offer both tools to reduce carbon pollution and an important opportunity to develop new revenue streams for family foresters. This helps provide financial stability in uncertain times as pressure increases to subdivide forestland for new development.

Our solutions cannot be one-size-fits all, as we know. Small acreage and minority landowners have too often been left out of the kind of opportunities we are talking about today. Their stories are

unique, and their needs may be very different than those of larger or more resourced operations. We have a duty to bring all voices to the table, and we have witnesses with us today who can speak to how we can do more to address the needs of these foresters specifically.

We also have to invest in our national forests, both in replanting stands that have been affected by wildfire and insect outbreaks and in pursuing science-based restoration of our public land to help prevent wildfires in the first place. Senator Bennet, who chairs our Forestry Subcommittee, and whose beautiful home State of Colorado last year saw some of the worst wildfires in recent in history, is leading a bill on this. I look forward to working with you on it, Senator Bennet.

As we work to better manage our forests to help us reach our climate goals, we have to think about a variety of different principles to help guide the discussion. First, we need to ensure that climate-smart forestry policies and practices complement and strengthen our traditional forest products markets. In fact, I think there is great promise in storing carbon in long-lived wood products like mass timber. We worked in a bipartisan way in the last farm bill to enact my Timber Innovation Act, and my alma mater, Michigan State University, is building the first mass timber building in the State of Michigan. I understand, Senator Boozman, you have a large construction project, at least one, in Arkansas as well. We must look for additional opportunities to build markets for climate-friendly forestry products.

Second, as we think about reaping additional climate benefits from managed timberland, we also need to redouble our efforts to protect the few remaining stands of old-growth forests. These mature forests are tremendous carbon reserves, and they ought to be preserved, both for the climate and for other benefits like providing wildlife habitat and clean water.

A diverse coalition of forestland owners, industry, conservationists, and outdoor recreation enthusiasts agree that voluntary, flexible policies and investments to drive climate-smart forestry practices are a win-win. My Rural Forest Markets Act with Senator Braun, along with the REPLANT Act with Senators Portman, Bennet and Marshall, are examples of bipartisan bills that positively address these issues. I know we will hear strong support for both pieces of legislation today, as well as other opportunities in this arena.

I look forward to hearing from our witnesses. We thank each of you for being with us. With that I would recognize my friend and our Ranking Member, Senator Boozman, for his comments.

STATEMENT OF HON. SENATOR JOHN BOOZMAN, U.S. SENATOR FROM THE STATE OF ARKANSAS

Senator BOOZMAN. Thank you, Chairwoman Stabenow, for your interest and commitment in continuing this important conversation focusing on the forestry sector. I appreciate the collaboration for today's hearing and thank our witnesses for their time today. I look forward to today's conversation, because the forest sector and the wood products industries have a great story to tell when it comes

to the numerous benefits healthy working forests provide, including carbon sequestration.

The good news is we have an abundance of the world's greatest carbon sequestration machines—trees. Using Forest Service data, the Environmental Protection Agency declared U.S. forests' carbon stocks contained 58.7 billion metric tons of carbon in 2019. U.S. forests were also a net carbon sink of 221 million metric tons of carbon in 2019, offsetting approximately 12 percent of gross annual greenhouse gas emissions in the United States for the year. Twelve percent—it is amazing.

While this is encouraging, we cannot simply plant more trees and expect an end to the conversation. Planting trees without appropriate and active management is the equivalent of planting mountains of kindling across our public and private forestlands. The good news is that America's foresters, public and private land management experts, and the wood products industry know how to maintain, cultivate, and sustain healthy forests today and for generations to come.

This lifecycle of planting trees, managing forests, harvesting timber, and delivering this commodity to a vibrant wood products industry is a win-win for everyone. Our forests win from active management and treatments that help mitigate against pests and diseases, and minimize the severity and intensity of catastrophic wildfires. Healthy, well-managed forests provide cleaner air and water and vibrant ecosystems for wildlife and recreation activities. This is a win for all of us.

When we manage our forests properly, we can harvest desirable timber, continue reforestation activities, and support the growing wood products industry, which sequesters carbon in products beyond the life of the individual tree. This is a win for public and private forestlands, our wood products industry, and for the economic sustainability of rural communities relying on this industry for their livelihood.

The common denominator in achieving these wins is management. Providing forestry experts the right tools yields us healthy forests, healthy markets, and countless benefits. According to the American Forest and Paper Association, the forest products industry employs over 900,000 people and supports 2.5 million jobs through its supply chain. The industry represents around four percent of the U.S. manufacturing gross domestic product and manufactures almost $300 billion in products annually. This industry and these jobs are essential to rural economies.

In Arkansas we are seeing some of the exciting innovations of mass timber. For instance, the University of Arkansas' Adohi Hall is a 202,000-square-foot student residence constructed almost entirely of mass timber. It is one of the largest mass timber buildings in the United States, estimating to store the equivalent of over 3,000 metric tons of carbon.

Also, Walmart is constructing a new corporate headquarters in Bentonville with 1.7 million cubic feet of mass timber, harvested and manufactured in Arkansas. As a result of that project, Structurlam will be opening a new facility in Conway, Arkansas, that will create over 100 new jobs in the State. These projects are

a microcosm of the win-win opportunities tied to healthy, well-managed working forests. There are many success stories to be told.

As Congress and the Administration consider strategies to promote voluntary participation in combating climate change, we must avoid policies that take forestland out of production or deter sound management practices. We must ensure foresters and landowners are able to operate with certainty, predictability, and transparency, and we must avoid taking actions that may disrupt this successful and sustainable market cycle.

This is true with the Administration's tax proposal on capital gains and on a stepped-up basis, which may have significant implications for agriculture and forestry industries by frustrating, rather than facilitating, market opportunities for landowners, timber harvest, and the wood products industries, which is why I encourage our stakeholders to examine these tax proposals and consider how they impact operations today and for future generations.

We need to keep our forests working and not pursue policies or incentivize practices that may impede the great story of our forest and wood products industries. With that, I am eager to hear the unique interests from our witnesses today to better understand the wins healthy working forests provide by sequestering carbon, supporting our rural communities and our growing wood products industry.

Thank you very much, Madam Chair.

Chairwoman STABENOW. Well, thank you very much, Senator Boozman. I appreciate working with you on the hearing and on this really important issue. I know we share a desire to do positive things in this area.

Now we will introduce all five of our witnesses first and then come back and ask each of our witnesses to share five minutes of testimony. We are very interested in what other information you would like to provide us in writing as well today.

Let me start with Kedren Dillard, a fourth-generation forest landowner in Brunswick County, Virginia. Ms. Dillard is part of a network of landowners with the Sustainable Forestry and African American Land Retention Network, and a board member of the American Forest Foundation. In addition to her expertise on forestry and climate matter, she has particular experience with heirs' property issues, working to clarify and document the ownership of her family's land, resulting in more than 250 descendants.

Today Ms. Dillard and her family continue to work on improving the health of their forests to ensure that their land will benefit generations to come.

Next let me introduce Mr. Troy Harris. I know that Senator Warnock had hoped that he would be able to give this introduction. I know he is working to get here to the Committee today, but I am going to proceed on his behalf.

Troy Harris is the Managing Director of Jamestown Timberland Investment Management Organization in Atlanta, Georgia. He is a certified forester, serves on the Operating Committee of the National Alliance of Forest Owners, is a member of the Forest Landowners Association, and the Georgia Forestry Association. Mr. Harris has more than 25 years' experience in timberland portfolio management.

I now want to recognize Senator Boozman, who will introduce our next witnesses.

Senator BOOZMAN. Thank you, Madam Chair, and I want to introduce Ms. Jessica Orrego, Director of Forestry of the American Carbon Registry at Winrock International, Little Rock, Arkansas. Ms. Orrego is currently the American Carbon Registry Director of Forestry at Winrock International. She is responsible for the listing, verifying, and registering of carbon projects under compliance and voluntary carbon markets. Ms. Orrego has experience in project development, consulting and implementation for a wide range of climate-focused entities, including the Plan Vivo Foundation, U.S. Climate Change Science Program, and EcoSecurities.

In her previous roles, she worked to develop protocols, projects, and climate research coordination. Ms. Orrego has a bachelor's degree in biology and master's degree in forestry from the University of Vermont. Welcome, Ms. Jessica Orrego. Thank you so much for participating in today's hearing.

Next, I would like to introduce another Arkansan, Mr. Joe Fox, our State Forester, President of the National Association of State Foresters, from Little Rock, Arkansas. Mr. Fox is the State Forester for Arkansas, a role held since 2012, in the Forestry Division of the Arkansas Department of Agriculture. He is the current President of the National Association of State Foresters.

Before coming to the department, Mr. Fox was the Director of Conservation Forestry for the Arkansas Field Office of The Nature Conservancy. He has experience in forest project development, conservation planning, and land acquisition. Previously he spent 20 years working in a family owned lumber business. He holds two bachelor's degrees in forestry and agricultural economics. Joe has done a tremendous job for the State of Arkansas. Thank you, Mr. Fox, for participating, and welcome.

Chairwoman STABENOW. Thank you very much. Last but not least, I will turn to Senator Bennet. I do have to make a note that Senator Bennet had two witnesses, I think, at the last hearing.

Senator BENNET. We are down to one.

Chairwoman STABENOW. Yes, I know, and Senator Boozman had two this time. I have got to work on Michigan here. We have got to make sure more members are getting people to come in from their State.

Senator Bennet.

Senator BENNET. Thank you, Chairwoman Stabenow and Ranking Member Boozman. Thanks for giving me the opportunity to introduce Dr. Tony Cheng. Dr. Cheng is the Director of the Colorado Forest Restoration Institute. He is also a professor and extension specialist in forest and rangeland stewardship at Colorado State University in Ft. Collins. He holds a master's in forestry from the University of Minnesota and a Ph.D.—okay, I know, you can't get through.

Chairwoman STABENOW. Excuse me. I don't think——

Senator BENNET. They had the highest voter turnout in the country. Okay.

He holds a master's in forestry from the University of Minnesota and a Ph.D. in forestry from Oregon State University. For over 20 years, Dr. Cheng has worked in Colorado and across the West, at

the intersection of academic research and practical forest management. In his role leading CFRI, Dr. Cheng works with land managers, collaborative groups, and local interests to develop science-based forest management strategies to restore landscapes and manage fire risk, with a focus on national forest lands.

During my time in the Senate I have relied on Dr. Cheng over and over again for his insights and expertise. In 2014, I asked him to co-lead a group of forestry experts to tell us how to better support forest health and wildfire recovery efforts in Colorado. These recommendations guided our work to reauthorize CFLRP in the 2018 Farm Bill, improve wildfire recovery funding, and finally end fire borrowing.

Last fall I asked Dr. Cheng to join a group of Colorado businesses, county commissioners, water leaders, and conservationists to develop policy recommendations for building climate resilience in the West. One of the group's top recommendations was investing in the forest and watershed health. Just a few weeks ago, Dr. Cheng and I were together with Secretary Vilsack and Governor Polis, looking at forest health treatments in Colorado's Arapaho & Roosevelt National Forests.

I am grateful for Dr. Cheng's leadership and guidance on these issues over the years, and I am honored to welcome him to the Committee today.

Chairwoman STABENOW. Well, thank you very much, Senator Bennet. We will turn to our witnesses. I do want to reassure our witnesses we will not harass you. We only harass each other on the Committee. We will start with Ms. Dillard. Welcome.

STATEMENT OF KEDREN DILLARD, FOREST OWNER, SUSTAINABLE FORESTRY AND AFRICAN AMERICAN LAND RETENTION NETWORK; BOARD MEMBER, AMERICAN FOREST FOUNDATION, WASHINGTON, DC

Ms. DILLARD. Thank you. Good morning. Thank you for the opportunity to testify on behalf of the Sustainable Forestry and African American Land Retention Network, SFLR, and the American Forest Foundation.

As you consider climate policy in this Committee and in this Congress, please consider policies that recognize the important role and opportunity African American forest owners like my family, as well as other family forest owners have in contributing to climate solutions. In addition to helping reduce carbon emissions, climate policy should give landowners the tools and support to tackle the impacts of climate change on our land, with voluntary efforts that increase our land's value, help us keep our land in the family, and keep it forested and healthy.

Family and individual forest owners own more than one-third of U.S. forests, making us essential in efforts to mitigate climate change. America's forests already capture and store nearly 15 percent of annual U.S. carbon dioxide emissions. We can do much more with our forests if we empower our family forest owners, including African American owners like me, with the right tools and policy support.

I am proud fourth-generation forest landowner. With my family, we own approximately 160 acres of land in three small farmland

plots in Brunswick County, located in Southern Virginia. Luckily, our titles are clear on all three properties now, but this took a great deal of work and money, paying the legal fees and buying out all 250 heirs to a portion of this land. With the help of the Black Family Land Trust, an SFLR network organization, to date we have been able to keep the land in the family.

We are fortunate to work through these heirs' property issues and land ownership concerns, but know that many other African American landowners with long and emotional ties to the land have not been so fortunate. Heirs' property, combined with the lack of access and trust in institutions that support landowners have led to significant loss of African American and other minority landownership.

On our land we harvest timber to pay for the upkeep and management of expenses, but this is not nearly enough to cover all our costs, forcing my family and I to absorb the remaining expenses out of pocket. There will come a time when fewer family members will share in these costs and it will be too much of a burden to bear by only a few. This will undoubtedly jeopardize keeping my land family owned and in forests.

As a result, we are actively looking for additional opportunities to help the land pay for itself, and in parallel, identify management efforts that are both good for the climate and for the long-term health of our forests. USDA conservation programs can certainly help. However, carbon markets present a near-term solution to this challenge for my family and other neighboring landowners who cannot afford management on their own.

Carbon markets can help bring private sector money, some estimate in the billions, to family forests like mine. While we would like to enroll our land in a carbon market, the opportunities are few and far between, as most carbon markets favor large lands over small, family owned forests like ours.

Individual carbon projects on small forests are extremely costly and complex, making carbon markets largely out of scope for me and other owners like myself. There are significant upfront costs for developing a carbon projects and implementing forest management practices that do not return revenues from the sale of carbon until years later. Most families simply do not have the resources for upfront expenses and the ability to wait years for a return.

I want to thank Senators Stabenow and Braun for introducing the Rural Forest Markets Act as a solution to overcome these barriers and help family forest owners access carbon markets. This bill unlocks private capital that can finance the high upfront costs of entering a carbon market, and can be paid as carbon is generated and sold from forest carbon actions over time. This bill will help family forest owners like me participate in carbon markets, earn revenue for needed forest management that benefits the climate, something I could not afford to do without this bill, and bring civilians and private sector resources to small farming families like mine.

I respectfully urge further improvement of the bill to ensure historically underserved landowners, including African American landowners who face significant barriers in market participation can take part in these opportunities.

Thank you for the opportunity to share my views and my story. I look forward to further discussion.

[The prepared statement of Ms. Dillard can be found on page 34 in the appendix.]

Chairwoman STABENOW. Thank you very much. We now would like to turn to Mr. Troy Harris. Welcome.

STATEMENT OF TROY HARRIS, MANAGING DIRECTOR OF TIMBERLAND, JAMESTOWN LP; BOARD MEMBER, NATIONAL ALLIANCE OF FOREST OWNERS, ATLANTA, GEORGIA

Mr. HARRIS. Thank you, Chairman Stabenow, Ranking Member Boozman, and distinguished members of the Senate Agriculture Committee. On behalf of Jamestown, thank you for the opportunity to testify today.

Jamestown is a global, design-focused real estate investment and management company with a 37-year track record and clear mission to transform spaces into innovation hubs and community centers. We employ more than 400 people worldwide with headquarters in Atlanta, Georgia, and Cologne, Germany.

Since 2009, Jamestown has owned and managed timberlands in the eastern United States, including timberland in Georgia, Alabama, South Carolina, Pennsylvania, New York, and Indiana. We take great pride in managing our forests using sustainable forestry practices.

In 2020, Jamestown made a pledge to reach net zero emissions by 2050, and to cut our carbon emissions by 50 percent by 2030. I am a forester by training, and so I am proud of the contributions our timberland can make to our company's emissions reduction goals.

Today I would like to talk about the bigger picture—how our countries working for us are contributing to climate mitigation. One out of every three acres in the United States is covered by forests, and 67 percent of U.S. forests are working forests. Working forests are forests sustainably managed to deliver a steady, renewable supply of wood for building materials, and more than 5,000 items that consumers use every day.

The U.S. is a global leader in sustainable forestry management, providing clean air, clean water, wildlife habitat, and rural jobs.

Harvests occur on only about two percent of our total land area on private working forests each year, and that same amount of acreage is free grown each year.

Forests are the optimal land use for maximizing carbon storage. Privately owned working forests provide approximately 90 percent of our wood and fiber needs, yet they also return and account for 73 percent of our gross annual forest carbon sequestration, enough to offset emissions from all passenger vehicles in the U.S. each year. Private working forests also store more carbon than all other U.S. forests combined.

The forest sector is already carbon negatives. Forests sequester more carbon than is admitted from forest harvest operations and forest products manufacturing together, in fact, 16 times more. The data clearly show that working forests can produce products while supporting rural jobs and benefiting climate.

There is room to do more, and we have set a path to get there as a forest sector. Jamestown is a member of the National Allice of Forest Owners. I recently joined NAFO and the CEOs of 42 other forest-owning companies, as well as the CEOs of the Environmental Defense Fund and The Nature Conservancy to adopt a unique set of principles on private working forests as a natural climate solution.

NAFO has carried these ideas through the broader stakeholder groups, in particular the Forest-Climate Working Group, the unified voice across U.S. forest sector on climate policy.

The built environment is one place where sustainable forest products can produce clear climate wins. According to the United Nations, traditional building materials account for roughly 11 percent of the global greenhouse gas emissions. Building with wood can sustainably reduce that number, and mass timber buildings, buildings made with structural timber, make more wood-intensive buildings possible.

Jamestown recently announced plans to construct a 100,000 square foot office building from mass timber targeting LEED Gold at Ponce City Market in Atlanta, Georgia. While Jamestown has been an early adopter, we are not alone. Michigan State University is a pioneer in the research and adoption of mass timber. They built the first mass timber building in Michigan, and Walmart's commitment to mass timber for their headquarters spurred a $90 million investment in a new mass timber production facility in rural Arkansas.

The U.S. is behind on mass timber production use. This is where the Committee can help. This Committee has three clear pathways to further climate-smart policies in our sector. First, you can expand markets for forest carbon, creating accessibility and credibility. Second, you can encourage more sustainable source wood construction by building on the Timber Innovation Act. Whole-building lifecycle analysis can lead to carbon reductions in the whole-built environment, not only in wood.

Third, you can improve forest carbon data. Markets for forest carbon and climate-smart construction need data to prove climate benefits with greater precision. The U.S. Government can collect and give credibility to data so that markets, forest owners, and consumers all have faith in it.

Private working forests are already doing a lot for the climate, and they can do even more. Thank you for your time, and I look forward to the discussion.

[The prepared statement of Mr. Harris can be found on page 39 in the appendix.]

Chairwoman STABENOW. Thank you very much. Now Ms. Jessica Orrego. Welcome.

STATEMENT OF JESSICA ORREGO, DIRECTOR OF FORESTRY, AMERICAN CARBON REGISTRY, WINROCK INTERNATIONAL, LITTLE ROCK, ARKANSAS

Ms. ORREGO. Chairwoman Stabenow, Ranking Member Boozman, and distinguished members of the Committee, thank you for inviting the American Carbon Registry to testify today on this important topic. We are at a critical inflection point in the history of for-

est carbon markets in the U.S. With demand for high-quality carbon credits taking off, today's hearing comes at the right time.

My name is Jessica Orrego, and I am the Director of Forestry at the American Carbon Registry, or ACR, which is a nonprofit enterprise of Winrock International and was founded in 1996 as the first private voluntary greenhouse gas registry in the world.

In both the voluntary carbon market and California's regulated carbon market, ACR oversees the registration and verification of carbon offset projects, which follow approved carbon accounting methodology, and we issue serialized offsets on a transparent registry system.

In the main forest project types in the U.S. are improved forest management, or IFM, reforestation, and avoided conversion. The vast majority of U.S. forest carbon projects are IFM.

The first message that I would like to leave you with today is that a vibrant U.S. forest carbon market exists, which is already delivering carbon finance to a vast diversity of landowners. The U.S. forest carbon market includes more than 200 projects on more than seven million acres across the country, and have issued close to 200 million tons of CO2 emission reductions in the last decade.

Projects are located in almost every forested region of the U.S., and almost every type of forest ownership class is represented in the carbon market, including industrial landowners, conservation organizations, family forest owners, and tribes. We are now seeing some State and municipal forests enter the market as well.

The U.S. forest carbon has issued credits valued at almost $2 billion to forest landowners in the past 10 years. Carbon revenue is directly helping landowners meet a number of land management objectives, ranging from tribes using carbon finance to purchase ancestral lands or improve fire management; to companies using the finance to help manage land more sustainably, or to assist in conservation goals; or even to pay for small landowners' insurance or taxes or other family expenditures.

I will give three brief examples. Across the country, state, county, and local governments own more than 80 million acres of timberland. That is an area larger than New Mexico, and represents huge potential for a new area of climate action. Michigan's Department of Natural Resources has already begun implementing the first State agency-led carbon project on commercially managed State forests.

Tribes have also entered the U.S. carbon markets, with more than 20 indigenous groups directly benefiting from carbon finance.

Finally, another area for growth in the carbon market is small-scale forest owners. Less than one percent of these forest owners currently participate in the carbon market, even though they own nearly 40 percent of the forests in the United States. Luckily, this is changing, and there are now emerging approaches to make the market more accessible to this important forest ownership class.

The second message that I would like to leave you with is that demand for carbon credits is rapidly increasing and will continue to rise, with U.S. forest well positioned to benefit, but that the basis of this growth must be built on integrity. More than 1,500 companies have now set net zero targets, and demand for offsets is exponentially increasing to new, record level. This is good news

for the U.S. forest carbon market. As demand for offsets grows, so too is demand for integrity. Companies want to know that their investments are leading to real results.

The final message is that there is no need to start from scratch or reinvent the wheel. Market and related infrastructure is already in place, and is rapidly evolving and expanding to offer more opportunities. Disruption to the existing carbon market could have adverse effects on investments, private capital, and on landowners and other stakeholders already participating in this market. It is our hope that the government will support the growth and scaling of the forest carbon offsets market by working with the current market stakeholders and within the existing processes and frameworks.

We look forward to working together to maintain momentum to increase benefits for all kinds of forest landowners and to adhere to high standards and integrity. Thank you so much for your time today.

[The prepared statement of Ms. Orrego can be found on page 44 in the appendix.]

Chairwoman STABENOW. Thank you very much. We would now like to hear from Mr. Joe Fox. Welcome.

STATEMENT OF JOE FOX, STATE FORESTER, FORESTRY DIVISION, ARKANSAS DEPARTMENT OF AGRICULTURE; PRESIDENT, NATIONAL ASSOCIATION OF STATE FORESTERS, LITTLE ROCK, ARKANSAS

Mr. FOX. Thank you. Thank you, Chairwoman Stabenow, Ranking Member Boozman, and members of the Committee for holding the hearing today and for the opportunity to testify on behalf of the National Association of State Foresters. I am Joe Fox, Arkansas State Forester and NASF President.

NASF represents the directors of forestry agencies in all 50 States, eight territories, and the District of Columbia. State foresters deliver technical and financial assistance to private landowners who own about half of all the forests in the U.S. We also partner with Federal land management agencies through cooperative agreements and good neighbor authority to help manage national forests and conduct wildfire operations nationwide.

State forestry agencies are uniquely positioned to address climate change, promote forest carbon sequestration efforts, and ensure greater forest resilience. One role that we play is that of advocate. We advocate for the inclusion of active forest management and Federal climate change policy and programming.

There are many existing Federal programs that could enhance the role of forests as carbon sinks with additional funding and higher prioritization. They include the Forest Inventory Analysis Program, the Environmental Quality Incentives Program, and the Forest Stewardship Program, and there are others. These programs serve to increase carbon storage by helping to improve the condition of our forests and maximize wood availability for forest product utilization.

As you all know, forest products, like forests themselves, act as carbon sinks and have demonstrative climate benefits in many different applications, including building construction and energy gen-

eration. The efficacy of forest and forest products in addressing climate change depends on forest sustainability. Without active management, forests are less resilient to climate change and less effective at sequestering carbon.

As State foresters, we know active forest management looks different in different forest types, different regions, and different communities. In Arkansas, where I am the State Forester, we harvested over 24 million tons of wood from the State's 19 million acres in 2019. It was a record year for us, and data from the U.S. Forest Service Forest Inventory and Analysis Program shows our annual growth exceeded our harvest and mortality rates by 20 million tons. In some locales, harvesting trees on the scale we do in Arkansas is not feasible. Nine times out of ten this is because there are not enough markets for forest landowners to sell their timber into.

This brings me to a critical point I want to stress to the Committee. Forest markets for both wood and carbon credits are critical to maintaining the health and sustainability of forests in the U.S. Wood markets, in particular, enable the carefully planned harvest of trees that is needed for forests to have appropriate stocking levels, balanced age classes, and species diversity. These managed forests are healthy forests, better able to withstand wildfire and pest, and more capable of providing clean air and clean water, wildlife habitat, recreational opportunities, and the countless other benefits of forests.

In addition to promoting active forest management with Federal programming and policy, this Committee can support forest-based climate strategies by championing coordinated wildfire mitigation. To maintain our forest's carbon sinks we cannot let them be destroyed by out-of-control wildfires.

We must reduce wildfire fuel loads in our forests. With thinning, harvests, prescribed fire, whatever the treatment, it is critical that hazardous fuels are reduced on at least five million acres each year, in addition to what we treat now. The Forest Service and NASF agree it will cost about $60 billion over the next 10 years to meet this goal. By making such significant investments in wildfire mitigation, this body can help maintain our forests as carbon sinks, create green jobs nationwide, and protect Americans from catastrophic wildfire.

In closing, addressing climate change requires collaboration. NASF is a member of the Forest-Climate Working Group to advance climate solutions. I want to thank you all for your bipartisan work on climate solutions. To quote the Texas State Forester, "Trees are the answer. What is your question?"

I look forward to answering your questions today, and thank you again for the opportunity to testify.

[The prepared statement of Mr. Fox can be found on page 50 in the appendix.]

Chairwoman STABENOW. Thank you so much for your testimony. Last but not least, Dr. Tony Cheng. Welcome.

STATEMENT OF TONY CHENG, Ph.D., DIRECTOR, COLORADO FOREST RESTORATION INSTITUTE; PROFESSOR, FOREST & RANGELAND STEWARDSHIP, COLORADO STATE UNIVERSITY, FORT COLLINS, COLORADO

Mr. CHENG. Chairwoman Stabenow, Ranking Member Boozman, and members of the Committee, thank you very much for your invitation for me to speak today.

The Colorado Forest Restoration Institute that I direct is one of three Southwest Ecological Restoration Institutes authorized by Congress back in 2004. CFRI is one of many programs at Colorado State University that develop and apply science-based decision support systems to address climate change for agriculture, natural resources, and forestry. Another example this Committee may be familiar with is the COMET project, which is developed by my CSU Soils and Crops colleagues in collaboration with the U.S. Department of Agriculture.

I am here today to share a western perspective on this hearing's topic, and I will note that there are many perspectives. With the focus on the Rocky Mountain West, where Federal forests are prevalent and are being impacted by a succession of wildfires, insect outbreaks, and prolonged droughts.

I will summarize my written testimony here in three points.

My first point is that climate change is delivering a double blow to western Federal forests. The first hit is what scientists are calling "compounding disturbances," where prolonged droughts, insect outbreaks, and wildfires are impacting forests at the same time, causing much of their stored carbon to be released into the atmosphere, especially in the form of wildfire smoke that we had been impacted by last summer.

The second hit is that the changing climate is inhibiting forest regeneration after wildfires in many areas. Forest recovery can take centuries, if at all. In the meantime, this green infrastructure to mitigate climate change.

My second point is that the work needed to make western Federal forests more resilient involves a portfolio of actions that can take many years to accomplish. Multi-year funding programs such as the Collaborative Forest Landscape Restoration Program and Joint Chiefs Partnership provide the stability and certainty needed by forest managers and their partners to plan and implement work at the scale needed to make an impact. Senator Bennet saw the results of this work firsthand in northern Colorado during his visit to the Cameron Peak fire a couple of weeks ago.

I want to acknowledge and credit the work of this Committee to reauthorize the CFLR program in Fiscal Year 2018. The Joint Chiefs Landscape Restoration Partnership Act that Senator Bennet and Senator Hoeven introduced earlier this month would provide a substantial boost to the long-term investments needed to achieve work at this scale.

Restarting those western forests not regenerating after wildfires will also be a long-term proposition. The proposed REPLANT Act, introduced by Senator Stabenow and Senator Portman, and its companion bill in the House, would provide the U.S. Forest Service with the needed resources to plant well over 1 billion trees in the next decade.

My third and last point is that sustaining western Federal forest as green infrastructure requires sustaining a corresponding social infrastructure. Across the West, representatives from various government, non-governmental, community-based, and private sector entities are working collaboratively to craft and implement portfolios of climate-forward forest management work that are based in locally relevant science, tailored to the specific ecological, economic, and social context, and collectively monitored to ensure that outcomes are being met.

This front-end collaboration could be thought of as an essential social infrastructure to make our forests resilient. However, the costs of sustaining this collaboration are not explicitly funded. Programs like CFLRP and Joint Chiefs dedicate funding for implementing shovel-ready projects but do not support the social infrastructure necessary to get the shovel ready in the first place. If the pipeline of climate-forward forest management on Federal lands and adjacent land ownerships is to expand, there needs to be sustained investments in this front-end collaborative work.

Additionally, Federal land agencies own social infrastructure and human resources have been decimated by decades of divestment. The proposed Outdoor Restoration and Partnership Act would provide needed funds to strengthen the social infrastructure needed to make western forests more resilient to, and help mitigate climate change.

Again, I want to thank the Committee for inviting me this morning to present at this hearing, and I am happy to answer any questions you might have.

[The prepared statement of Mr. Cheng can be found on page 74 in the appendix.]

Chairwoman STABENOW. Thank you very much, and thank you to all of our witnesses this morning.

Let me now start with Mr. Harris. I am really glad that your testimony highlighted the tremendous opportunity of using mass timber in commercial building. As you know, we had a bipartisan bill, Senator Crapo and I, that we put into the 2018 Farm Bill, and we are seeing a lot of very positive things happening.

You were talking in your testimony, though, about building on the Timber Innovation Act, and I wonder if you might talk a little bit more about what you would like to see us do to build on that and really the promise of this technology, going forward.

Mr. HARRIS. Thank you. I think the industry, the mass timber industry, has greatly benefited from the progress and the recognition that the act provided, specifically architects, designers, and most importantly probably building codes have been addressed to allow for mass timber construction, and that was probably the largest mover. It impacts the current building that is going on right now. I believe there are over 1,000 projects in every State that are using mass timber. We feel like that can double easily over the next few years, and so continued research, design improvements, and just knowledge of getting the concept of mass timber out I think is very important to the continued success of people recognizing all the benefits that come from it.

Chairwoman STABENOW. Thank you very much. Ms. Dillard, I am really glad to know Sustainable Forestry and African American

Land Retention Network is so engaged in this important discussion, and I am particularly glad to have your support for the Rural Forest Markets Act and the REPLANT Act. Could you talk more about some of the challenges and barriers that small-acreage and minority forest landowners face in entering new markets like the forest carbon market, and managing their forestland in general?

Ms. DILLARD. I would be happy to. Thank you for the question. One of the barriers is carbon markets are complex, so, you know, sitting with small family forest owners and explaining to them the complexities of carbon markets require education and outreach and discussion. That is one barrier.

The second barrier are the upfront costs, you know, from hiring a forester to mapping out the activity to implement the forest management plan associated with carbon markets or support carbon markets is, I would say, a second major barrier.

The third is while my family, thankfully, was able to resolve their property issues and building trusts, we build trust with USDA, that is not true for many underserved landowners. That is typically another key barrier. That is why legislation like the Rural Forest Markets Act is so important. It helps unlock the private equity to help with upfront costs, so my family and families like mine can afford to participate in carbon markets.

Chairwoman STABENOW. Thank you very much. I look forward to working with you on all these issues.

Mr. Fox, I appreciate again your support and your testimony for our bipartisan REPLANT Act. Could you talk more about why clearing the reforestation backlog in our national forestlands is so critical right now? I know you spoke about it, but, what types of opportunities do you see for State foresters to engage and help with that effort as well?

Mr. FOX. Well, with the good neighbor authority and other authorities, we can help our National Forest partners replant those places that have been denuded by catastrophic wildfire and other reasons. We also have tree nurseries, seedling nurseries. We have one here in Arkansas, and we are going to need a lot of help expanding those nurseries to meet demand for billions of trees, not millions but billions of trees. That backlog is going to require State forestry nurseries, U.S. Forest Service nurseries to produce the trees to plant.

There are a lot of opportunities. There is a lot of good collaborations with others helping with growing the trees, with planting the trees. To have the immigration, to all of us to have the workers that we need to be—I have forgotten the designation of the immigration place. In any case, we need those workers to plant the trees as well.

Those things—the trees, the workers to plant them, and cooperation with the Forest Service and others are the ingredients to be successful.

Chairwoman STABENOW. Thank you so much. Senator Boozman.

Senator BOOZMAN. Thank you, Madam Chair. Ms. Orrego, Winrock's American Carbon Registry was founded in 1996 as the first private voluntary gas registry in the world. You yourself have over 20 years of experience in this space. Suffice it to say, you and

Winrock are not new to the carbon and related markets in the forest sector.

Would you share your recommendations on what you think is needed, or perhaps not needed, from the Federal Government in this voluntary market space as it relates to forestry?

Ms. ORREGO. Thank you, Senator. I am happy to answer the question. As I mentioned, there is unprecedented demand for offsets, and to really scale up the volume of offsets coming from U.S. forests, a lot of work has to be done and a lot of capital is needed.

I think there is an important role for the Federal Government to play to support the growth and scaling of the forest carbon market, and that could be by providing capacity building support or through loans, as referenced in the Rural Forest Markets Act. Those loans could go to companies and organizations who are aggregating and providing services to landowners or directly to landowners, or potentially for expanding nursery production, as I understand that that is a barrier to expanding reforestation efforts in the United States.

However, I do want to reiterate, and as I stated in my testimony, there is no need to reinvent the wheel here. The carbon market is operating already, and it is growing rapidly, and so we recommend that any role that the government plays will work to complement the carbon market and the existing framework. Thank you.

Senator BOOZMAN. Thank you very much. Mr. Fox, we all know that wildfires can be enormous carbon emission events, in addition to wildfire, pests, and diseases that can devastate healthy forests and make timber from those forests unmarketable. Active forest management, including prescribed fire and mechanical treatments, is critical to decreasing the frequency and scope of these events and protecting the overall health of our forests.

Mr. Fox, in addition to mitigating wildfire and protecting against pests and diseases, what role do you perceive active management having as it relates to carbon sequestration in the growing wood products industry, including mass timber?

Mr. FOX. Well, as you know, Senator, I like to say healthy forests need healthy markets. Healthy forests begat clean water, clean air, carbon sequestration, wildlife habitat, and all those things. That is being redundant, actually. Forests are both-and, not either-or. While we harvest and thin our forests, that helps the remaining trees to grow. It gives light to the ground, lets those plants come up, express themselves, that the turkeys like, and hunters like turkeys, and the insects like. All those things in our ecological system do better when the trees are thinned. Also the young trees, whether they are plantation trees or whether they are naturally regenerated, store more carbon than older trees.

All trees have a lifecycle; they get old. Just like people do, and the older the tree, the less carbon is stored. We need those variations, diversity of age classes, we need diversity of structure in the forest, for all those things. Young, vigorous, healthy forests store more carbon than any other kind of forest.

Senator BOOZMAN. Thank you very much. Ms. Dillard, you mentioned the heirs' property, which again is something that I am very interested in. Tell me, though, would it be helpful if you doubled the capital gains tax in regard to that? Also, if you wanted to retire

and sell your property to your son or maybe a partner, is that a helpful thing to our foresters, people in your situation, your fellow foresters, your neighbors, going from 23 percent to 43 percent?

Ms. DILLARD. Senator, I would love to give you an answer, if I may work on an answer for you and circle back, if that is okay?

Senator BOOZMAN. I appreciate that. Again—let me ask Mr. Fox the same question.

Mr. FOX. Senator, if you could guide me through the question one more time.

Senator BOOZMAN. How is it going to help the forest industry if we raise capital gains from 23 percent to 43 percent? What effect would that have on forestry, and then also the stepped-up basis in the sense of, again, what would that do with transfer of property?

Mr. FOX. Well, any raise in the capital gains tax is going to go hard against family forest landowners, and it is going to make it harder generationally. Either timber will not be cut in order not to have the tax applied, or it is going to be cut really quickly before the tax is raised. A raise in the capital gains tax without a stepped-up basis is, frankly, devastating to family forest landowners.

Senator BOOZMAN. Good. Thank you.

Chairwoman STABENOW. Thank you very much. Just for the knowledge of the members, Senator Bennet is next, and then Senator Fischer and Senator Smith. That is the order that I have at the moment. Senator Bennet.

Senator BENNET. Thank you, Madam Chair. Dr. Cheng, last December a group of forest policy experts sent our Committee a letter outlining the forest management and wildfire challenges in the West. They noted that higher temperatures, more severe drought, and longer fire seasons, all driven by climate change, pose a threat to community safety, public health, and our watersheds. I think you described these as compounding disturbances in your testimony. The group suggested investing $40 to $60 billion over the next decade to accelerate action and make our forests more resilient.

In April, I introduced a bill with Senator Wyden, the Outdoor Restoration Partnership Act, that provides a framework to make this type of investment in forest health. If we can target resources to high-priority areas and partner with states, tribes, municipalities and landowners we could build climate resilience and create millions of jobs in the process.

Dr. Cheng, given your experience at the local level and working across boundaries, what should this Committee keep in mind when considering a major investment in forest restoration? For example, what infrastructure exists to support forest restoration and wildfire mitigation in the West? What are some of the gaps and what are some of the likely challenges?

Mr. CHENG. Madam Chair, Senator Bennet, thank you for that question. I will first preface my comments saying that the costs of these fires, in particular, but also just the loss of forests as a result of a variety of mortality events, these are billion-dollar problems, and how we have addressed them, at least in the West in Federal forest lands is almost like nickel-and-diming it. We really lack that upfront investment for that front-end collaborative work to really

build the social capacity, the social acceptance, the science basis for where we need to do that work at the scale we need to do it.

A lot of that, I would definitely want to see that investment provided to, especially local community-based organizations that are really at the forefront of convening and coordinating a lot of the multi-stakeholder collaboratives that we are seeing. They are really operating on a shoestring, but they are really bearing the brunt of this issue and trying to create that pipeline to work at the scale.

The second is that we are not only facing a backlog of reforestation but also facing a backlog in terms of prescribed fire as an important tool to really mitigate those large, catastrophic fires. My colleague, Dr. Courtney Schultz at Colorado State University has provided research as well as testimony to Congress, is that one of the biggest gaps and biggest bottlenecks for scaling up the prescribed fire programs that we really need is simply a lack of horsepower, the lack of human resources and the people with the training and qualifications, and basically a prescribed fire work force. I think that would be able to complement a lot of the other work forces that we also need to stand up—the tree-planting work force, that State Forester Fox had mentioned.

The last point is that, especially here in the Intermountain West, where we really do not have very great forest products markets, the kind of industry and operations that we have might not initially be at the scale of the work or be able to accommodate the kind of materials that can provide that economic incentive back to forestland management.

Really standing up the kinds of infrastructure and the kind of operations that need to work at the scale, in the places that need to occur, also need a good lift. We have sawmills that are kind of scattered. They are few and far between. The distances for hauling material is a huge barrier. To be able to have better distributed forest wood utilization industries and operators would be a great benefit.

Senator BENNET. Thank you, Dr. Cheng. I want to just leave my colleagues with this thought, because, as I said, Secretary Vilsack was out. Sixty billion dollars sounds like a lot of money, and I know that it does. We are spending that money anyway. We are just spending it fighting fires. It costs us, for every single acre—and we heard this the other day out there, from the Forest Service—every acre that we treat costs $1,500 to treat. Every acre that we deal with in a forest fire costs us $50,000. We are profoundly wasting the American people's money, and by doing it we are not creating any of the jobs that Dr. Cheng just talked about. We could create a bunch of jobs on the front end that would be sustaining and useful to the economy, I think. Anyway, thank you.

Chairwoman STABENOW. Thank you. I could not agree with you more. I mean, just the numbers alone say it, and that does not count the devastation or what is happening to people in terms of the forest fires.

Senator BENNET. Not to mention what both of you guys talked about, which is the lack of sequestration of carbon. I mean, this is all of that CO2 is going up into atmosphere.

Chairwoman STABENOW. This is why we are doing the hearing. This is why we are glad you are chair of the Subcommittee, and I look forward to working with you on this. Senator Fischer.

Senator FISCHER. Thank you, Madam Chair. Mr. Fox, I wanted to ask you about a project in Nebraska that has huge potential for forestry and the agriculture sector in addressing climate change. The Nebraska Forest Service and industry partners have started the Great Plans Biochar Initiative, which helps improve awareness in market development of biochar in the Great Plans. The Nebraska Forest Service conducted a pilot study to examine potential benefits of providing biochar as a feed supplement to cattle to reduce ethane emissions and increase animal productivity. Can you talk about the results of that pilot and the potential climate benefits?

Mr. FOX. I can, Senator. Although I am a tree guy—I am not a cattle guy—but isn't it interesting that our forests can help agricultural productivity, whether it is biochar bleeding into the ground as a soul amendment to row crop farmers or whether biochar is blended into the feed of the cattle. That is the pilot project in Nebraska. Biochar was blended into the feed for cattle. Methane production decreased by over 10 percent. Growth of the cattle increased, or production of the cattle increased by almost 10 percent, and it is really pretty cool. You know, I had not thought about this myself.

In Nebraska, or whether you are cow-raising in Arkansas, it a good thing for a forest product, and it is a new forest product. There are many other forest products, but this one is really an innovative example of how we can use our trees. Thank you, Senator.

Senator FISCHER. Thank you. Also, how important are locally made conservation goals and plans in managing privately owned forests, and how best could the Federal Government help private forest owners manage their forests without imposing or requiring Federal conservation requirements and standards?

Mr. FOX. Well, thank you, Senator. Again, I was on the Jefferson County Conservation District about 20 years ago. I was the token forester on an all-farmer board. I appreciated being there, and I am very aware of—well, NASF partners with the National Association of Conservation Districts. The local level, at the local level, conservation districts is where conservation planning can go. In Arkansas, we have our State Forest Action Plan, mandated by the 2008 Farm Bill, and reupped after 10 years. All States do that, and we use stakeholders like the Arkansas Association of Conservation Districts, a lot of other stakeholders to plan what we are going to do.

Then at that local level, conservation districts felt NRCS direct EQIP funds—environmental quality incentive program funds—toward the farmers. That is where the rubber meets the road, is where those producers used the moneys. Arkansas is 57 percent forested, and we have got 75 counties. Each county has a conservation district. Those counties choose different things to apply the EQIP funds. Their priorities are different, depending on what is going on in their county.

It is the best way. We are a voluntary State here in Arkansas, and it is the best voluntary way that private landowners do conservation work. Thanks.

Senator FISCHER. Thank you. Mr. Harris, I understand you are a board member of the National Alliance of Forest Owners. Is that correct?

Mr. HARRIS. That is correct.

Senator FISCHER. I would ask you that same question, how the Federal Government can help private forest owners manage their forest without a lot of requirements or imposing a lot of regulations. Then I also noticed, when we heard about the stepped-up basis and the issue there, you were nodding your head. Would you also like to comment on that?

Mr. HARRIS. I guess I will start with, you know, as a forester and a proud one, what we are hoping to highlight today is that our organizations and our companies do a lot of good. I think that you have to think of our Nation's forests as a mosaic. One size does not fit all.

I think that on the private working forest level the markets speak loudly to what benefits us and how we like to manage our forests, and what ultimately we are working toward.

You know, conservation focus is interesting because, as Mr. Fox said, when we know what is important in specific areas—and I think that is important, is that, you know, at the big holistic macro level is one thing, but when we can drive down to specific areas or specific focus I think there are a lot of opportunities to do a lot of good.

I can use an example, in the State of Georgia, where groups like The Nature Conservancy have targeted and are looking to protect gopher tortoise habitat. Well, companies like mine and the other ones that I work with, if we understand what the objectives are we can work toward, because we have this mosaic of forests, we can work toward managing where we are not only growing our trees and doing that well but also helping with conservation. I think that on the private working level it is very specific as you go down to each individual area.

As far as taxes, I think that the one thing that concerns me with that—and I was shaking my head—is that I think that a lot of forest landowners, especially family landowners, are what we would probably like to say, they are land rich and cash poor. Tax policies that raise those rates on landowners force them to make bad decisions, if they have to pay a tax bill because of tax legislation.

I would be concerned about tax changes that raise those rates. The landowners do not have the cash to pay for them, and what we see in our industry is that forces families to either sell land or sell timber that they do not want to in order to pay those tax bills, and that is why I was nodding my head yes. I do think it is a very important consideration.

Senator FISCHER. Thank you. Thank you, Madam Chair.

Chairwoman STABENOW. You are welcome. Thank you. Senator Smith, and then we will have Senator Tuberville. Senator Smith?

Senator SMITH. Thank you so much, Chairwoman Stabenow and Ranking Member Boozman for pulling this Committee together. I know that the 30,000 people in Minnesota that work in the forest

products sector in our State are so happy to see a hearing on forestry in the Ag Committee. You know, I also know from them that this past year with COVID has been a challenging year in so many different ways, and just like so many other industries around the country, timber harvesting and hauling has had a difficult year, and it has been a real challenge.

I want to just note that I am grateful that I had a chance to work with Senator Collins on my Loggers Relief Act, which I introduced last year, and we got included in the year-end package. This bill is providing funding for direct assistance to loggers and log haulers impacted by the pandemic, so an important part of the forest product sector.

I would like to spend my time today with all of you—welcome to the panel; it is great to be with you—talking about this concept of carbon sinks and carbon markets. You know, I think a lot of times when we talk about getting to a net zero economy we do not spend enough time talking about the net part of that. You know, when we are adding carbon into the atmosphere we also, at the same time, can be capturing and storing carbon from the atmosphere. Our forests are a giant reservoir of captured carbon, and they need to be a crucial part of our strategy for addressing climate change, and doing that in ways that are creating jobs and opportunities for Americans.

That is what we need to do, right? We need to dramatically reduce carbon in our atmosphere in a way that creates jobs and works for forest owners and operators. I think this has to be part of our strategy.

This brings me to the question of carbon markets. Voluntary carbon markets seem to be, could be a huge opportunity for forest landowners and help to contribute to our overall goals and strategy, creating also ways for them to earn revenue. I have heard from folks in Minnesota that the private carbon offset market is a little bit of the Wild West when it comes to how it works. It has got a lot of momentum but not a lot of guardrails that are actually protecting landowners.

I am really interested in diving into this a bit, and I would like to start with Ms. Orrego—and I hope I am saying your name correctly—and Dr. Cheng. How do you see this? How can we ensure the integrity of forest carbon stocks and support the participation in carbon markets in a way that is actually good for landowners?

Ms. ORREGO. Thank you, Senator. I am happy to start. You know, we also welcome scrutiny. As I said in my testimony, growth and long-term sustainability of the carbon market does depend on integrity. We are always taking on board any criticisms and innovating and improving our processes and our requirements, based on the latest science and technology, to ensure that those emission reductions are real, credible, and verifiable.

Unfortunately, some of the critics and the critical coverage has limited sights on a few cherrypicked examples, rather than examining the broader impact of the forest carbon market, which is a hugely positive story that we are trying to get out there and tell that story a little bit better. We really feel like there are guardrails. We see a lot of momentum. It is picking up quickly, and we

are happy to work with the Forest Centers of Minnesota to tackle some of their concerns.

Senator SMITH. Thank you. Dr. Cheng?

Mr. CHENG. Thank you for the question, Senator Smith, and this is a little bit outside my expertise so I would have to defer to experts like Ms. Orrego. I think one of the challenges that we have out here in the West is, at least in my State, in Colorado and in other States, our forests are losing carbon faster than they are sequestering. I think there are lots of opportunities to look at ways in which carbon margins can be brought back as an investment tool, as an economic incentive.

Again, I think the ways in which we can calculate sequestration versus loss is something that I know is very controversial, and I think a lot more maybe investment into the science of how we actually monitor that and capture that is also needed.

Senator SMITH. Right. Well, thank you very much. I think that there is a lot of power and a huge amount of potential on this, and I look forward to working on this with Minnesota forest product owners and folks all over the country, because I think it is an important part of our strategy.

Thank you very much, Chair Stabenow.

Chairwoman STABENOW. Thank you so much. Senator Tuberville and then Senator Warnock will be next.

Senator TUBERVILLE. Thank you, Madam Chair, and thank you for having this today.

You know, Alabama has 23.1 million acres of forest. Seventy-one percent of our State is forestry. Ninety-four percent of those forests are owned by more than 250,000 private forest owners, including me. As of 2019, Alabama has the largest inventory of standing timber ever recorded, 42.2 billion cubic feet. Since 2001, we have seen 37.3 percent increase in volume of standing timber. Ecosystem carbon in Alabama's forest carbon and soil above and below biomass dead wood and litter has increased from 1 billion metric tons in 1990 to 1.4 billion metric tons in 2019. Alabama's forests removed 41 percent of all CO2 emissions in the State, and Alabama's forests currently store 47 years of all CO2 emissions produced in the State.

Thank you all for being here today. Mr. Harris, forest landowners are capable of growing more timber in their forests. We have the tools and technologies to increase the amount of timber growing in our forests, if there is a market for the products being produced.

To a good Auburn man, War Eagle, what suggestions do you have to encourage stronger markets and provide voluntary incentives to landowners to implement forest management policies?

Mr. HARRIS. War Eagle, Senator. I think, you know, Alabama has a great story, and Alabama does a great job. We own 22,000 acres in the State. I think that the forest industry is strong, alive, and healthy.

What we are doing right now is growing a lot of timber, more timber than we use. The main thing that we can do, within the entire nation, really, is to create healthy markets, invigorate them, support them, and that will benefit forest landowners.

I think the biggest one that we see and the biggest opportunity currently right now, which is a win-win for this Committee, in particular, is mass timber. Using more wood that becomes permanently sequestered in a building that people occupy and enjoy is something very unique and special about our business. A new market created for timber that consumes more wood will definitely benefit landowners in the end.

Senator TUBERVILLE. Thank you very much. Mr. Fox, in your testimony you discussed the advancement of cross-laminated timber. Down in Dothan, Alabama, there is a SmartLam facility that produces mass timber products. From your ample experience in the forestry sector, can you explain how building with wood, like mass wood timber, offers a solution, not only for the carbon sequestered in the long-lived wood product, but also how mass timber products offer management opportunities, especially for small-diameter trees?

Mr. FOX. Surely, Senator. Thank you for the question. I am remiss if I do not point out that some of the best people in Alabama were born in Arkansas.

Having said such, CLT, cross-laminated timber, is a terrific product. It cuts down labor costs by two-thirds when you are putting up a building like the dorm at the University of Arkansas. StructureLam is also completing—in fact, they are doing some soft opening dry runs on a cross-laminated timber plant in Conway, Arkansas, just north of Little Rock, to supply the 350-acre Walmart campus that is to be built in Bentonville very soon.

We are excited about that. That is jobs. Any place that a lumber mill, a sawmill, has the ability to sell their products is good for the land, for forest landowners. As I have already stated, we are overproducing. We are growing 20 million tons more in my State than are being harvested, and the harvest is at record levels.

We have learned how to grow. Now we are going to have to learn how to balance the growth to the markets. Without that balance, sooner or later there are too many trees, it is too dense, the bugs come or wildfire comes, and we have catastrophic events.

Anything we can do—and right now those 2x4s, 2x6s, 2x8s are used in cross-laminated timber. Small-diameter timber does not have a home. There are less paper mills in my State, and I think in your State. There are 15 less paper mills than there were about 20 years ago in Arkansas. They use the small-diameter timber. We need pellets in that market. That uses small-diameter timber. We are overcrowding with those six-inch diameter and eight-inch diameter trees that do not quite make it to saw logs. We need to be able to thin those too.

Whichever size, whatever species, it is always good to have a market, because conservation without case is just conversation. Thank you.

Senator TUBERVILLE. Thank you very much. Thank you, Madam Chair.

Chairwoman STABENOW. Thank you. Senator Warnock.

Senator WARNOCK. Thank you so very much. Good to follow my colleague from Alabama. If you are not born in Georgia, I guess Alabama will do. Thank you so much, Chairwoman Stabenow, for holding this hearing on a topic that is important to all of us.

I am proud to say that Georgia is the No. 1 forestry State in the Nation, providing directly downstream jobs to over 141,000 Georgians and others across the Nation. Georgia is home to over 22 million acres of privately owned forestry land, forest land, generating an annual economic impact of $36.5 billion. This industry is an economic driver for the rural communities throughout Georgia.

Georgia, on the other hand, is also a State of incredible growth. Our population is currently over 10.7 million people, representing an 11 percent population increase in the last decade, and much of this change is driven by growth in and around the metro Atlanta area.

Sometimes in my travels and in politics I hear folks talking about rural-urban divide in Georgia. I think that there are plenty of opportunities to increase economic connections between Atlanta, metro Atlanta, and the rural parts of our State, and to do so in a way that centers climate-smart growth, that creates jobs and opportunities while being kind to our planet.

Mr. Harris, you have a long history of working on forestry issues in Georgia. How can population growth in a city like Atlanta actually provide economic opportunities for rural communities in Georgia who rely on timber production?

Mr. HARRIS. Thank you, Senator. At Jamestown, I think one of the most exciting things that we have seen is this mass timber awakening, if you will, and we are very excited about the opportunity to tie our commercial real estate business together with our timberland business. It just makes sense.

Mass timber, obviously, if used more in construction, would help a lot of things that we are talking about today, but right now the industry is emerging. If we wanted to build mass timber buildings in Atlanta, Savannah, Brunswick, we would probably have to source that timber and that timber production from out of State, in the case of Georgia, and I think that is the case for many States. We do not have a lot of mass timber manufacturing plants. We have a lot of sawmills, but we do not have the plants that put together the mass timber panels.

If we believe that using wood is good, and it is a great solution for urban housing and construction in commercial spaces as well, and that starts to take hold, that will likely lead to manufacturing plants that are more local, and I think that benefits all States, really, because it could really be put up anywhere, but in particular I think that urban-rural interface between building in more of an environment and the use of mass timber and wood would benefit Atlantans, in particular.

Senator WARNOCK. Mm-hmm. In Atlanta it is accompanied by an emphasis on sustainable development and green materials. I think that is something that all of us have to be concerned about. Is Georgia's forestry sector prepared to meet the increasing demand for climate-smart products, and how can Congress be helpful?

Mr. HARRIS. I think Georgia is absolutely prepared and ready to take this challenge on. As a Georgian, and as a forester just in general, I think all States are prepared to take on this challenge. We do amazing things with our forests, which, you know, basically providing 90 percent of what the U.S. needs as far as wood products and forest products that people use every day. We do that very

well, and we are extremely well positioned to leverage off of that to building a green economy. I think we are right in the forefront of that.

States that are heavily forested, like Georgia, are ready, willing, and able to contribute to positive environmental impacts, and we are quite proud of that. We honestly, would love to talk more about that and share more about that, and I think Congress can help with that, with research and study. I think that is the one thing that is lacking right now. Things like the FIA, the Forest Inventory Act, where we are measuring

[audio interruption] are growing sustainably would be a big thing for us and Congress could do.

I think investments into research and study and adding credibility to our sector would great benefit.

Senator WARNOCK. Great. Well, thank you so much, Mr. Harris. I appreciate your work in Georgia's forestry sector. This challenge around climate change is a challenge, but it also created economic opportunities for our forestry sector to make smart investments, and I think it helps Georgians, both in rural Georgia and in our urban centers. I appreciate the opportunity to talk to you today.

Chairwoman STABENOW. Thank you. Thank you, Senator Warnock. Senator Thune.

Senator THUNE. Thank you, Madam Chair and Ranking Member Boozman, for having today's hearing, and I want to thank our panelists as well before the Committee for your input on this issue.

Mr. Fox, the Black Hills National Forest is a critical component of South Dakota's economy that supports recreation, agriculture, and resource development. The forest also helps support the local timber industry and supply lumber, which is in high demand right now, I think, as we all know.

Unfortunately, a sawmill in Hill City, South Dakota, is closing due to lack of available timber. The sawmill closure follows cuts in recent years to the Black Hills National Forest timber sale program, which the mill relies on for its supply. The mill closure will not only result in the loss of more than 100 jobs, which is a huge impact on that small community, it would also have lasting effects on the community and the regional economy.

I am a long-time supporter of proactive forest management to help mitigate the risk of wildfires, maintain healthy forests, and support rural economies. Mr. Fox, could you talk about the importance of forest management and the benefits that it provides, and are there ways that Congress can make forest management more effective?

Mr. FOX. Thank you, Senator Thune. I would love to talk about that.

You know, if all forests have a growth rate, it might be, if it is a very young forest, it can be well above 10 percent. If it is an older forest, it goes down. An older forest in Arkansas that is not growing too well might be six percent, might be even two percent. When you do not harvest, when you just let the trees grow and get older and slower and susceptible to disease and wildfire, they are going to slow down.

One way to keep the forest growing faster and more vibrant is to harvest timber in it, whether it is public land or private land.

It does not matter who owns the land. The silviculture works the same way.

We need those forest markets, and we need to be open to the forest markets—let's say the Black Hills—in order to get the growth, the young, vibrant growth that any forest needs. Whether it is ponderosa pine or whether it is southern yellow loblolly pine or whether it is cherry bark oak or post oak, they all need room to grow, and we need a good balance of those younger trees.

That is part of the forest management story. We must manage to keep our forests resilient, and to keep them resilient they need young stocking coming on. All the stands do not have to be the same age or the same stocking. We can have a lot of variability between stands within one forest.

I hope that answers your question.

Senator THUNE. Yes, it does. Thank you. I just could not agree more, and I just think those management practices that maintain a healthy forest are so essential, and especially true right now in the Black Hills, where, as I mentioned, there have been consistent cutbacks or attempts to cut back the forest harvest and to get away from management, which, in the end, creates a much healthier forest. I hope the Forest Service here in Washington, DC. is listening to the needs that many of our forests have around the country.

I do not have a lot of time, but I want to recognize this hearing rightfully recognizes the role that forests serve in carbon sinks, and I hope one of the takeaways today is the importance of forest management timber harvest and replanting to maintain healthy, resilient forests, especially given the higher rate of carbon capture of younger trees.

In order to leverage these natural carbon sinks, however, we need to ensure that we are actually able to replant trees after a disturbance, such as a wildfire or a hurricane. According to the Forest Resources Association, there is rough a three- to five-year backlog in forest fire remediation, which has gone unaddressed because of the shortage of workers, including H–2B visa workers.

Could any of you quickly—I do not have a lot of time—speak to the labor challenges that we are facing out there to help restore our forests?

Mr. FOX. I would be happy to try that. H–2B visas are vital to our planting crews and the companies that plant behind either harvesting jobs or wildfire. Without enough workers, it is very strained right now to find enough workers, seasonally, to do the planting. You do not want to plant in the hot time of the year. You have got to plant in the cool, dormant season of the year. That, again, does not really matter which part of the country you are in.

Those visas are imperative to the workers that we need to replenish our forests.

Senator THUNE. Thank you, Madam Chair.

Chairwoman STABENOW. Thank you very much, Senator Thune. We have now Senator Brown, then Senator Braun, and Senator Gillibrand. Senator Brown?

Senator BROWN. Thank you, Madam Chair. Much of the testimony today is focused on the carbon storage potential of forests and smaller timber stands, but tree cover in urban settings is also

crucial in keeping our cities and towns livable in a warming climate.

I read, four or five years ago, a book called "Urban Forest," and it pointed out, if I can remember, fairly precisely, the numbers. Tree cover in Beverly Hills from aerial photographs exceeded 50 percent of the land. In South Central L.A. it was about 12 or 13 or 14 percent. You can see what that means to all kinds of issues, from clean water and soil and air to just livability with temperatures and all the things.

Could any of the panelists, anyone who wants to answer this, speak to the benefits of tree cover for those living in cities and towns, and, at the same time, the particular challenges of growing and maintaining canopy in cities? Whoever feels most eater to answer that question, or address that question.

Mr. FOX. Well, thank you, Senator, and I think I am talking too much, and I will be happy for my colleagues to chime in. I think I can say all State forestry agencies have an urban forestry program. If you believe in climate-smart forestry, which applies to rural forestry, it also applies to urban forestry. Those benefits are huge. They slow down water. They shade buildings, and I think it is like 15 percent less cost for utilities when buildings are shaded. There is an aesthetic value, a psychological value, for just having trees in your neighborhood. It is a calmer neighborhood. Small shops like trees in front of their places of business. Shoppers are more inclined to buy when there are trees there.

We do quite a lot with our nursery business to provide trees for the urban setting. There are even uses for urban trees that die or need to be removed for road widening. There are all sorts of benefits for healthy, urban forests. A lot of work goes into that, and State forestry agencies step up to the plate there.

Senator BROWN. Well, I thank you. The full legacy of racist policies like redlining is all too clear in the location of urban heat islands today. You suggest that. Studies show that these heat islands are concentrated in neighborhoods with the fewest trees. I am working on legislation to improve tree canopy in neighborhoods that have been cutoff from investment because of these policies. I hope to work with members of this Committee to ensure that the worst climate impacts are not relegated to the most vulnerable communities, that maybe planting new trees in cities like Cleveland or maintaining existing canopy. It is clear to me that the Forest Service can and should play a role in helping communities across the country make these investments.

The second part of the question, in the last couple of minutes. What are the particular challenges of growing and maintaining canopies and canopy in cities, if someone could try to address that for me? If nobody does, it is back to Mr. Fox.

Mr. FOX. Here in Arkansas, being able to take those measurements and know what the tree canopy is, that is what our urban foresters do. They know what their canopy is. It might be 25 percent. It might be 60 percent. Then they can plan how to upgrade the canopy in their city or a certain neighborhood. First, first, first, you have got to measure, and you have got to know what you are working with. There is quite a bit of that that goes on all through the cities and towns in the United States.

It is quite a large industry, to be frank, about maintaining, planting and maintaining urban forests.

Senator BROWN. Thank you. Dr. Cheng, my last question is, can you talk about potential work force needs as it relates to urban forestry?

Mr. CHENG. Senator Brown, thank you for the question. I think it pairs with a lot of the issues that we have been talking about overall in terms of rural forestry and Federal land forestry. There has just been an underinvestment in forest and tree planting, tree care, forest management in general. Especially in urban areas, this is a burden that is borne by cities themselves and their tax base. It is something that we really distribute and segment and silo our capacity for tree and forest management, and that could be better integrated.

Senator BROWN. Thank you, Dr. Cheng. Senator Stabenow, Madam Chair, thank you for the really important hearing.

Chairwoman STABENOW. Thanks very much. Now to Senator Braun, my partner on so many of these issues. Senator Braun.

Senator BRAUN. Thank you, Madam Chair. Whenever we have a discussion on forestry it is my favorite subject. In fact, I have been a practicing tree farmer since the late 1980's. The neat thing about that is it is kind of a great therapy for this new job I have as a U.S. Senator. I go back every weekend.

I want to emphasize a couple of points that I have noticed, especially over the last few years, but many others have echoed here, how a growing, well-managed forest does sequester more carbon. That means that you need to manage your woodland not only from periodic harvest, to make sure that you are culling out what may not be that species of desired growth, the ones that need to come out to generate more room for other trees, and then intermittent work called timber stand improvement.

There has been a lot of interest too—I am a member of most of the forest associations across the country and within my State—in climate, and how forests become a more important part of that. What I know most about forest ground, especially so much of it owned by farmers, they are great stewards of their cropland. Many times the management in their woodland, due to the periodic income, different from their annual rotation, does not get the attention it needs. That means there is a lot of upside potential.

What I want to focus on here today, and my question would be for Mr. Harris and Mr. Fox, and if there is time for anyone else, where I spend the most time on the weekends, over the last five years especially, 10 years when it started showing up on the radar, emerald ash borer, which came from China probably on pallets. It has taken out nearly every ash tree in this country, comprised eight percent of all hardwoods. That is devastating on whatever management you had in place and probably your ability to sequester carbon.

Japanese stiltgrass, the biggest problem we have in Southern Indiana, suffocates regeneration. You have got bush honeysuckle, garlic mustard, multiflora rose, ailanthus tree of heaven, many others I could mention. Many came in through nurseries.

I would love to know what your opinion is of where invasive species, whether it is a bug or another bush or tree, where does that

weigh in on the health of our forests, and are you having as many issues in your back yard as I am in mine, and what I see across Indiana?

Mr. HARRIS. Senator, I will go first if that is okay, Mr. Fox. As you know, we manage about 6,500 acres in your State. All of the things that you just discussed are very real and very real to us. I think invasive species are a huge problem that the Federal Government and State governments can help us with. It is the expertise needed to understand what we are dealing with, how to deal with it, and how to deal with it cost-effectively, is a major thing that a lot of landowners struggle with, and I think especially smaller landowners struggle with it even more.

Our company is large. My full-time job is being our company's forester, and so I am paid, and required to keep up with all of these things and be proactive. Proactive management is a huge part of invasive species and knowing what we are dealing with and how to deal with them. I would say that the small landowners are the ones who suffer the most from that, because they may not even know that they have the problems until it is too late. They are very real, and things that we have to deal with every day.

Mr. FOX. Senator, again, thank you for the question. This is where you and the Committee can really help us. Our forest health program is somewhat limited budget-wise, and we get major help from the U.S. Forest Service in their forest health programs, whether it is an urban forest or whether it is a rural forest. We conduct detection flights when we think we have an ips beetle outbreak, which happened a little bit in west Arkansas a couple of years ago. Or it might be red oak borers, which wiped out a million acres in Arkansas and Missouri of red oak, a native insect that attacks red oak trees when there are too many trees per acre and after a drought.

That forest health network that is within the Forest Service helps us have the funds to look and see so that we can serve landowners like Ms. Dillard, and warn them, help them with corrections or mitigation when they might have southern pine beetle or emerald ash borer. We have it here in Arkansas. Our ash is not quite gone yet, but it is leaving.

We need those Federal program dollars for forest health to know how we can help to educate landowners, and we need it in forest inventory analysis, so when we take plots we can see what is out there and know we have a problem, discover the problem. You can really help us. Thank you, sir.

Senator BRAUN. You bet. The sad thing about invasive species is that most forest owners do not know they have invasive species in their woods, because until you really get into the details of managing your own woodland, it looks like the landscape. I believe it is probably the most serious threat we have on managing our woodlands, and I think it would be an interesting discussion for a further committee hearing sometime.

Chairwoman STABENOW. Well, thank you, Senator Braun, and I can just say from Michigan, we have lost tens of millions of trees because of emerald ash borer alone, and it has just been devastating. It is an important discussion. Thank you.

Senator Gillibrand?

Senator GILLIBRAND. Thank you, Madam Chairwoman. I appreciate it very much.

Dr. Cheng, thank you to the witnesses for being here today. Global deforestation impacts our security, climate change, wildfires, willful indigenous communities, and the global health crisis we are facing from COVID–19.

Zoonotic spillover, the transmission of novel pathogens from animals to humans, is the origin of most emerging infectious diseases, including COVID–19. The rate of zoonotic disease outbreaks is rapidly increasing and driven by human activities that increase interactions between wildlife, livestock, and people.

Land use change, particularly the clearing and degradation and fragmentation of tropical forests within emerging disease hotspots, as well as the wildlife trade and intensive livestock production, are of the greatest concern from a one-health and pandemic prevention perspective.

Dr. Cheng, what sort of activities does Congress need to be looking at in order to stop global deforestation and to prevent future pandemics from occurring? What one-health approaches to this issue of deforestation do you find helpful?

Mr. CHENG. Senator Gillibrand, thank you for the question. There have been international agreements around especially forest retention and deforestation. A lot of those require just a lot of voluntary practices on the part of national governments. We end up relying a lot on nongovernmental organizations to help provide incentives for countries to maintain those forest covers.

There is also a forest products trade that can either help facilitate or frustrate these global deforestation issues. Working with countries and producing our own timber, using our own timber resources for domestic consumption, is a great opportunity for us to be able to solve that problem. The U.S. imports way more timber for our domestic consumption than we produce ourselves. Doing our part in terms of producing what we consume is a way for us to be able to contribute to deforestation problems.

Senator GILLIBRAND. Thank you. I want to follow along in the conversation that Senator Braun really delved into, and the problems you are facing, Senator Braun, are the same ones we are facing in New York. New York State has more invasive forest insects and diseases than any other State. These insects and diseases arrive in our country as an unintended byproduct of global trade.

The two main pathways of entry are on live trees and shrubs imported for the nursery trade and in solid wood packaging materials such as crates and pallets.

In addition to severe ecological damage, these pests cause billions of dollars per year nationwide in economic damages, costs which fall largely on homeowners and local governments. Pests like the spotted lanternfly, which arrived on a stone pallet from Asia, posed a severe risk to crops and forests all around the U.S. This pest can weaken trees, cause the loss of leaves, and make leaves more susceptible to other pests and diseases.

Mr. Fox, should there be more coordination between the Forest Service and the Animal and Plant Health Inspection Service to combat invasive species such as the spotted lanternfly?

Mr. FOX. Thank you, Senator. There is an obvious answer. There is really good cooperation between APHIS and U.S. Forest Service within the U.S. Department of Agriculture right now. Just here in Arkansas Department of Agriculture we cooperate with our plant board, so Forestry Division and Plant Industries Division epidemiologists work together with APHIS on these issues here in my State.

Having said that, more is better here. Those pests are spreading. We have a cogongrass problem here in the South that we have got to work on, and we have got fire ants here in the South that have been with us now for 30, 40 years.

There are constant things that we have to work on that more cooperation would definitely help. Knowing that in that cooperation is the cooperation of State agencies like Plant Industries Division here and those similar ones in other States. You need cooperation at the State level as well as the Federal level.

Senator GILLIBRAND. Thank you, and thank you, Madam Chairwoman.

Chairwoman STABENOW. Thanks very much. Well, let me thank all of our witnesses again. This has really been an excellent hearing. Thank you, Senator Boozman, for working with me on this.

We have heard very clearly that as family foresters, professionals, and public servants working in the field every day, you are seeing what we are seeing, a real opportunity for public and private forestland to lead the way in addressing the climate crisis. We have also heard that if we want to be broadly successful in this effort we have to make sure policies work for everyone. That means making sure small acreage, minority, under-represented and under-resourced producers have the support they need to be successful as well.

If we can be successful in crafting practical policies, we can reduce carbon pollution and create new sources of revenue for family foresters, which I think is really a terrific opportunity for us.

I hope that each of you and your organizations will continue to lead on this issue, and I look forward to having our Committee work with you as we move forward.

In addition, the record will remain open for five business days for members to submit additional questions or statements. The hearing is adjourned.

[Whereupon, at 11:26 a.m., the Committee was adjourned.]

A P P E N D I X

MAY 20, 2021

Testimony of Ms. Kedren Dillard

Representing the Sustainable Forestry African American Land Retention Network and American Forest Foundation

Before

The Senate Committee on Agriculture, Nutrition, and Forestry Hearing on Federal, State, and Private Forestlands: Opportunities for Addressing Climate Change

May 20, 2021

Good morning and thank you for this opportunity to testify on behalf of the Sustainable Forestry and African American Land Retention Network (SFLR) and the American Forest Foundation (AFF).

As you consider climate policy in this Committee and in this Congress, I urge you to create policies that recognize the important role and opportunity for forests and forest products as a climate solution and that ensure that African American forest owners like my family and family forest owners more broadly are able to participate and contribute to tackling climate change in voluntary ways that increase our land values, help us keep our land in the family and keep it forested.

My name is Kedren Dillard, and I am a fourth (4^{th}) generation forest landowner. With my family, I own approximately 160 acres of land in three small farmland plots in Brunswick County located in Southern Virginia.

I'm here today speaking on behalf of the Sustainable Forestry and African American Land Retention Program (SFLR), one of the only African American-led and managed conservation and environmental networks. The SFLR Network helps African American landowners turn their family forests into sustainable economic assets.

SFLR's core pillars utilize managed forestry and small agricultural enterprises to address land loss and land tenure, including heirs' property resolution and climate change, in African American communities throughout the southern United States. The mission of SFLR is to create a sustainable system of support for African American forest owners that significantly increases the value of African American-owned forests, promotes land retention, creates asset development, promotes conservation and environmental protection, and educates landowners about the principles and practices of climate change mitigation.

As leading African American experts in forest conservation, the SFLR Network brings a time-tested ability to attract and support Black landowners to enhance their landholdings' financial and ecological value and act together to increase land retention and wealth creation in their communities. The SFLR network has assisted more than 1,400 landowners, who own a combined 90,183 acres, ensuring land assets remain held by historical landowner families. The foundation for the Network's success is the excellent work of African American-led community-based anchor organizations with strong connections to African American families. The majority of these landowners have owned their family forests for generations and are well-positioned to act as stewards of the land.

I'm also here today as a member of the American Forest Foundation's Board of Trustees. AFF exists to deliver meaningful conservation impact through the empowerment of family forest owners. Several

years ago, AFF and SFLR formed a partnership to further our shared goals to achieve conservation objectives by empowering African American forest owners.

SFLR and AFF are also members of the Forest Climate Working Group, a diverse forest sector coalition working together to advance forests and forest products as climate solutions. My testimony also reflects ideas developed in concert with this diverse coalition.

My Story

With respect to my family forest, the first small farm passed down from my great-grandfather is about 50 acres of forest and 30 acres of open land. The second, from my great-great-grandfather, making me a 5th generation owner in this instance is 55 acres of forest and open land. And finally, from my great-Aunt, I share ownership of an additional 20 acres of trees and 5 acres of open land. Luckily, the titles are clear on all three properties, and each is in either a corporation or LLC, owned by a set number of shareholders who are family members.

My 12 first and countless 2nd and 3rd cousins and I owe a great deal of thanks to my father and his six siblings for positioning these properties to remain whole as the land moves in ownership to my generation and through the generations that follow. We experienced first-hand the danger of heirs' property with my great-great grandfather's land. By the time we were made aware of this inheritance, the land had over 250 descendants, many of which had no idea they were tied to the property. My family absorbed the costs associated with paying the legal fees and buying out all 250 heirs to this land which took over ten years. Unfortunately, this was before the passing of the Uniform Partition Heirs Property Act in 2020 in the Commonwealth of Virginia, which now significantly reduces the amount of time it takes, and the costs associated with getting inherited land out of heirs' property.

We harvest timber on all three farms to pay for upkeep and ongoing management expenses and do so as landowners certified in the American Tree Farm System®, a program of AFF's, which helps us manage our land to top standards of excellence. Through the guidance and support of SFLR, we have participated in USDA reseeding programs and cost-share initiatives, we have created a forest management plan for each of the three properties.

My family's relationship with the SFLR network started with the Black Family Land Trust, Inc (BFLT), an SFLR network organization and one of the nation's only conservation land trusts dedicated to the preservation and protection of African-American and other historically underserved landowners assets. We reached out to BFLT for help with technical assistance for one of our woodlots and continued to use the programs BFLT offered, such as the Wealth Retention Asset Protection Program (WRAP) that helped our family fine-tune the operation of our LLC, ultimately helping us keep the land in the family.

While the revenue from harvesting timber every 20+ years is helpful, the return does not come close to offsetting what we pay in taxes, management costs, and maintenance. This delta is paid out of pocket by family members. Doing so puts our land at risk; as younger generations become decision-makers and shareholders to the property, they are doing so without the same emotional connection and value to the land. There will come a time when fewer family members will share in the expenses. This is too much of a burden for a few to bear and will jeopardize keeping the land family-owned and whole. As a result, we are actively and with rigor looking for other opportunities to help the land pay for itself.

Carbon markets, where we can earn income for additional carbon that we sequester and store our land, have great potential to help supplement other income streams to help keep our forests healthy and as forest.

Family Forest Carbon Opportunities to Tackle Climate Change

Forests, including African American-owned forests, are essential for tackling climate change. While forests are a piece of the solution, they are an essential piece. America's forests and forest products already capture and store nearly 15% of annual U.S. carbon dioxide emissions generated from the burning of fossil fuels. With the right policies that enable voluntary action, forests can do even more.

Families and individuals, including African American forest owners, own more than one-third of U.S. forests, making these owners essential in efforts to mitigate climate change.

Taking climate action can also benefit landowners. Helping family forest owners, including African American owners, take action to capture and store carbon in our forests can have multiple benefits beyond the climate: increasing the viability of forest ownership so we can keep our forests intact and healthy and providing a whole range of economic and environmental co-benefits.

African American forest ownerships are often smaller acreages, but collectively, these ownerships make up a forested landscape that must be engaged as a natural climate solution. These ownerships are often on the frontlines in climate-impacted communities, where the impacts of climate change are felt the most. Additionally, due to significant barriers to forest conservation because of issues like heirs' property and lack of access to traditional forestry support, African American-owned forests are often the most vulnerable to conversion to non-forest use and loss.

In addition to encouraging action in forests for climate, increasing use of forest products is also a key climate strategy that family forest owners are an essential component of, given that more than half of the wood consumed in mills in the U.S. comes from family-owned forests. Strategies that create or enhance markets for forest products not only produce climate benefits as these products are used as substitutes for more fossil-fuel intensive products but also encourage and help finance climate-friendly action in the forest.

Forest Carbon Markets As Key Strategy for Empowering Landowners to Take Climate Action that Meets Our Goals as Landowners

There are many tools that can be used to help family forest owners, including African American owners, take action in their forests to capture and store carbon and produce other benefits, from USDA conservation programs to tax incentives to leverage carbon and forest products markets. While all of these tools will likely be important to fully realizing the potential of forests and forest products as climate solutions, voluntary carbon markets present a near-term opportunity to leverage significant private sector resources to enable climate action.

With some estimating carbon markets could be worth between $90-480 billion by mid-century, these markets represent an important revenue stream for family forest owners to take forest-climate action in their forests to produce additional carbon and sell that carbon to corporations or others seeking to reduce their emissions, especially after corporations have done all possible to reduce emissions in themselves. These forest-climate actions that landowners can take for carbon markets are often the

same actions needed for other important landowner values like forest health, wildlife habitat, or clean water but are typically unaffordable. Revenues from these markets could far surpass existing government incentives for forest actions and can be leveraged with government incentives for maximum benefit.

And while there are other sectors that can produce carbon credits for these markets, estimates suggest that natural climate solutions, with forests being the largest natural climate solution, are needed to fill as much as 85% of the demand for these markets.

Barriers to Carbon Markets for Family Forest Owners including African American Owners

To date, unfortunately, carbon markets have been off-limits to most family forest owners for several reasons:

- The small size of most family-owned forests, and especially African American owned forests with an average acreage size of 63 acres, make an individual carbon project unaffordable due to the high cost of project development and verification;
- Lack of access to technical assistance that helps landowners understand the right practices to take in the forest;
- Financial barriers including the upfront costs of implementing forest-climate actions that often don't produce carbon benefits immediately to be sold in the market.

In addition to these barriers, African American owners often face additional barriers due to heirs' property issues and lack of trust in institutions and systems, fueled by centuries of inequity and systematic racism. Often organizations like the SFLR network that aim to help address these issues face similar inequities.

When family landowners are left out of these opportunities, it means rural and climate-impacted communities are left out of these important opportunities to take local climate action, to support forests and forest health, and local economies.

Rural Forest Markets Act, Other Strategies, Can Help

Fortunately, there are solutions to help family forest owners, including African American owners, overcome these barriers and access carbon markets in ways that will benefit us as landowners, forest health, local economies, and the climate.

There are organizations like AFF, SFLR, and The Nature Conservancy (TNC), which are developing solutions to help family forest owners, including African American owners, participate in these markets and generate wealth to care for their land and keep it in the family.

One such program, the Family Forest Carbon Program, developed by AFF and TNC, is designed to help family owners participate in carbon markets by providing technical and financial assistance to landowners to implement forest-climate practices in their forests, which generate measurable, verifiable carbon credits to be purchased by private sector buyers.

But these programs and others will face scaling issues, given this is an emerging, still uncertain market for both landowners and carbon buyers.

To enable these markets to work and leverage significant private sector funds for forest climate action on family forests, we recommend passage of the Rural Forest Markets Act, along with other actions. The Rural Forest Markets Act will unlock private capital by de-risking investments for private investors with credit enhancement such as a loan or bond guarantee. This is essential to enable the use of private investment capital to fund the significant upfront cost of climate-smart forestry actions that take, in some cases decades, to produce carbon that can be sold in the market. Without this private capital, carbon markets will be off-limits to forest owners.

The Rural Forest Markets Act must include a priority and capacity to support minority-led, community-based organizations that work with historically underserved groups including African American landowners. This will ensure historically underserved communities and landowners are ready for this market opportunity and have equitable access to these markets at the outset, rather than being left out for decades as has been the case in the past. Additionally, projects guaranteed through the Act must benefit landowners and help increase land values for family forests, including African American owners.

In addition to RFMA passage, other policy tools are essential for unlocking carbon markets and forests potential in ways that benefit landowners, such as policies that:

- Help build confidence in the market—both landowners and carbon buyers;
- Co-invest in the production of carbon credits, (could be with existing conservation programs or policies like tax incentives) recognizing that many forestry practices will not be paid for solely with revenues from the carbon market but have value for climate and other co-benefits;
- Invest in the forest carbon practice science, data and inventory solutions, and program development through grants and other funding support that can bring innovation, efficiency, continuity and credibility, and continuous improvement to climate-smart forestry action;
- Support landowner engagement and technical assistance, including support for African American and other historically underserved forest owners who need assistance to be ready for the market, addressing issues like heirs' property that can be barriers to market access. This should include support for capacity building within organizations like SFLR to work with landowners to support market readiness.

As mentioned above, AFF and SFLR are also members of the Forest Climate Working Group and support the policy recommendations contained in the FCWG Policy Platform noted here: https://forestclimateworkinggroup.org/resource/forest-climate-working-group-policy-platform-for-117th-congress/

In conclusion, we urge swift action on the Rural Forest Markets Act and other policies noted above that will enable family forest owners, including African American owners, to contribute to climate mitigation in ways that work for these owners while leveraging the private sector.

WRITTEN TESTIMONY

OF

TROY HARRIS OF JAMESTOWN

BEFORE THE UNITED STATES SENATE AGRICULTURE COMMITTEE

MAY 20, 2021

Chairwoman Stabenow, Ranking Member Boozman, and distinguished Members of the Senate Agriculture Committee, on behalf of Jamestown, thank you for the opportunity to testify on private working forests and the important role they can play as a natural climate solution.

Jamestown is a global, design-focused real estate investment and management company with a 37-year track record and clear mission to transform spaces into innovation hubs and community centers. Jamestown employs more than 400 people worldwide with headquarters in Atlanta, Georgia, and Cologne, Germany. Since its founding in 1983, Jamestown has executed transactions in excess of $35 billion. As of March 31, 2021, Jamestown has assets under management of $12.6 billion and a portfolio spanning key markets throughout the U.S., Latin America, and Europe. Current and previous projects include Chelsea Market in New York City, Industry City in Brooklyn, Ponce City Market in Atlanta, Ghirardelli Square in San Francisco, and the Innovation and Design Building in Boston.

Since 2009, Jamestown has owned and managed timberlands, starting in the southeastern United States and now extending through Indiana, Pennsylvania, and New York. Jamestown utilizes modern and sustainable forestry practices, and recognizes that healthy forests provide clean air, clean water, recreation, and economic opportunities for a variety of stakeholders. In 2019, Jamestown planted over 1.2 million trees on its timberland properties.

In 2020, Jamestown made a pledge to reach net zero emissions by 2050 and cut our carbon emissions by 50% by 2030. Tree growth is an important part of reducing our carbon emissions, and products that are sourced from sustainably managed forests are seeing increased interest and demand. An example of the carbon-sequestering properties of trees is the adoption of mass timber as a renewable building solution across every region of the country. Organizations are increasingly including renewable wood materials in the suite of material options for consideration, offering the construction and development sector a progressive and creative method to transform structures into carbon vaults. Furthermore, mass timber allows building occupants and visitors to be surrounded by natural, elemental materials that inspire and keep them connected to the natural environment.

Modern forestry has no equal in its capacity to deliver climate mitigation benefits at scale. Sustainably managed private working forests are both a critical nature-based solution to climate change and the source of 2.5 million well-paying American jobs, mainly in rural communities. By providing a continuing cycle of growing, harvesting, and replanting, sustainable forest management optimizes a forest's ability to sequester and store carbon and improves forest health and resilience. The positive impact that forests are already having is massive. U.S. forests and forest products offset 15% of U.S. industrial carbon emissions every year.

Forest product markets deliver economic value to private working forests and shield them from economic pressure to convert land away from forests. In the U.S., the forest sector is mature and maintains some of the highest sustainability standards in the world. U.S. private forest

owners plant more than one billion trees per year, planting which is driven by high demand. Private working forests and sustainably sourced wood products are two of the largest contributors to our current mitigation strategy and are well positioned to provide even more significant climate solutions in the future.

Private working forest owners are leading the way in pursuing natural climate solutions. Recently, I joined the CEOs of 42 other leading U.S. forest owning companies who sit on the Board of the National Alliance of Forest Owners (NAFO) and the CEOs of leading national environmental and conservation organizations to adopt a unique set of Principles on Private Working Forests as a Natural Climate Solution, which express our common vision for increasing the climate mitigation of sustainably managed private working forests and sustainably produced forest products.

Over the past few years, NAFO has also worked closely with a broad community of stakeholder organizations to advance the climate mitigation benefits of private working forests. One main avenue for collaboration has been the Forest-Climate Working Group, which provides a unified voice across the U.S. forest sector for advancing climate policy. NAFO also participates in the Food and Agriculture Climate Alliance to advance broader working land-based climate mitigation solutions.

Forest Carbon Sequestration and Storage

Forests provide carbon benefits at scale through active sequestration and long-term storage. Smart climate policy will seek to maintain existing storage while optimizing additional sequestration and storage potential.

Over one-third of the United States is covered by forests, and 67 percent of U.S. forests are working forests, meaning forests sustainably managed to supply a steady, renewable supply of wood for lumber, energy, paper, and packaging, providing more than 5,000 items that consumers use every day. Seventy percent of those working forests are privately owned. Harvests of any type (timber stand improvement, thinning, final harvest, etc.) occur on only two percent of the total land area of private working forests, and the same land area is regrown through planting or natural regeneration each year.

Privately owned working forests provide approximately 90 percent of our wood and fiber. At the same time, they account for 73 percent of our gross forest carbon sequestration – enough to offset emissions from all passenger vehicles in the U.S. each year. Private working forests also store an additional 82 gigatons of carbon – more than all other forests combined.

The forest sector is already carbon negative, offsetting not only its own emissions, but a significant portion of the country's annual emissions as well. The data clearly show that forests can be both productive and beneficial to the climate.

Since 1958, the total forest acreage in our country has remained relatively constant, and the total volume of wood growing in our forests has increased by nearly 60 percent. Most of that growth came from privately owned working forests. Even as demand grew, and as the population more than doubled, working forests expanded. Today, we grow 43 percent more wood on private working forests than we harvest each year, despite consistent high demand for wood. This increased growth translates into carbon sequestration and storage. The bottom line is that strong markets are good for forests and climate mitigation.

Private working forests hold massive carbon storage benefits. Keeping working forests working through healthy and diverse markets for forest products shields private working forests from economic pressure that can lead to land use change — a triple loss including the forest's accumulated storage, its active sequestration, and the future carbon value in terms of both storage and sequestration. Modern forestry's ongoing cycle of growing, harvesting, and replanting keeps forests and their carbon benefits intact.

At Jamestown, we take our environmental responsibility as a manager and developer seriously. We have signed onto the UN Sustainable Development Goals, and adopted short-, medium-, and long-term ESG targets in support of all 17 goals. This includes a target of net zero operational carbon by 2050. We have received top scores on our annual assessments from Principles for Responsible Investment (PRI), and our institutional open-end fund was ranked #3 in its peer group by the Global Real Estate Sustainability Benchmark (GRESB) for 2019. In April, Jamestown announced plans to reach net zero carbon operations at Levi's Plaza by 2025. The effort positions the nearly one-million-square-foot office campus to be the first existing, large-scale commercial property in San Francisco to reach this milestone.

For the private sector, market-based decarbonization through private working forests and forest products is an important tool for reducing greenhouse gases in the atmosphere while improving livelihoods, especially in rural communities. The tax code can incentivize increased forest carbon sequestration and storage, while USDA can support voluntary carbon registries and updated protocols that maintain rigor while removing barriers to entry.

Increasing the role of private working forests as a carbon mitigation solution also requires current and reliable forest inventory data and analysis. USDA's Forest Inventory & Analysis Program (FIA) is the world's premier forest data collection program. Increased investments in FIA focusing on carbon measurement capability and the use of advanced technology is fundamental to an overall forest carbon mitigation strategy.

Sustainable Wood Construction

Wood continues working for the climate in the built environment. Half the dry weight of wood is stored atmospheric carbon. This means that buildings can become carbon vaults, storing the carbon in the wood used to construct them. Every year, wood products add about 100 million metric tons of CO_2e to the already existing wood products storage pool. Added up, wood products store about 9.7 gigatons of carbon in houses and other wood buildings in the U.S. That is more than double the carbon stored in all national parks.

The manufacture of traditional building materials accounts for approximately 11% of global GHG emissions, according to the UN. That total is larger than all of the emissions from the European Union, and only smaller than those of China and the United States. Architects and developers are focusing on reducing this so-called "embodied carbon" in building materials. Yet, most federal programs to reduce carbon emissions in the built environment emphasize only energy efficiency and exclude embodied carbon.

Mass timber buildings offer economic, social, and environmental solutions that make them a smart investment. They can be the best solution for avoiding emissions and storing carbon in the built environment, while at the same time supporting sustainable working forests and the myriad environmental benefits outlined above. As a natural, biodegradable, sustainable, green, and carbon-storing building material, wood is unmatched. Mass timber construction is so durable that after military blast testing and fire resistance testing, there are plans to use cross-laminated timber (CLT) in American embassies abroad specifically because of mass timber's

remarkable safety performance. Using panelized, prefabricated mass timber construction can decrease construction time by 20 percent and drastically reduce the need for emissions-heavy trucking. Beyond the practical reasons for supporting mass timber construction, there is the simple fact that people want to live and work in mass timber buildings for their beauty, comfort, and fundamental connection to the natural environment.

Jamestown recently announced plans to construct a 100,000 square-foot office building targeting LEED Gold from CLT as part of the expansion plan for its Ponce City Market, in Atlanta, Georgia. CLT is an environmentally friendly, sustainable, and carbon-neutral alternative to traditional construction methods. Utilizing sustainable materials like CLT is one component of Jamestown's commitment to achieve net zero carbon emissions by 2050 within its portfolios.

While Jamestown has been an early adopter of mass timber, we are not alone. Michigan State University (MSU) has been a pioneer in research and the adoption of mass timber. MSU's STEM building was the first mass timber construction project in Michigan. The 2018 Farm Bill included the important Timber Innovation Act and its funding for the Forest Service's Wood Innovation Grant program. MSU has used the Wood Innovation Grant program to strengthen its role as a national leader in research to help us better harness the climate benefits of mass timber construction and sustainable forest management.

Major corporations also recognize the value of mass timber. Multinational companies like Adidas, Alphabet, Amazon, McDonald's, Microsoft, and Walmart have all plans to use mass timber. Notable among these examples is the planned new 350-acre mass timber headquarters Walmart is building in Arkansas. Walmart's commitment to mass timber spurred a $90 million investment in a new mass timber production facility in rural Arkansas. Walmart is choosing wood construction for the same reasons Jamestown has. It's a smart investment in rural forest communities that produces significant carbon mitigation benefits.

Despite our abundance of sustainable working forests, and demand for better, more climate-friendly construction, the U.S. is behind on mass timber production and utilization. Congress can continue to advance the work begun with the highly successful Timber Innovation Act to help make mass timber more commonplace in the U.S.

Changing how the federal government considers the built environment can significantly reduce embodied carbon at scale and align with the ongoing efforts of the private sector. With oversight of the Forest Product Laboratory (FPL), Wood Innovation Grant Program, and the BioBased and BioPreferred procurement programs, this Committee has several avenues to encourage building with wood to reduce embodied carbon. For instance, additional investments in FPL to advance whole building lifecycle analysis (LCA) to drive decisions on building materials can help project developers cost-effectively and creatively reduce carbon. Such emphasis could provide opportunities in all infrastructure projects, including transportation, federal buildings, affordable housing, and more.

Sustainable management of U.S. forests is important to ensuring increased use of wood in construction truly achieves climate and other environmental outcomes. Multiple, credible third-party certification systems are available in the United States to ensure sustainable practices in support of climate benefits. This includes programs to certify forests to a forest management standard, chain of custody certification programs, and responsible sourcing programs provided by the Sustainable Forestry Initiative, the American Tree Farm System, and Forest Stewardship Council. In accordance with the clarification made in the 2018 Farm Bill, all qualified certification programs should be given equal treatment in any federal procurement or other climate change policy involving private working forests.

Wildlife Conservation and Other Environmental Co-Benefits

Climate benefits are just one of many environmental benefits provided by working forests. Water supplies for communities around the country flow through forested watersheds, where forests act as a natural filtration system for nearly 30 percent of the water we drink. Private working forests also play an important role in keeping common species common and conserving at-risk and declining species. These forests are vital to wildlife conservation, as sixty percent of our nation's at-risk species rely on private forestland for habitat. Collaborative conservation efforts such as the NAFO's Wildlife Conservation Initiative (WCI) have created cooperative partnerships with the U.S. Fish & Wildlife Service, state wildlife agencies, forest certification programs, eNGOs and others to benefit species while keeping private working forests as forests.

Climate-Smart Policy Recommendations

This Committee has three clear pathways to further climate-smart policies supporting private working forests and forest products:

1. Help expand markets for forest carbon, increasing accessibility and credibility. If there is a strong market signal for our forests to sequester and store more carbon, we will do just that.
2. Encourage more sustainably sourced wood construction in the built environment. It reduces the carbon footprint of the built environment and supports forest retention and overall carbon mitigation.
3. Improve forest carbon data. Markets for carbon and markets for climate-smart construction need data to prove that climate benefits are real. We have some of that data, but not all of it. The U.S. government can collect and give credence to the data so that markets, forest owners, and consumers all have faith in it.

Conclusion

The recommendations provided today are designed to provide climate mitigation solutions that advance good paying jobs and economic prosperity in rural forested communities across the country. As the Committee considers these recommendations, we urge Committee members to emphasize the impacts of increasing the use of forests and forest products on the nearly three million Americans who live and work in our rural forest communities. Advancing the role of forests and wood products as climate change solutions can both build and strengthen the forest products supply chain and the people it employs as strong, engaged participants in natural climate solutions.

Thank you again for conducting this hearing to identify opportunities for the forestry sector to address climate change. The right climate solutions can enable private forest owners to invest further in sustainable management that enhances forest carbon sequestration, water quality, wildlife habitat, and good paying rural jobs. Jamestown stands ready as a resource to this Committee as it addresses the important challenge of climate change and the solutions private working forests can offer.

WRITTEN STATEMENT OF THE AMERICAN CARBON REGISTRY
AT WINROCK INTERNATIONAL

Presented By:
Jessica Orrego
Director of Forestry

TO THE SENATE COMMITTEE ON AGRICULTURE, FORESTRY, AND NUTRITION

Hearing: Federal, State, and Private Forestlands: Opportunities for Addressing Climate Change

May 20, 2021

Introduction to the American Carbon Registry (ACR)

The American Carbon Registry (ACR), a nonprofit enterprise of Winrock International, was founded in 1996 as the first private voluntary greenhouse gas registry in the world. Our mission is to create confidence in the scientific integrity of carbon offsets in order to accelerate transformational actions that reduce greenhouse gas emissions and create other environmental and social benefits. ACR has five forestry experts on staff, all of whom have advanced degrees in forestry and forest management.

The goal of well-designed and high-integrity carbon offsets is to create financial incentives that drive climate action and deliver environmental and social benefits that wouldn't have happened otherwise. This is where standard-setting bodies, such as ACR, come in. Our job is to operationalize climate finance though the implementation of science-based, peer-reviewed methodologies that accurately quantify carbon benefits and ensure transparency in reporting and credit tracking through retirement.

In both the voluntary carbon market and California's regulated carbon market, ACR oversees the registration and verification of carbon offset projects, following approved carbon accounting methodologies or protocols, and issues serialized offsets on a transparent registry system. Projects must undergo detailed audits by accredited, independent third-party verification bodies that review projects for eligibility and additionality, the application of requirements for setting baselines and for quantification and monitoring of emission reductions and, for forest carbon, ACR's rigorous requirements to maintain project activities for at least 40 years and to mitigate the risk of and compensate for reversals of forest carbon stocks. Each offset represents the reduction or removal from the atmosphere equivalent to one metric ton of carbon dioxide, which can be used to offset unavoidable emissions occurring elsewhere. More information about our methodologies and registry can be found on the ACR website.

Our objective is to maintain the highest integrity and to ensure that emission reductions are real, credible, verifiable and only counted once. As a pioneer in harnessing the power of markets to improve the environment, ACR has set the bar for offset quality that is the market standard today and continues to lead market innovations.

Project Types

The main forest project types in the U.S. are improved forest management (IFM), reforestation and avoided conversion. The vast majority of forest carbon offset projects in the U.S. are IFM, which includes activities that increase landscape carbon retention by incentivizing sustainable forest management practices, such as harvesting less frequently and selectively harvesting only portions of each stand. Reforestation includes planting and regeneration of trees on degraded or fallow land, and avoided conversion includes the protection of forest that is subject to a clear threat of conversion to a different, non-forest land use. For example, conversion to agriculture, or to a golf course.

Size of Forest Carbon Market in the U.S.

The U.S. forest carbon market includes 200 projects on more than 7 million acres across the country that have issued close to 200 million tons of CO_2 emission reductions in the last decade. ACR has issued about three quarters of these credits, either for the California market or under our own ACR program.

Carbon Pricing

Per ton offset prices depend on a variety of factors including the project type, vintage and volumes purchased, as well as the standard under which the project is certified. According to a recent market publication by Ecosystem Marketplace that analyzed data from 2019, North American voluntary offset buyers have a strong preference for U.S.-based offsets and in 2019 purchased approximately 80 percent of offsets from U.S. projects at prices ranging from under $2/ton to over $5/ton, at an average of $3.36/ton.

Forestry was one of the most popular categories with an average price of $5.92/ton, and ACR's average offset price (including non-forestry projects) was $6.37/ton. The voluntary carbon market, and particularly demand for forest carbon credits, has accelerated significantly since 2019, and we understand prices have increased accordingly and are close to, if not equivalent to, prices of $12-$15/ton in the California regulated carbon market. As a case in point, Microsoft's 2020 tender for removals credits in 2020 cited a benchmark price of $15/ton.

Therefore, using a $10/ton reference price, the U.S. forest carbon market has issued credits valued at almost $2 billion for forest landowners in the past 10 years.

Types of Landowners and Benefits

A vibrant U.S. forest carbon market exists, which is already delivering carbon finance to a vast diversity of landowners.

Projects are located in every heavily forested state and region of the U.S., and almost every type of forest ownership class is represented in the carbon market, including industrial landowners, conservation organizations, family forest owners and tribes. We are now seeing some state and municipal forests enter the market as well.

Carbon revenue is directly helping landowners meet a number of land management objectives, ranging from tribes using carbon finance to purchase ancestral lands and to improve fire management, to timber companies using the finance to help manage land more sustainably, or to assist in conservation goals, and even to help small landowners pay for insurance, taxes, or other family expenditures.

Here's an example of how forest offset projects help landowners undertake these actions and get rewarded for them.

The example is an innovative project that complements existing U.S. Department of Agriculture conservation programs, specifically the Conservation Reserve Program, or CRP, to give landowners access to the carbon markets. The CRP works by giving farmers yearly rental payment in return for removing environmentally sensitive land from agricultural production and planting species that will improve environmental health and quality. This is a wonderful initiative that supports millions of farmers around the country. However, as market conditions change, farmers can choose to cut down those trees and put that land back into agricultural use. A project led by GreenTrees, a U.S. project developer, leverages the power of carbon markets to incentivize farmers to maintain and increase their forest carbon stocks over the long-term. By committing to keep the trees they plant in the ground for at least 40 years, the project allows them to generate, quantify and sell carbon credits. The project has already aggregated more than 600 small landowners on over 130,000 acres across seven states. This is currently the largest reforestation project in the U.S. and has issued over 5 million tons of verified offsets. The project assists the participating

landowners with their reforestation efforts, including providing long-term carbon measurement, monitoring and verification and access to carbon market finance that they could not have obtained by themselves. In addition to the primary project outcome of increased landscape carbon sequestration, other co-benefits include habitat creation, timber income, and soil conservation. Several U.S. companies have purchased offsets from this project, including Norfolk Southern, Microsoft, Bank of America and Duke Energy.

Growing Demand

Demand for carbon credits is rapidly increasing and will continue to rise, with U.S. forest landowners well positioned to benefit. But this growth must be built on integrity.

As companies strive to contribute to global climate goals, they are looking for opportunities to offset current and future unavoidable emissions with support for climate action elsewhere. More than 1,500 companies have now set net-zero targets, and demand for offsets is exploding.

At the same time, the International Civil Aviation Organization's Carbon Offsetting and Reduction Scheme for International Aviation, known by its acronym CORSIA, launched this year, requiring airlines to maintain emissions at 2019 levels or buy credits from approved crediting programs, including ACR. CORSIA is expected to generate a global airline demand for between 2.5 and 4 billion tons of offsets by 2035.

Finally, there is also demand emerging from Article 6.2 of the Paris Agreement for Internationally Transferred Mitigation Outcomes (ITMOs).

The science tells us that natural climate solutions to protect, restore and sustainably manage natural ecosystems can provide a third of the climate action the world needs by 2030 to stay on track to meet Paris Agreement targets and avoid the catastrophic impacts of climate change. So, it's no surprise that when companies are looking for offsets, they often look to forest-based projects. Many companies also like projects that have a relevant story to tell their customers, including place-based projects in the regions where they operate or service.

This is all good news for the U.S. forest carbon market. But as demand for offsets grows, so too does the demand for integrity. More and more companies want to know that their investment is leading to real results. When it comes to forests, integrity is rooted in science and innovation. Public access to data derived using replicable, peer-reviewed methods of measurement, together with reporting that is backed by independent verification, is essential. At ACR, we combine the best available data with systematic and conservative rules and processes to ensure the additionality and rigor of each carbon offset issued.

Helping both forest landowners and buyers distinguish what constitutes quality in the marketplace is critical moving forward.

Growing Market

The market, and related infrastructure, is also rapidly evolving and expanding to offer more opportunities for different kinds of landowners.

<u>State, County and Local Lands.</u>

Across the U.S., state, county and local governments own more than 80 million acres of timberland. That's an area larger than New Mexico, our fifth-largest state. Some of this land is managed as state parks or

nature reserves. However, large portions of it are considered "productive forests," which means they are often harvested for timber in favorable market conditions. By changing the way these forests are managed and incentivizing the retention of these forests, it's possible to increase landscape carbon stocks and reduce associated greenhouse gas emissions, representing huge potential for a new area of climate action.

For example, Michigan's Department of Natural Resources has begun implementing the first state agency-led carbon project on commercially managed state forest land anywhere in the U.S. The revenue from the sale of carbon offsets will reduce the financial pressure to harvest timber or participate in other natural resource extraction activities such as oil and gas, resulting in benefits to the climate and to the local economy.

Tribal Lands.

Tribes have entered the U.S. carbon markets, with more than 20 indigenous groups directly benefitting from carbon finance. Most of these indigenous groups are participating in the California compliance market, and in fact, have received 40 percent of all forestry offset issuance in that market. More recently, tribes and Alaskan native corporations are entering the voluntary carbon market as well.

Small and Family Landowners.

Another area for growth in the carbon market is small, non-industrial forest owners. According to the latest National Woodland Owner Survey data, less than 1 percent of these forest owners currently participate in the carbon market, even though they own nearly 40 percent of the forest in the U.S. This is due to known financial and institutional barriers associated with the scale and complexity of the existing market.

Luckily, this is changing. New approaches are emerging to streamline quantification and measurement, and to aggregate numerous small-scale forest owners to make the market more accessible to this important forest ownership class. A significant amount of private capital is ready to get behind the right approaches for bringing these forest owners into the market.

In fact, the American Carbon Registry recently concluded the stakeholder consultation for a new, innovative aggregation and quantification methodology for IFM activities on ownerships of non-industrial private forestlands between 40-5,000 forested acres. The primary carbon sequestration mechanism is the commitment to grow trees longer and to increase forest stocking. ACR will now begin a blind scientific peer review process before it is published and ready for use.

Conclusion

To conclude, we would like to leave you with three key messages.

First, a robust market with existing infrastructure including standards, verification bodies, investors and technical experts is in place. Offsets that result from rigorous and science-based quantification approaches are being issued to forest projects.

Second, the demand for forest offset credits is exploding and is expected to grow, offering opportunities for forest landowners of all sizes and ownership classes. This includes emerging initiatives and approaches to aggregate small-scale landowners at scale. While this is just beginning to gain traction, it is backed by large amounts of private capital, and has potential to expand significantly.

Third, there is no need to start from scratch or re-invent the wheel. It is our hope that the government will support the growth and scaling of the forest carbon offsets market by working with the current market stakeholders and within the existing process and frameworks. Disruption to the existing carbon market could have adverse effects on investments, private capital, and on landowners and other stakeholders currently participating in this market. The government could play a role in supporting forest owners and enhancing their access to the existing market, and this may be particularly key for small-scale forest owners, who have faced both institutional and financial barriers related to sustainable forest management and reforestation. There may also be an opportunity for the government to support nursery operators to scale up production of seedlings, as we understand that to be a key barrier for scaling reforestation.

The carbon market offers an exciting opportunity for forest owners to both benefit from an additional revenue stream and to incentivize long-term, sustainable forest management practices that help combat climate change. Forest carbon projects include significant co-benefits including habitat and water projection, as well as recreational benefits. The demand for high quality nature-based offsets is at an all-time high, and is expected to dramatically increase. We look forward to working with partners to ensure that this growth leads to increased benefits for all kinds of forest landowners in the country, while also adhering to high standards and integrity.

Written Testimony of the National Association of State Foresters (NASF)
Joe Fox, Arkansas State Forester and NASF President

Submitted to the Senate Committee on Agriculture, Nutrition and Forestry
Hearing on "Federal, State, and Private Forestlands: Opportunities for Addressing Climate Change" May 20th, 2021

The National Association of State Foresters (NASF) is pleased to provide written testimony to the Senate Committee on Agriculture, Nutrition and Forestry for this important hearing on "*Federal, State, and Private Forestlands: Opportunities for Addressing Climate Change*". Thank you, Chairwoman Stabenow, Ranking Member Boozman, and members of the committee, for holding this hearing today and for the opportunity to testify on behalf of NASF.

NASF represents the directors of the forestry agencies in all 50 states, eight U.S. territories, and the District of Columbia. State foresters deliver technical and financial assistance to private landowners for the conservation of more than two-thirds of the nation's forests. They also partner with federal land management agencies through cooperative agreements and Good Neighbor Authority to manage national forests and grasslands. All state forestry agencies share a common mission to protect America's forests and most have statutory responsibilities to provide wildland fire protection on all lands, public and private.

America's trees and forests are a strategic national resource with vast potential as solutions for climate change, public health, and economic challenges. Wildland fire is a national crisis – bold action is needed to sustain forests, protect public safety, and prevent the conversion of forests from carbon sinks to carbon emission sources. **Active forest management, supported by forest markets, combined with coordinated wildfire prevention, mitigation, and suppression efforts can substantially mitigate the effects of climate change. The efficacy of forests, forest products, and woody biomass in addressing climate change depends on forest sustainability. Without active management, forests are less resilient to climate change and less effective at sequestering carbon. When forests are actively managed they provide a number of public benefits, including clean air and water, enhanced wildlife habitat, carbon sequestration, recreational opportunities, watershed protection, timber production, and support to rural communities.**

Addressing Climate Change Requires Collaboration

For more than a century, state forestry agencies have partnered with the U.S. Department of Agriculture's (USDA) Forest Service (Forest Service) to deliver professional forest management and wildfire protection across complex, multi-jurisdictional landscapes with a holistic "all lands, all hands" approach. Meaningful, landscape-scale forest restoration doesn't happen without collaboration across ownership boundaries. From Forest Service technicians to certified

professional foresters and municipal arborists, to state field foresters and private landowners, together we can work across all land ownerships – federal, tribal, state, and private – to mitigate the most pressing threats America's forests face, including climate change.

Over 30 states have formalized their commitments to greater collaboration with the Forest Service and other federal agencies with Shared Stewardship Agreements. State forestry agencies have played a vital role in ensuring the success of the collaborative shared stewardship framework by coordinating key partners and facilitating active forest management across all ownerships, including federal lands. State-based approaches to shared stewardship enhance outcomes through shared decision-making and shared priority-setting.

State forestry agencies are uniquely positioned to promote forest carbon sequestration efforts and ensure greater forest resilience. As reflected in state Forest Action Plans, a variety of climate-focused efforts are underway, some with support from federal grants and programs. Adequately funding these programs and structuring them in a manner that places a high priority on the role of forests will aid states in helping the nation achieve climate change-related objectives.

Since 2008, states have gathered partners together to develop Forest Action Plans, which prioritize strategies, areas, and actions for all forested land – federal, state, private, urban, and rural. In 2020, all states revised their Forest Action Plans. Supporting the work outlined in Forest Action Plans not only helps address immediate forest management needs nationwide, it provides economic support to rural communities across the country.

Twenty-five states are members of the U.S. Climate Alliance, which centers collaborative work around 12 key priorities, including "*Natural and Working Lands,*" which offers up state Forest Action Plans as a solution for maintaining forest resilience in a changing climate.

Through NASF, state foresters are actively engaged with America's only forest sector coalition working to advance climate change solutions: the Forest Climate Working Group (FCWG). The FCWG provides policy makers with innovative, science-based ways to leverage forests and forest products as natural climate solutions.

Enhancing Forest Resilience and the Role of Forests in Addressing Climate Change

Eighty percent of Americans say the government should be actively working to mitigate the effects of climate change.[1] Increasing carbon storage and decreasing the use of fossil fuels are key to that endeavor. Forests and forest products are uniquely positioned to do both. In this testimony, NASF will highlight state foresters' efforts to address climate change, and recommend several changes to federal policy and funding priorities that would improve the capacity of America's forests to sequester carbon, produce renewable fuels and forest products, and mitigate the effects of climate change.

[1] Poll released by ABC News, Stanford University and Resources for the Future on July 16, 2018

Though there is no clear political consensus around the issue of climate change, the scientific basis for this phenomenon is well established.[2] The effects are already being felt and projected to be more impactful in the future.[3] They include glacial melting around the globe, rising sea levels, and significant deviations from historic weather patterns. Increasing carbon storage and decreasing the use of fossil fuels are widely touted solutions to the effects of climate change.[4]

It is estimated that total forest carbon storage in the U.S. (including wood products) is 58.7 billion tons.[5] Each year, forests and harvested forest products capture between 600 and 700 million tons of greenhouse gas equivalents, offsetting roughly 12% of U.S. annual greenhouse gas emissions.[6] However, since 1990 for a variety of reasons, the annual net increase of carbon in standing forests has declined by nearly 10%.

It is also important to note that a changing climate represents a threat to forest health. In some regions it increases the likelihood of sustained drought. In other areas, there have been more frequent, longer duration floods. Changing weather patterns can also introduce new pathogens and invasive species. More active management with a strong focus on forest resilience will be an ongoing need.

Wood products represent another source of stored carbon and have the potential to lessen fossil fuel consumption through substitution. In addition, increasing the utilization of wood bolsters markets for standing timber, in turn incentivizing landowners to retain and sustainably manage their woodlands.

Increasing Carbon Storage in Forests

The area of forested acres in the U.S. had been increasing for several decades, but has now leveled off and stands at over 800 million acres. Population growth has increased development and corresponding land conversion, but the greater threats to forests nationwide are poor management and health. From 1976 to 2016, the annual mortality of standing timber in the U.S. more than doubled due to over maturity and increases in wildfire, insect infestations, and disease.[7] Trees that are dead or declining rapidly, actually become carbon emitters.

---

[2] J. Cook, et al, "Consensus on consensus: a synthesis of consensus estimates on human-caused global warming," *Environmental Research Letters* Vol. 11 No. 4, (13 April 2016); DOI:10.1088/1748-9326/11/4/048002

[3] IPCC, 2018: Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty [Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.)].

[4] *An IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems – Summary for Policy Makers.* Intergovernmental Panel on Climate Change, 2020

[5] *Integrating forests and wood products in climate change strategies.* UN-FAO Forestry Paper 177, 2016

[6] *EPA Inventory of US Greenhouse Gas Emissions and Sinks;* Chapter 6. EPA 430-R-20-002

[7] USFS General Technical Report WO-97 *Forest Resources of the United States*, 2017, by S. Oswalt, et al, March 2017

Active management of federal, state, and private forests is critical to creating and maintaining forests that are resilient to these threats and remain carbon solutions rather than carbon sources. Management strategies focused on resilience include promoting species and age class diversity, actively managing for optimal forest health, and creating or retaining suitable pathways for species migration.

Young, vigorously growing stands accumulate carbon more rapidly than older stands. For example, in a typical maple/beech/birch forest, a stand can add over 2 metric tons per hectare per year between the ages of 15 and 35 years. Older stands of all forest types are responsible for accumulating and retaining a substantial volume of carbon and are an important element in diverse landscapes, but in a typical maple/beech/birch forest, for instance, trees over 95 years of age will add less than an additional 1 ton per hectare per year.[8] Net accumulation of carbon in forests should be evaluated at the right spatial and temporal scale, as stored carbon can increase within a management regime that includes harvest.

To optimize the accumulation of forest carbon and improve forest resilience in the face of increasing threats, greater federal funding for focused state-federal cooperative programs is imperative. These programs serve to both improve the condition of forests and make wood available for forest product utilization. Readily available raw material promotes the presence of forest industry. At the same time, the markets these industries provide encourage landowners to maintain and manage their woodlands.

Increasing Carbon Storage in Forest Products

The U.S. produces over 100 million cubic meters of lumber, plywood, and oriented strand board per year.[9] A cubic meter of wood contains about 1 ton of carbon dioxide.[10] Despite the 2020 coronavirus pandemic, annual housing starts are projected to increase from about 1.4 million to over 2 million by 2028.[11] A typical 2,400 square foot home stores roughly 28 ½ tons of carbon dioxide.[12] In addition, life cycle assessments have shown that greenhouse gas emissions from the manufacture of wood products can be less than that of concrete or steel.

Keeping private forests working is essential to securing the economic, environmental, and social benefits trees provide to society at large. **In order to retain and properly care for their forests, landowners need sources of revenue.**

Markets for wood provide that source of revenue and are critical to maintaining the health and sustainability of forests in the U.S. They enable the sustainable, carefully planned harvest of trees to optimize stand density and create age class and species diversity – characteristics that are

[8] USFS General Technical Report NE-343. *Methods for Calculating Forest Ecosystem and Harvested Carbon with Standard Estimates for Forest Types of the United States*, by Smith et al, April 2006
[9] USFS Research Note FPL-RN-0348 *US Forest Products Annual Market Review and Prospects, 2013-2017*, J. Howard, et al, July 2017
[10] Wood construction battles climate change through carbon storage. News Release, Metsawood, 2015
[11] Construction and Housing Starts Outlook for 2019 to 2028. National Association of Realtors. May, 2019
[12] Wood Products and Carbon Sequestration. Sustainable Building Series #6. Canadian Wood Council @ www.cwc.ca

critically important to enhancing wildlife habitat, forest resilience, and balanced harvest cycles. Timber harvest transfers carbon off the forest ecosystem and stores it in wood products like lumber. Residues from harvested wood can be used as an energy source like wood pellets. With good, scientific based forest management, the forest remains forest—it recovers and regrows—resulting in the uptake of carbon from the atmosphere once again. When we use wood products or bioenergy in place of fossil fuels, we avoid the permanent release of fossil fuel-based carbon into the atmosphere, also known as the substitution effect.

Benefitting economically from forests does not diminish the environmental and social value of forests; in fact, it is key to supporting the delivery of environmental and social benefits. **The readily available raw material that sustains the forest industry is produced by landowners who maintain and manage their woodlands in perpetuity.**

Within this view, NASF also believes that the institutions and enterprises that provide forest management expertise are equally critical to ensuring sustainability. Wood should be harvested in a carefully planned manner using best management practices that embody sound science, represent community values, continue to provide important environmental benefits, and reflect responsible economics. Research and teaching institutions, private landowners, natural resource agencies, consulting foresters, forest owning/managing businesses, natural resource related non-profits, and certification bodies all play an important role that must evolve and grow as demand for wood may well increase when new uses emerge.

The complexity of America's forest resources and patterns of land ownership require flexible, state-defined approaches to forest-based solutions that achieve national outcomes. State forestry best management practices are a shining example of state-based solutions achieving national outcomes for water quality.

Addressing Climate Change on Private Lands

State forestry agencies employ roughly 7,850 trained foresters and provide more than 270,000 technical assists to private landowners annually. The Forest Service State and Private Forestry (S&PF) mission area provides vital support to deliver these services, which contribute to the socioeconomic and environmental health of rural and urban areas. S&PF programs provide a significant return on the federal investment by leveraging the boots-on-the-ground and financial resources of state agencies to deliver assistance to forest landowners, tribes, and communities. However, private landowners face barriers – including unforeseen costs and insufficient technical assistance – that can prevent them from taking necessary management action. As population growth and urbanization increase nationwide, private forest lands are threatened by land use conversion and development. Now more than ever, it is critical that we maintain our privately owned forest lands in a condition that supports the health, prosperity, security, and well-being of all Americans. **An extremely effective tool for encouraging private forest landowners to voluntarily adopt forestry practices that address climate change is through technical assistance that equips landowners with the unbiased, science-based information they need to sustainably manage their forests now and into the future. The best way to provide for**

increased technical assistance to landowners is by increasing funding and support for the programs that accomplish this work.

Addressing Climate Change in Urban and Community Forests

The S&PF Urban and Community Forestry Program is delivered in close partnership with state foresters and leverages existing local efforts that have helped thousands of communities and towns manage, maintain, and improve canopy cover and green spaces.

Urban forests are important climate solutions and are proven to be effective at achieving energy savings, improved air quality, neighborhood stability, aesthetic value, reduced noise and urban heat island effect, and improved quality of life in municipalities and communities around the country.

Urban trees and forests provide a wide array of social, economic, and environmental benefits to people living in urban areas. Today, more than 83 percent of the nation's population lives in urban areas; yet, urban and community forests face serious threats, such as development and urbanization, invasive pests and diseases, and wildfire in the wildland urban interface (WUI). Trees in cities and towns not only sequester carbon, they also reduce energy consumption. Studies suggest that urban and community tree resources can save up to $5.4 billion annually in energy costs.[13]

The Role of Active Management: Economic, Environmental, and Social Benefits to Society

Approximately one-third – or nearly 800 million acres – of the U.S. is forested. Of those acres, 56% are privately owned. More precisely, 38% (299 million acres) of privately owned forested acres are owned by families or individuals and 18% (149 million acres) are owned by larger timber-owning/managing businesses. Of the remaining forested acreage in the U.S., 33% (265 million acres) is held in public trust by the federal government and 11% (87 million acres) is owned by state or local governments.[14]

Of the estimated 12 to 13 billion cubic feet of wood removed from U.S. forests annually, 90% is derived from privately owned lands[15], most of which (57%) are owned by families or individuals.[16] The total volume of removed wood peaked nearly four decades ago in 1986 at nearly 20 billion cubic feet, while the standing volume of timber in the U.S. continues to increase: since the 1950s, total volumes have grown by over 50%.[17]

---

[13] USFS General Technical Report WO-97 *Forest Resources of the United States, 2017*, by S. Oswalt, et al, March 2017

[14] *Research Supporting the Loss of Family Forests Across the United States: Section II*, Butler et al, Family Forest Research Center, May 2014

[15] *Forest Resources of the United States, 2012: A Technical Document Supporting the Forest Service Update of the 2010 RPA Assessment*. GTR WO-90, October 2014. S Oswalt, et. al.

[16] Estimated from personal correspondence provided by Dr. Brett Butler, US Forest Service Family Forest Research Center. January 2016

[17] 2012 RPA Board Foot Tables, US Forest Service.

Standing volumes increase as trees grow from seedling to sapling to pole to sawtimber. With increases in volume often comes increases in stand density, which leads to greater competition for water and nutrients among trees within a given stand. Competition naturally thins a stand to some extent, but not enough to prevent overall tree growth from stagnating due to overcrowding. This over-crowded condition creates stress in a tree, making them more vulnerable to disease and pest infestation. Stands that are over-crowded or too densely stocked (or what foresters call "overstocked") also increase the likelihood of more destructive wildfires.

High standing timber volumes can create significant problems. From 2008 to 2012, 40 million acres of trees were killed by insects and diseases[18] exacerbated by overstocking. It is also projected that the total carbon sequestered in U.S. forests will begin to decline by 2040 due in part due to an increase in the relative age of standing timber.[19]

The quality and quantity of water resources are also affected by standing timber volumes. According to an American Forest Foundation report, 40% of the forested land in 11 western states most critical to protecting water supplies is at high risk of extreme wildfire due to insufficient management.[20] Additionally, where harvesting is limited, a stand's age class distribution becomes skewed toward mature timber, negatively impacting wildlife species that are dependent on early successional, brush-dominated, high sun exposure habitat created with harvest.

High standing timber volumes in U.S. forests also present opportunities. Timber in the U.S.is a critical natural resource that provides the nation with wood and paper products and directly supports over 3 million jobs.[21] It's estimated that 53% of the lower 48 states' drinking water originates from forests[22] and about 15% of the nation's annual carbon emissions are offset each year by the additional carbon stored in U.S. forests and wood products.[23] Recreational opportunities, wildlife habitat, and scenic landscapes are also important public benefits derived from forests.

Historically, natural forest disturbances like floods, high wind events, and lightning-caused fire have maintained forest stand densities and volumes at healthier levels. Human flood control has sharply curtailed the influence of water and human settlements have necessitated greater wildfire suppression. In lieu of natural disturbances, the best method available for controlling stand density and balancing age classes is careful and planned tree removal (or what foresters call "active management").

---

[18] USDA Forest Service. 2013. *Major Forest Insect and Disease Conditions in the United States – 2012*. FS-1023, Washington DC.
[19] USDA Forest Service. 2012. *Future of America's Forests and Rangelands – Forest Service 2010 Resources Planning Act Assessment*. GTR WO-87, Washington, DC.
[20] Western Water Threatened by Fire. American Forest Foundation. 2016
[21] Forest Resources of the US – 2007, Smith et al, GTR WO-78
[22] Private Forests, Housing Growth and America's Water Supply: A Report from the Forests on the Edge, Forests to Faucet Project. RMRS-GTR-327, September 2014. M. Mockrin et. al.
[23] US Environmental Protection Agency. 2013. *Inventory of US greenhouse gas emissions and sinks: 1990 – 2011*. EPA 430-R-13- 001, Washington, DC.

The Value of Commercial Harvest: Strong Timber Markets Create Opportunities

According to the research, landowners equipped with trusted forestry advice are 13% to 17% more likely to harvest timber. And landowners who have harvested timber are more likely to have improved wildlife habitat on their land.[24]

Commercial harvests make long-term forest sustainability possible. Strong timber markets create opportunities for landowners, public and private, to provide the economic, environmental, and social benefits that we all depend on.[25] Yet, their desired outcomes – wildlife habitat, forest health, tree species diversity, wildfire risk reduction – are often best accomplished through tree removal. Where tree removal generates revenue, more of these activities can be accomplished.

Businesses owning timberland want to realize a competitive rate of return on their investment. Diverse, robust markets are an absolute necessity for achieving this objective. Where competitive returns are not achievable, there is pressure for those lands to be converted to other uses. Virtually all of the largest landowners are certified to either the Sustainable Forestry Initiative standard or the Forest Stewardship Council standard. Both certification programs require land management activities that provide for environmental protections and social accountability.

NASF supports federal budget and policy changes that accelerate the scope and scale of active management on federal lands in order to restore forest health, reduce wildfire risk, and enhance contributions to local economies. Even though there is broad support for greater active management, federal land managers in some regions are challenged by a lack of markets.

Without markets, commercial harvests are not feasible. Markets for biomass (woody material that needs to be removed from forests, but is not marketable timber) have always been lacking, but increasingly, markets for timber harvested from public lands are also becoming more scarce. This greatly limits the extent to which active management can be implemented since most forest management activities generate costs that require revenue to offset.

Emerging Markets: Opportunities for Sustainable Commercial Harvests

Emerging markets for wood can serve to complement traditional forest products, thus expanding wood demand and offering landowners more opportunities for active management through commercial harvests. Following are brief descriptions of several promising new uses for wood that have the potential to ultimately result in the improved management of the nation's forests. Demand for these new products is driven by a number of factors that likely will become even more prominent in the future. These include:

- Subsidized power production in Europe where government policy is focused on eliminating coal-fired operations over a period of time.

[24] Evaluation of the Effectiveness and Reach of the Educational Programs and Technical Assistance Activities of the U.S. Forest Service, Forest Stewardship Program. Technical Report. June 2013. B Butler et. al.
[25] Family Forest Ownerships of the United States, 2013: Findings from the USDA Forest Service National Woodland Owner's Survey. Journal of Forestry. 2016. B Butler et. al.

- Environmental concerns over the longevity of plastics and their continued accumulation in oceans and landfills.
- A desire for building materials that effectively sequester carbon and often generate a smaller carbon footprint during manufacture and use.
- Desires to reduce dependence on fossil fuels in favor of renewable sources to meet transportation needs.

Wood Pellets Production

The production of densified wood pellets, particularly for energy generation, has grown dramatically in response to public policy objectives to lower dependence on fossil fuels. A small percentage of pellets are used for wood fired heating. Currently there are 87 operating manufacturing facilities in the U.S. with more under construction. Annual production capacity is just short of 12 million tons. In February of 2018, facilities purchased about 1 million tons of feed stock. About 18% of the feedstock would be characterized as pulpwood or roundwood and the remaining represented some form of residual material, like sawdust from a sawmill. About 80% of the pellet production is exported.[26]

Theoretically, if feedstock purchases were in the neighborhood of 15 million tons per year that would be the equivalent wood usage of approximately 10 large capacity papermills. Unfortunately, between 2005 and 2012, the U.S. lost 15 pulp mills.[27]

Cellulosic Biofuels

The U.S. uses over 133 billion gallons of gasoline, 42 billion gallons of diesel, and 22 billion gallons of jet fuel every year. Though gasoline consumption is expected to decline over time because of the increasing presence of electric vehicles, the demand for jet fuel is expected to increase and the demand for diesel is projected to remain consistent because of its use in trains and large vehicles. It has been estimated that 1 billion tons of sustainably grown biomass could produce enough fuel to replace 25% to 30% of U.S. demand.

Currently, cellulosic biomass feedstock costs outcompete average crude oil costs, but refining costs are substantially higher. As a result, there are only a limited number of operational facilities that can economically refine cellulose, hemicellulose, and lignin into fuel. It is presumed at this point that successful wood-based processes will focus on jet fuels and the incidental production of marketable by-product chemicals.[28]

Biochar

A by-product from the production of biofuels manufactured through pyrolysis, biochar is a very fine charcoal-like material used to improve soil characteristics. Pyrolysis involves heating wood to extremely high temperatures without oxygen, (as the presence of oxygen would cause wood to burn) converting it into mostly pure carbon. The best biochar is produced at temperatures above

[26] Monthly Densified Biomass Fuels Report. U.S. Energy Information Administration. May 2018
[27] The Forestry Source. Society of American Foresters. Smith & Guldin. January 2012
[28] Presentation by Josh Schaidle, National Renewable Energy Laboratory, to NASF. February 2017

350 degrees centigrade. As a soil amendment, it lowers acidity and tightly binds undesirable metals so that they are not taken up by plants or leached from the soil. It can also increase soil porosity in tight clays or reduce porosity in soils that drain too quickly, such as sand, and creates a favorable medium for the production of micro-organisms that are beneficial to trees.

Importantly, biochar is principally carbon that is near permanently stored. As such its greatest potential may be its use for long-term carbon sequestration.[29] Because biochar is nearly pure carbon, micro-organisms in soil aren't able to break it down further. On the other hand, wood or some other organic material incorporated into soil would be broken down by micro-organisms into other compounds, including carbon dioxide, which can be released back into the air.

Where readily available, biochar has developed market value. Reclamation of oil drilling sites and as a soil amendment for high-value crop operations are common uses. Current research is focused on mobile kilns that can be used on site during management activities to utilize low value timber.[30]

Torrefaction

Torrefaction is also a pyrolysis process (conducted at lower temperatures than biochar) that makes wood into a product similar to coal. It is more practical than coal, however, in that it is easier to grind, simplifying storage and eliminating moisture uptake issues. Though the weight loss in the process is 30%, the energy loss is only 10%. Its energy profile is improved by the fact that torrefaction generates a combustible gas that can be recirculated back into the system and burned to provide heat.[31]

Torrefaction has the potential to produce a renewable source of fuel for gasification processes used to make biofuels. Analysis has shown that it could also be a more economical alternative for the densified pellet market in places where that market is still developing.[32]

Mass Timber

Mass timber is a category of mostly engineered wood building materials that can be used as floors, walls, ceilings, and beams. These products include LVL, Glulam, NailLam, Mass Plywood Panels (MPP) and cross-laminated timber (CLT). CLT is produced in large panels by assembling successive layers of boards perpendicular to one another. The result is a product that rivals steel in strength and fire resistance and is lighter in weight than concrete. As such, CLT and other mass timber products can replace concrete and steel in tall structures.[33] Additional benefits include carbon storage and reduced CO2 emissions during construction. Though more commonly produced and utilized in Europe since the late 1990s, it has recently gained traction in the U.S. wood products industry, with manufacturing facilities starting up across the country. Building

[29] Biochar: A Home Gardener's Primer. Washington State University Extension Fact Sheet FS147E
[30] Presentation by Darren McAvoy, Utah State Biomass Resources Group, to NASF. February 2017
[31] Biomass Technology Group website www.btgworld.com
[32] Renewable and Sustainable Energy Reviews. W. Chen et. al. Volume 44, pp847 – 866. February 2015
[33] Advanced Wood Products Manufacturing Study for Cross-laminated Timber Acceleration in Oregon and Southwest Washington. Pacific Northwest Manufacturing Partnership. 2017

codes across the U.S. have been updated (in 2015, 2018, and 2021) to allow for mass timber buildings taller than 85 feet.

While widespread use of mass timber is good news for timber producing regions of the country, it also promises some distinctive benefits for builders, communities, and the environment. Builders, pressured by persistent labor shortages, are finding a wider pool of workers able to safely install mass timber panels. They also report significant labor savings and more efficient and safe job sites. Construction times are reduced by "just-in-time" delivery to job sites and quick installation of panels.

Communities also experience less noise and dislocation during construction of mass timber buildings, and by avoiding the usual stockpile of dimension lumber on site, fire risks are reduced. The positive environmental attributes of mass timber buildings include a low energy intensity during manufacturing, superior energy efficiency in mass timber structures, and better management of a renewable resource.

Nanotechnology

There are two different categories of cellulose nanomaterials produced through different processes: cellulose nanocrystals and cellulose nanofibrils. The processes produce microscopically small particles that can be assembled into materials with highly desirable properties. They are lightweight, strong, stable, and stiff. Potential applications include use as a material in paint, coatings, adhesives, lightweight packaging, cell phone manufacturing, composites, and wound covering hydrogels.[34] Adding nanocrystals to concrete mixes can also reduce the volume of cement needed by 15% because of the final material's added strength.

NASF Policy Recommendations for Addressing Climate Change by Enhancing Carbon Sequestration in Forests and Forest Products

Forest management is more than carbon management. **Forest managers must consider a site's attributes and its potential for any number of co-benefits, including carbon sequestration, water filtration and absorption, clean air, wildlife habitat, recreational opportunities, and wood production.**

Particularly as market capacity grows for forest carbon, it is essential that reforestation and forest management efforts are recognized for what they are: comprehensive environmental solutions with tremendous promise for climate change mitigation and adaption. **Forest management should continue to strive for balanced species and age class diversity – which means a balance of old- and young-growth.**

Carbon in excess (for instance, when a forest is too densely stocked with trees) can increase the risk of catastrophic wildfire and pest infestations. **Reducing the utilization of forest thinnings, prescribed burns, and harvests in a bid to maintain standing carbon would also undermine**

[34] Cellulose Nanomaterials – A Path Towards Commercialization Workshop Report. USDA Forest Service. August 2014

forest markets (which are necessary to keeping forests working and as forests) and the well-being of local economies and schools supported by timber revenues.

Programs and emerging markets that promote even greater use of wood products not only increase carbon storage, they have the added benefit of bolstering markets for raw materials. Strong markets encourage the retention and sustainable management of forests and woodlands. Following are examples:

Forest Service, Forest Products Programs: The Forest Service supports several efforts that promote wood utilization. These include the **Forest Products Research Lab**, the **Wood Education and Research Center**, **Wood Innovation Grants**, and the **Mass Timber University Grant Program**. These are all valuable efforts that should be retained and built upon.

USDA National Institute of Food and Agriculture (NIFA): A number of universities around the country include forest products technical assistance within their extension programs. These are partially funded by NIFA under the **Renewable Resources Extension Act Program**. Continued funding of this program will also ensure that information gained through forest product research and development efforts is effectively transferred to end users.

Mass Timber Construction

Mass timber is a category of wood building materials that includes products like mass plywood panels (MPP) and cross-laminated timber (CLT). CLT rivals steel in strength and fire resistance and is lighter in weight than concrete.[35] Additional benefits include carbon storage and reduced CO2 emissions during construction.[36] Though the use of mass timber construction materials continues to grow, local building codes have not always kept up with the technology. Revisions to the **International Building Code (I-Code)** should change that, as I-Code has been adopted by all 50 states. If government purchasing policy favored mass timber construction, it could yield even greater carbon storage and greenhouse gas reduction benefits.

Increasing the Use of Forest Biomass for Energy

The mitigating effects of forest biomass energy on climate change hinge primarily on forest sustainability, which can be measured with a landscape-level analysis of net carbon sinks and emissions.[37] Biomass made from wood residues and low-quality standing timber is generally accepted as a "climate-friendly" fuel.[38] When forests that provide biomass for fuels are managed effectively over time they can be a sustainable form of renewable energy.[39] In the absence of nationwide policy that favors the use of renewable energy, some states have adopted their own,

[35] Advanced Wood Products Manufacturing Study for Cross-laminated Timber Acceleration in Oregon and Southwest Washington. Pacific Northwest Manufacturing Partnership. 2017
[36] Emerging Markets for Wood and Their Positive Impact on Forest Resource Management. NASF 2018-01
[37] Opportunities Ahead for Expanding Forests and Harnessing Bioenergy. A. Bartuska, D. Wear and R. Bonnie. Resources for the Future. March 11, 2020
[38] Is Energy from Woody Biomass Positive for the Climate? IEA Bioenergy. January 2018
[39] Forest Carbon Accounting Considerations in US Bioenergy Policy Reid A. Miner, et al, Journal of Forestry, November 2014

disparate standards. Without a federal renewable energy standard for woody biomass harvested from sustainably managed forests, markets for biomass will be slow to develop.

NASF Policy Recommendations for Responding to America's Wildfire Emergency: Accelerate Implementation of the National Cohesive Wildland Fire Management Strategy

Increase Active Forest Management

Substantial increases in active forest management and fuel treatments across all landscapes and ownership boundaries are needed in the areas at greatest risk for unwanted wildfire. Wildfires in the West may be top of mind, but managing wildfire is a national challenge. Without an increase in coordinated forest management, wildfires will continue to pose a threat to the nation's forests, destroy our cherished communities, and irrevocably alter American landscapes. The scale of wildfires and their community impacts far outpace current efforts to prevent them and mitigate the damage they cause. **Fire threats are best addressed by a holistic all-lands approach to wildfire response and proactive forest management across federal, state, and private lands.**

Fully Implement the Wildfire Funding Fix

In 2018, Congress passed the "wildfire funding fix" to end the practice of "fire borrowing" and to free up hundreds of millions of dollars to increase the pace and scale of restoration projects. Although the "wildfire funding fix" has been implemented with a new cap adjusted suppression and reserve account, additional funding for mitigating restoration work has not materialized in the Forest Service budget. The commonly held expectation was that additional Forest Service mitigation funding would flow into non-suppression programs such as Hazardous Fuels, State and Volunteer Fire Assistance, and S&PF programs, like Forest Health and Forest Stewardship, all of which experienced severe budget shortfalls due to "fire borrowing." **Building a plan for full implementation of the "wildfire funding fix" will be a critical first step in addressing the wildfire emergency.**

Commit to Sustained Investment in Wildfire Mitigation

Wildfires in America are an emergency and should be treated like one. Funding the normal budget line items of the Forest Service and the Department of the Interior each year will not solve – and has not solved – the problem. An off-budget solution that provides reliable funding each year to the Forest Service, the Department to the Interior, and state forestry agencies for the implementation of the highest priority risk-reduction projects is essential to fighting wildfires before they start. **Increased collaboration between federal and state agencies, non-government organizations, local communities, and private landowners – bolstered by a sustained and unprecedented federal investment over the next ten years – is needed to make the difference.**

Build Capacity to Support Cohesive Strategy Partners

Collaboration and coordination have already increased as a result of strong partnerships between state forestry agencies, the Forest Service, and conservation partners, but additional resources are needed to truly push this work forward at the pace and scale necessary to protect Americans and their communities. Building workforce capacity in federal and state agencies, as well as among partner organizations, will need to be a key focus going forward. Making these significant investments in state forestry agencies to support wildfire mitigation projects will not only reduce risk, but create jobs in rural America at a time when they're needed most. In revising their Forest Action Plans, states have used the most up-to-date information to identify priority areas for this work. **The need and priority planning are there; the last pieces of this puzzle are the dollars to get the work completed.**

Increase Support for S&PF Wildfire Programs

Increased support for the State Fire Assistance and Volunteer Fire Assistance (SFA/VFA) programs has proven to significantly increase the amount of hazardous fuels acres treated and improve wildfire response capacity for state, local, and volunteer departments across the country. Attacking fires when they are small is the key to reducing fatalities, injuries, loss of homes, and cutting federal fire-fighting costs. **Bolstering support for both of these key programs should be included as part of any national strategy.**

Empower the Wildland Fire Leadership Council to Convene Cohesive Strategy Partners

The Wildland Fire Leadership Council (WFLC) should serve as the convening body for the broad group of partners vital to the National Cohesive Wildfire Management Strategy's (Cohesive Strategy) success. Convened by WFLC, these partners can explore increasing the capacity and involvement of non-governmental organizations and building a larger coalition to support this work at the national scale. Wildfire management is inherently a partnership effort between federal, state, local, and volunteer agencies and departments.

Increase the Use of Prescribed Fire

There is an immediate need for the return of low intensity fire to our landscapes. The appropriate use of prescribed fire makes our forests and communities more resilient to natural and necessary fire cycles. Increasing the use of prescribed burning depends on partnerships among the U.S. and state environmental protection agencies and a shared understanding that small smoke emissions from prescribed fire pose less risk to human health than mega-emissions from uncontrolled wildfire. **The National Prescribed Fire Act offers a legislative solution to increase the use of prescribed fire.**

Increase the Pace and Scale of Cross-boundary Work

Additional funding for Good Neighbor Authority (GNA) projects is needed to support improved federal forest health. GNA projects are proven to increase the pace and scale of critical forest treatments, support cross-boundary projects and coordination, and provide job opportunities for rural communities. State forestry agencies could hire temporary employees to conduct GNA work that benefits federal lands without supplanting vacant Forest Service positions.

NASF Policy Recommendations for Placing Greater Emphasis on Climate Change in Federal Program Implementation

Tree Planting, Reforestation, and Afforestation on Public and Private Lands

When especially damaging disturbance events interrupt a forest's natural cycle—as in the case of uncharacteristically severe wildfire wiping out entire stands and the seed source—tree planting may be important to boost the forests' regrowth. As of 2019, the Forest Service identified about 1.3 million acres of national forests where planting trees and encouraging natural regeneration are needed. High-severity wildfires contributed to roughly 80 percent of these acres. Currently, there is more than a 20-year backlog of National Forest System lands in need of reforestation treatments. This inability of a forest to naturally recover challenges our efforts to maintain a whole suite of benefits that forests provide, including carbon storage.

Nearly all federal programs available to forest landowners support tree planting, but greater funding priority should be given to tree planting activities given the carbon sequestration potential of young trees. Forests in the U.S. sequester between 600 and 700 million metric tons of greenhouse gas equivalents every year, but one analysis showed that an additional 50 million tons per year could be mitigated by reforesting approximately 8 million acres.[40]

Depending on the forest type, reforestation requires anywhere from 300 to 800 seedlings per acre. At an average of 500 seedlings per acre, planting 8 million acres would require 4 billion seedlings.[41] **State-owned tree nurseries would have to increase their annual production of seedlings by 400% over ten years to produce 4 billion seedlings**. **USDA should establish long term seedling purchase agreements with state-owned tree nurseries to meet reforestation needs.**

Private nurseries could certainly help, but they are typically growing for contracts with planting dates two years into the future. **A substantial increase in tree planting would necessitate careful planning (including climate change informed species selection), advance notice, and funding assistance.**

---

40 *Potential for Additional Carbon Sequestration Through Regeneration of Non-Stocked Forest Land in the United States,* V.A. Sample, Journal of Forestry, December, 2016.
41 *National Survey of State Operated Tree Seedling Nurseries and Tree Improvement Programs,* National Association of State Foresters.

Forest Service Research and Development (R&D)

Managing a forest is a long-term endeavor that benefits from an understanding of how forest ecosystems function in order to satisfy diverse societal needs. Understanding the role that forests and forest products play in carbon sequestration and emission is critical to the advancement of climate change policy. This includes data generated by the Forest Inventory and Analysis Program, research on forest threats and tree growth, development of more efficient remote sensing techniques, and research on new and emerging wood products, including biofuels. Budgets for these efforts need to remain a priority.

Strengthen the Forest Inventory and Analysis (FIA) Program (FCWG Policy Platform)

The FIA program is the only source of forest data and analysis that is national in scope. It informs decision-making in the forestry sector, shapes wildfire protection strategies, serves as the basis for assessing urban tree canopy, and helps land managers analyze the effects of forest fragmentation on economies and ecosystems. Increasingly, FIA is relied on to provide data on the state of the nation's largest carbon sink – our forests – making it an essential component of decision-making for climate change mitigation and adaptation strategy. However, the demands for information on forest carbon are becoming more varied and at scales that outstrip the current funding-constrained capabilities of the program.

State forestry agencies contribute over $5 million annually to FIA implementation and look forward to serving as key implementing partners in the necessary growth and expansion of the program.

Strengthen the Role of Resources Planning Act (RPA) Assessments

RPA Assessments and supporting technical reports produced by the Forest Service RPA research team constitute a trove of valuable scientific information presently underutilized by stakeholders interested in forests, carbon, and climate. Additionally, stakeholder engagement with the RPA Assessments has been lacking in recent years. In order to enhance utilization and strengthen the applicability of RPA Assessments in policy making, NASF recommends Forest Service leadership prioritize engagement with external stakeholders to help direct more timely and responsive RPA research efforts on forest carbon projections and respond to specific policy-relevant questions from interested stakeholders. An additional $3.5 million to the Forest Service Research and Development mission area would further accelerate forest carbon-related research and capacity for carbon modeling.

Forest Stewardship Program (FSP)

FSP is the most extensive family forest-owner assistance program in the country and is delivered in partnership with state forestry agencies, cooperative extension services, certified foresters, conservation districts, and other partners. FSP equips private forest landowners with the unbiased,

science-based information they need to sustainably manage their forests now and into the future, helping to keep forests as forests. In addition to delivering technical assistance directly to forestland owners, the FSP often serves as a gateway to other landowner cost-share assistance programming, like the USDA Environmental Quality Incentives Program, state programs, and partner programs, that can help landowners keep their forests working and intact.

Today, there are nearly 24 million acres nationwide managed with Forest Stewardship Plans. From 2019 to 2020, the total acreage covered by current Forest Stewardship Plans increased by nearly half a million acres. Forest Stewardship Plans provide guidance for family forest landowners to keep their land healthy and productive and often serve as management roadmaps for several generations. Forestland owners that have management plans are almost three times more likely to meet their management objectives compared to those without management plans. The FSP helps landowners to reach their management objectives while tying those objectives to the state's Forest Action Plan. Increased federal funding for FSP will allow state forestry agencies to ramp up outreach efforts and provide additional technical assistance to landowners to ensure that private forestland acres are maintained.

Providing private non-industrial landowners with technical assistance is at the core of most state forestry assistance programs and FSP offers a supplemental funding source for this function. Over 10 million non-industrial landowners control 38% of the country's forests and woodlands, yet only a small portion of these currently access technical and financial services through state and federal agencies or other partners. This suggests that most of these lands are not actively managed to maintain health and vigor and are more prone to over maturity, and thus their carbon benefits are not being maximized. **Being able to put more technical assistance on the ground through the nationwide network of state agency foresters is a long-standing need that increased FSP funding could help meet.**

Forest Legacy Program (FLP)

With the Great American Outdoors Act (GAOA) signed into law, the Land and Water Conservation Fund (LWCF) will receive permanent annual funding at the full authorized level, nearly doubling historical appropriations for the LWCF. **FLP should receive increased funding levels commensurate with the increased funding provided to the LWCF by the GAOA.** This state-federal program has protected nearly 2.5 million acres of working forests through fee title or permanent easement acquisition. Increased priority should be placed on projects that can demonstrate an increase in carbon sequestration. **USDA Forest Service should increase funding to states to increase greatly needed capacity at the state level to administer the program which would increase project implementation and program success.**

Environmental Quality Incentives Program (EQIP)

EQIP helps landowners pay for conservation practices, such as tree planting and timber stand improvement, which both serve to increase carbon sequestration. Importantly, the program also pays for prescribed fire, which helps manage forest resources for greater resilience. EQIP dollars

allocated to forestry practices in 2019 amounted to about $133 million – just 10% of total EQIP funding in 2019. **If combatting the effects of climate change is a national priority, funding forestry practices within EQIP should play a larger role.**

Conservation Stewardship Program (CSP)

By acreage, CSP is the largest working lands conservation program in the country. It provides landowners a yearly payment for implementing enhanced conservation practices that go beyond basic conservation standards. Landowners must compete to enter the program and are more competitive if they implement a "bundle" of enhancement practices. Under current regulation, forest landowners only have one bundle option: a set of enhancements aimed at improved wildlife habitat. Enhancement E612A involves converting cropland to trees for water quality protection. This practice would also increase carbon sequestration, but with the greatest volumes being sequestered 10 years following planting. **A new bundle of enhancements should include contract extensions for tree planting and optimal carbon uptake in standing timber. This bundle could be constructed to also improve water quality and wildlife habitat.**

Conservation Reserve Program (CRP)

CRP offers an annual payment to landowners who take highly erodible lands out of agricultural production. Various land cover types, including forested acreage, are eligible for the program. The 2018 Farm Bill increased the overall cap on program acres, but sign-ups have not reached that upper level. The ranking criteria for "General Sign-up" include air quality improvement, but do not mention carbon sequestration explicitly. **Greater carbon storage could be achieved by increasing the CRP acreage cap, increasing rental payments, placing greater priority on tree planting, and revising current restrictions that discourage the planting and maintenance of tree cover.**

Regional Conservation Partnership Program (RCPP)

RCPP funds a wide diversity of partner-implemented projects. The 2018 Farm Bill gave RCPP a large boost in permanent funding, but as with most NRCS programs, carbon sequestration is not among the "critical conservation concerns" that receive priority funding. **Carbon sequestration needs to be made a clear program objective.**

Agricultural Conservation Easement Program (ACEP)

ACEP has an annual mandatory funding allocation of $450 million. The program's purpose is to maintain wetlands and agricultural lands through the purchase of easements from willing landowners. NRCS will pay up to 50% of the fair market value of the easement. NRCS can pay up to 75% where the lands include grasslands of special environmental significance. Lands do not qualify if they are over two-thirds forested. ACEP was intended to combine and take the place of

several past NRCS easement programs. Unfortunately, the Healthy Forests Reserve Program (HFRP) was not one of those. **Revisions that would capture the authorities of HFRP and eliminate the limitation on forested acreage would better serve climate change objectives.**

NRCS Healthy Forests Reserve Program (HFRP)

The HFRP helps landowners restore, enhance, and protect forestland resources on private lands through easements and financial assistance. The program aims to aid in the recovery of endangered and threatened species, improve plant and animal biodiversity, and enhance carbon sequestration. Originally authorized in the Healthy Forest Restoration Act of 2003, HFRP is authorized to pay landowners up to 100% of the fair market value of the easement.

HFRP provided landowners with 10-year restoration agreements and 30-year or permanent easements for specific conservation actions. Permanent funding was eliminated in 2014 and the last allocation was made in 2016. Though the Regional Conservation Partnership Program has been using HFRP authorities for some projects, it is unclear whether that will continue based on 2018 Farm Bill language. Reviving this program would give landowners the ability to capture the value of carbon sequestered in actively managed forests. As part of the Conservation Title, HFRP should be enhanced with substantial mandatory funding to serve as the leading national program for forest conservation easements.

Conclusion

State foresters have important roles to play in addressing climate change.

One role is advocating for the inclusion of forests, active forest management, and forest products in federal climate change policy and programming. Unlike other agricultural activities that many federal programs support, forestry is a long-term endeavor with long-lasting carbon benefits.

There are many existing federal programs that could enhance the role of forests as carbon sinks given additional funding and higher prioritization. These programs serve to increase carbon storage by improving the condition of our forests, expanding forest footprints, and making wood available for forest product utilization. Forest products also have value as carbon sinks and have demonstrative climate benefits when compared to other construction materials and energy sources.

Markets for wood are critical to maintaining the health and sustainability of forests in the U.S. They enable the economic, carefully planned harvest of trees to control stand density and create forests that have a more balanced diversity of age classes, which is important to wildlife habitat diversity, forest resilience and providing a more even flow of sustainable wood fiber for harvesting. As harvest levels continue to decline nationally, and high volumes of standing timber pose forest health problems, it is important to support the research and development of emerging wood markets and institutions that support science-based sustainable management.

Another role, central to their agencies' missions, is being active stewards of America's forests. The efficacy of forests, forest products, and woody biomass in addressing climate change depends on forest sustainability. Without active management, forests are less resilient to climate change and less effective at sequestering carbon.

Addendum

The following legislative proposals address climate change and are supported by NASF:

The REPLANT Act

i. Removes the current $30 million funding cap and directs all wood product tariffs to refill the Reforestation Trust Fund – which would quadruple the amount of available funding to $123 million per year on average. The bill only uses funds that are already being collected – it does not change the list of products, increase the tariffs, or use taxpayer funds.

ii. The bill also directs the Forest Service to develop a 10-year plan and cost estimate to address the backlog of replanting needs on national forest land by 2031. It also prioritizes land in need of reforestation due to natural disasters that are unlikely to naturally regrow on their own.

The Growing Climate Solutions Act

i. Establish a certification program at USDA to help solve technical entry barriers to farmer and forest landowner participation in carbon credit markets.

ii. Establishes A Greenhouse Gas Technical Assistance Provider and Third-Party Verifier Certification Program through which USDA will be able to provide transparency, legitimacy, and informal endorsement of third-party verifiers and technical service providers that help private landowners generate carbon credits through a variety of agriculture and forestry related practices. The USDA certification program will ensure that these assistance providers have agriculture and forestry expertise, which is lacking in the current marketplace.

NASF Recommendation: Include state forestry agencies as officially recognized by USDA to serve as third party verifiers.

The Rural Forests Markets Act

i. Establish the Rural Forest Market Investment Program that offers guaranteed loans up to $150 million (total for the fund, not each loan) for nonprofits and companies to help small and family forest owners create and sell forest credits for storing carbon or providing other environmental benefits.

ii. Provide a climate solution by encouraging forestland owners to adopt voluntary land management practices that draw carbon out of the air and stores it in forests.

iii. Create new revenue streams for small-scale, family forest owners by making it possible to generate innovative credits they can sell in established environmental marketplaces.

iv. Invest in rural communities by reducing the financial risk to private investors who can contribute the upfront financing that makes these projects possible.

NASF Recommendation: Include state forestry agencies as eligible entities to receive these loans.

The Trillion Trees and Natural Carbon Storage Act

i. Creates the International Forest Foundation, a nonprofit organization, to encourage and accept donations in support of international reforestation, restoration, and deforestation prevention efforts.

ii. Authorizes $10 million for USDA Forest Nursery Revival programs to ensure that the supply of seeds and saplings allows for increased domestic planting.

iii. Engages America's allies in conservation by authorizing the Secretary of State and USAID to increase their forest management cooperation efforts with other nations in order to better promote reforestation and sustainable land use management abroad.

iv. Amends existing international conservation programs to explicitly include carbon sequestration and forest management among the list of approved technical assistance categories.

x. Makes it easier for private landowners to participate in carbon credit markets by authorizing USDA to provide loan guarantees for related projects.

xi. Requires that USDA establish objectives for increasing the net carbon stock of American forests, grasslands, wetlands, and coastal blue carbon habitats.

The Outdoor Restoration Partnerships Act

i. Establish an Outdoor Restoration Fund to dramatically increase support for local collaborative efforts to restore forests and watersheds, reduce wildfire risk, clean up public lands, enhance wildlife habitat, remove invasive species, and expand outdoor access. The bill establishes an advisory council of local leaders, industry, and national experts to administer grants, coordinate with existing regional efforts, and provide oversight.

ii. Empower local leaders by making $20 billion directly available to state and local governments, tribes, special districts, and non-profits to hire individuals who can plan, implement, and monitor restoration and resilience projects. Empowering local leaders that have an ability to bring diverse voices to the table is the path for progress in the West.

iii. Partner with states to invest $40 billion in restoration and resilience projects across public and private land, in coordination with governors. This partnership will ensure that federal agencies are willing and able to support state and local efforts to reduce wildfire risk, restore watersheds, and improve wildlife habitat. Tackling the backlog of restoration and resilience projects across the country will sustain our economy and way of life.

Addendum to the Written Testimony of the National Association of State Foresters (NASF)
Joe Fox, Arkansas State Forester and NASF President
Submitted to the Senate Committee on Agriculture, Nutrition and Forestry
Hearing on "Federal, State, and Private Forestlands: Opportunities for Addressing Climate Change" May 20th, 2021

Statement from the National Association of State Foresters
June 11, 2021

The National Association of State Foresters seeks to correct a factual error delivered by our President, Joe Fox in an exchange with Senator Boozman during the above-mentioned hearing in the Senate Agriculture Committee.

The factual error we would like to address can be found on page 43 of the attached transcript of the hearing, lines 16-24.

Mr. Fox made the following comments in response to a question from Senator Boozman related to active management and carbon sequestration:

"But also the young trees, whether they are plantation trees or whether they are naturally regenerated, store more carbon than older trees."

"So all trees have a lifecycle, just like people do, and the older the tree, the less carbon is stored. So we need those variations, diversity of age classes, we need diversity of structure in the forest, for all those things. But young, vigorous, healthy forests store more carbon than any other kind of forest."

It is a factual error to state that younger trees store more carbon than older trees.

What Mr. Fox intended to convey was that young, vigorously growing stands accumulate carbon more rapidly than older stands. For example, in a typical maple/beech/birch forest, a stand can add over 2 metric tons per hectare per year between the ages of 15 and 35. Older stands of all forest types are responsible for accumulating and retaining a substantial volume of carbon and are an important element in diverse landscapes, but in a typical maple/beech/birch forest, for instance, trees over 95 years of age will add less than an additional 1 ton per hectare per year.[1]

We thank you for the opportunity to submit this statement to correct the error and clarify the intention of the comment.

---

1 USFS General Technical Report NE-343. *Methods for Calculating Forest Ecosystem and Harvested Carbon with Standard Estimates for Forest Types of the United States,* by Smith et al, April 2006

Senate Committee on Agriculture, Nutrition and Forestry
Federal, State, and Private Forestlands: Opportunities for Addressing Climate Change

Thursday, May 20, 2021
Tony Cheng
Director, Colorado Forest Restoration Institute
Professor, Forest & Rangeland Stewardship
Colorado State University
Fort Collins, Colorado

Madam Chairman, Members of the Committee,

Thank you for the invitation to speak. My name is Tony Cheng. I am the director of the Colorado Forest Restoration Institute (CFRI) and a professor in the Department of Forest and Rangeland Stewardship, both located at Colorado State University (CSU).

CFRI is part of the Southwest Ecological Institutes authorized by Congress in 2004 (through the Southwest Forest Health and Wildfire Prevention Act (PL 108-317)) to develop, transfer, and apply locally-relevant science and science-based decision support to address forest restoration and wildfire risk mitigation across all land ownerships and management jurisdictions in the Interior West. We're one of many programs at CSU developing and applying science-based decision support systems to address climate change solutions for agriculture and natural resources, a highlight being the COMET project conducted with the US Department of Agriculture that helps farmers and ag land conservation specialists make informed management decisions.

Federal forests are part of a green infrastructure portfolio to mitigate climate change. Climate change is also impacting the climate-mitigation capacity these forests. Western federal forest in particular have a unique set of issues and vary greatly in the diversity of their ecology, and their linkages to western communities' social and economic well-being. I am here today to share a western perspective (and there are many), especially in the Rocky Mountain West where forests are being impacted by a succession of wildfires, insect outbreaks, and severe droughts.

My first point is that climate change is delivering a double blow to western US forests

Forests need disturbances to rejuvenate and sustain. However, increasing temperatures and more frequent droughts wrought by climate change have led to large-scale wildfires, insect outbreaks, and drought-induced die-offs in western federal forests over the past 20 years. Many western forests are experiencing what scientists call "compounding disturbances", where insect outbreaks, wildfires, and severe droughts are impacting an entire region's forests at the same time or in relatively short succession. When forests are lost, the carbon they store is released, exacerbating climatic changes.

Additionally, the pace of climate change may be outpacing forests' natural capacity to recover from disturbances. A growing body of scientific evidence is showing that, in many places, forests are not regenerating some 20 or more years after wildfires. This is due in part to the size and severity of wildfires, but also to climatic conditions no longer conducive to trees being able to establish and grow after fires. Forest recovery could take centuries, if at all. In the meantime, this green infrastructure to mitigate climate change has been lost.

Second, there is a need and opportunity for strategic long-term investments in a portfolio of climate-forward forest management approaches

The work needed to make western forests more resilient to climate-induced disturbances involves a portfolio of actions that can take many years to accomplish. For example, in many western forest ecosystems, forest thinning is one part of a resilience strategy that also requires long-term maintenance through prescribed fire to reduce extreme fire behavior and restore fire as a natural process. Prescribed fire is also a critical tool to reducing the size and duration of future wildfires, but only if it is implemented at a sufficiently large scale. In many areas of the West, this program of work can take many years to achieve the scale needed to make an impact.

Multi-year funding programs such as the Collaborative Forest Landscape Restoration Program and Joint Chiefs program have made a difference in places receiving these funds. These national programs provided the stability and consistency needed for forest managers and their stakeholders to implement the portfolio of work needed at scale over many years. Both programs were critical to the success of projects CFRI has been involved, as Senator Bennet saw first hand the results of this work during his visit to the Cameron Peak Fire on May 7 (2021).

I want to acknowledge and credit the work of this committee to reauthorize the CFLR Program and members for advocating for doubling CFLRP funding in FY18. I encourage the Committee to formally authorize the Joint Chiefs Landscape Restoration Partnership Act that Senator Bennet and Senator Hoeven introduced earlier this month.

Additionally, re-starting federal forests that not regenerating after large severe fires or other disturbances is critical to mitigating climate change now and into the future. The non-profit organization, American Forests, estimates that 2 million acres of national forest in the US are in immediate need of reforestation. But this will require long-term investment to rebuild and sustain the supply chain from seed collection to tree nurseries to getting seedlings into the ground. The proposed REPLANT Act would provide the US Forest Service with the needed funds to plant well over a billion trees over the next decade. This scale of reforestation is essential not only to sequestering carbon, but providing clean water, recreation opportunities, wildlife habitat, and wood fiber, among many other values, into the future.

My third point is that sustaining federal forests as a form of green infrastructure needs robust, sustainable social infrastructure

Developing and implementing the portfolio of work needed to fortify our federal forests to climate change exceeds the capacity of any single entity. As such, across the West, representatives from government entities at all levels, community-based organizations, conservation groups, and private industry have been working collaboratively to craft portfolios of work informed by locally-relevant science, and tailored to their specific ecological and social contexts. Supporting the work of forest collaboratives is the core of what CFRI and the other SWERIs do. There is increasing research showing that this "front-end" collaboration can produce larger-scale projects and achieve higher efficiencies than projects without collaboration. Collaboration can therefore be regarded as a form of social infrastructure foundational to sustaining forests as green infrastructure.

While many federal policies and programs intended to resilify federal forests rely on multi-stakeholder collaborative processes, the cost of sustaining collaboration are not explicitly funded. Programs like CFLRP and Joint Chiefs dedicate funding for implementing so-called "shovel-ready" projects, but do not support the social infrastructure necessary to do the collaborative planning, analysis and decision-making necessary to get to shovel-ready in the first place.

Additionally, federal land agencies' own social infrastructure has been decimated by decades of divestment, competing mandates, misaligned incentives, and economic dislocations. As my CSU colleague Dr. Courtney Schultz and her colleagues have found in their research on policy barriers to prescribed fire, a key limiting factor to expanding the scope and scale of prescribed fire is human capital – simply having sufficient number of trained and qualified individuals to safely and effectively carry out the backlog of prescribed burns already planned.

The lack of investment in social infrastructure has not only affected federal land agencies, but also has also limited the long-term sustainability and effectiveness of community-based and non-governmental organizations that are the linchpins of collaboration. These entities are instrumental in facilitating science-informed 'zones of agreement', fostering community and public understanding and acceptance, and leveraging financial and technical resources to accomplish work across jurisdictions and land ownership boundaries. If the pipeline of climate-forward forest management on federal lands and adjacent landownerships is to expand, there needs to be substantial investments in these entities.

The proposed Outdoor Restoration Force Act would allow federal land agencies and their collaborative partners to make up significant ground. Both the Restoration and Resilience Grant Program and Partnership would provide foundational funds to shore up and strengthen needed social infrastructure and human resource capacity.

I want to thank the committee for inviting me to present at this hearing. I am happy to answer questions you may have.

QUESTIONS AND ANSWERS

MAY 20, 2021

Senate Committee on Agriculture, Nutrition, and Forestry
Federal, State, and Private Forestlands: Opportunities for Addressing Climate change
May 20, 2021
Questions for the Record
Ms. Kedren Dillard

Ranking Member John Boozman

1) The Intergovernmental Panel on Climate Change (IPCC) stated that: "in the long term, a sustainable forest management strategy aimed at maintaining or increasing forest carbon stocks, while producing an annual sustained yield of timber, fiber, or energy from the forest, will generate the largest sustained mitigation benefit."

    a. How do your organizations support our working forests and what role do you see forest manufacturers play in helping to ensure the viability of our working forests?

The Sustainable Forestry and African American Land Retention Program (SFLR) and the American Forest Foundation (AFF) work to empower African American forest owners, like my family and family forest owners more broadly, to manage their land for timber and other conservation impacts. This work by these organizations is done through many ways, one being through the Family Forest Carbon Program, developed by AFF and The Nature Conservancy (TNC), providing financial assistance to family landowners to cover the high upfront costs of forest management.

The Program supports forests manufacturers and promotes working forest solutions through climate-financed incentives that transition landowners to sustainable management. Increasing carbon in our forests is completely compatible with timber production and management of sustainably harvested tree stands. These activities increase the stand's carbon storing potential, maintaining the annual sustained yield of timber and fiber from our forests.

As a result of sustainable management, forest manufacturers have access to quality hardwoods and ample low-grade material across the landscape. Further, the overall landscape is restored, providing better wildlife habitat, water quality protection and places to recreate.

Encouraging and supporting family forest owners to take climate action will not only help the forest products industry, it will help conserve our nation's private lands for generations to come. More specifically, initiatives such as the Family Forest Carbon Program will help Black farmers participate in climate sustainability efforts while maintaining their land.

2) You may have heard about the Administration's tax proposal related to capital gains, like-kind exchanges and stepped-up basis. Many agricultural producers, foresters, and forestland

owners have expressed concerned about the potential implications, intended or otherwise, these proposals may have on their operations.

a. What is your response to any policy, tax or otherwise, that may incentivize forestland owners to either divest their property interest prematurely or take forestland out of production for a period of time that may exceed the life of the commodity?

The impact of tax proposals related to capital gains, like-kind exchanges and stepped-up basis, varies from landowner to landowner. However, we must support policies that encourage the maintenance of healthy forests and in doing so, we must create a favorable tax environment that encourages all family forest owners to afford long term management and keep the land in the family.

Senate Committee on Agriculture, Nutrition, and Forestry
Federal, State, and Private Forestlands: Opportunities for Addressing Climate change
May 20, 2021
Questions for the Record
Mr. Troy Harris

Ranking Member John Boozman

1) The Intergovernmental Panel on Climate Change (IPCC) stated that: "in the long term, a sustainable forest management strategy aimed at maintaining or increasing forest carbon stocks, while producing an annual sustained yield of timber, fiber, or energy from the forest, will generate the largest sustained mitigation benefit."

    a. How do your organizations support our working forests and what role do you see forest manufacturers play in helping to ensure the viability of our working forests?

    Forests mitigate the effects of climate change through sequestration and storage – both important, but two very different things.

    Growing trees in U.S. forests sequester a massive amount of carbon each year. In total, they pull over 1.5 billion metric tons of gross CO2e out of the atmosphere each year. In a ton-to-ton comparison, that is almost as much as the emissions generated from burning fossil fuels for electricity each year.

    In addition to their sequestration power, forests are the optimal land use for maximizing carbon storage. The amount of carbon stored in U.S. forests is massive. In total, our forests have locked away about 82 years' worth of transportation emissions.

    All forest types play a unique and essential role in actively sequestering carbon from the atmosphere. Private working forests are the largest carbon sink, accounting for 72% of the gross forest sequestration by U.S. forests. Private working forests sequester more carbon than is emitted by passenger vehicles each year.

    Private working forests are the largest forest carbon storage pool in the U.S. forest carbon landscape – they account for 54% of the total forest carbon storage pool.

    Yet, forests are only one part of the storage picture. When we cut a tree to produce lumber for a house or a building, half of that wood by weight is carbon. Each year, new wood products add about 100 million metric tons of CO_2e to the wood products storage pool. Today, all of the wood products out there – the vast majority in solid wood like lumber -- store about 9.7 gigatons

of CO_2e, which is more than double the carbon stored in all our nation's National Parks.

We don't have to choose between working forests and carbon benefits. Private working forests produce 90% of annual U.S. harvest volume while simultaneously providing 72% of annual carbon sequestration.

2) You may have heard about the Administration's tax proposal related to capital gains, like-kind exchanges and stepped-up basis. Many agricultural producers, foresters, and forestland owners have expressed concerned about the potential implications, intended or otherwise, these proposals may have on their operations.

    a. What is your response to any policy, tax or otherwise, that may incentivize forestland owners to either divest their property interest prematurely or take forestland out of production for a period of time that may exceed the life of the commodity?

    Markets are good for forests. Over the past 70 years, the market demand for forest products has grown, while volume of our standing inventory has increased by 50%. If we manage our forests responsibly, they can deliver.

    Growing timber is capital intensive, requiring significant investment in regular operating costs like road maintenance and forest health treatments that reduce the risk of wildfire. Research shows that the most significant threat to private working forests is conversion – when a landowner decides to use their land for something other than a forest, typically driven by economic pressures. Today we have too many trees and too few markets. The forest product markets today are an important signal to landowners that they will see a return on their long-term investment when their trees are ready to harvest. Robust, healthy forest products markets encourage landowners to continue to invest in their forests and prevent forest conversion.

    Some provisions in law, including some tax provisions, recognize landowners and investors for the long-term risk they are taking and provide a return on their long-term investment These provisions also recognize the unique and long-term contributions of the sector via co-benefits such as clean air, clean water, and wildlife habitat, as well as carbon sequestration and storage.

<u>Senator Amy Klobuchar</u>

1) Minnesota has been a national leader in building with mass timber, and we have over 17 million acres of forest. With Chairwoman Stabenow and a bipartisan group of Senators, I helped write the Timber Innovation Act, which was included in the 2018 Farm Bill. This Act has helped spur research and development of innovative wood products and create

opportunities for the use of those products, including mass timber, in the construction of tall wood buildings.

a. Based on your experience, where do we currently stand as a nation in terms of adoption of mass timber as a construction material? What additional actions can this Committee take to further incentivize the use of climate smart products like cross-laminated timber?

Mass timber is quickly entering the mainstream, and it can help us advance many of our climate objectives by harnessing the power of the marketplace for climate mitigation. Mass timber reduces our reliance on traditional, carbon-intensive building materials, which are responsible for up to 11% of global emissions. And because solid wood products like lumber store carbon for the long-term, we can turn buildings from a major source of carbon emissions into carbon vaults that lock away carbon long-term.

More than 1,000 mass timber buildings have been constructed or were in design across all 50 states as of December 2020, according to WoodWorks. The number of mass timber buildings could double every two years, according to the 2020 North American Mass Timber Report.

The market exists well beyond tall office buildings or housing. Think of everything in the built environment and infrastructure – airports, hospitals, military installations, schools, affordable housing – all are strong candidates for mass timber.

This committee can encourage more sustainably sourced wood construction in the built environment by first recognizing the carbon storage benefits of wood products like mass timber. The federal government can help set the tone by establishing standards for lower carbon building materials that would increase the use of mass timber. This would build on the Timber Innovation Act and the Tall Wood Building Prize, creating demand and helping architects and builders use the material.

The immediate opportunity is to think about how mass timber can be applied in an infrastructure package or in the Farm Bill. In Georgia, we can solve a lot of our infrastructure issues – in both rural and urban communities – with wood that is grown right here in Georgia.

b. How can we ensure that we are still achieving climate and other environmental outcomes while building with mass timber and presumably using more wood? What role, if any, should third-party certification programs play in climate smart forestry practices?

Most U.S. construction is supplied with North American lumber. North America is a mature forest market. The U.S. is a global leader in sustainable forest

management. Multiple, credible third-party certification systems are available in the United States to ensure sustainable management practices drive a diverse suite of environmental benefits across carbon, water, and wildlife among others. This includes programs to certify forests to a forest management standard, chain of custody certification programs, and responsible sourcing programs provided by the Sustainable Forestry Initiative, the American Tree Farm System, and Forest Stewardship Council. In accordance with the clarification made in the 2018 Farm Bill, all qualified certification programs should be given equal treatment in any federal procurement or other climate change policy involving private working forests.

Markets are good for forests. Over the past 70 years, the market demand for forest products has grown, while volume of our standing inventory has increased by 50%. If we manage our forests responsibly, they can deliver.

Senate Committee on Agriculture, Nutrition, and Forestry
Federal, State, and Private Forestlands: Opportunities for Addressing Climate change
May 20, 2021
Questions for the Record
Ms. Jessica Orrego

Ranking Member John Boozman

1) The Intergovernmental Panel on Climate Change (IPCC) stated that: "in the long term, a sustainable forest management strategy aimed at maintaining or increasing forest carbon stocks, while producing an annual sustained yield of timber, fiber, or energy from the forest, will generate the largest sustained mitigation benefit."

    a. How do your organizations support our working forests and what role do you see forest manufacturers play in helping to ensure the viability of our working forests?

Answer: As a leading carbon offset standard, the American Carbon Registry operationalizes climate finance to allow forest manufacturers to meet their corporate or public goals while also achieving a higher standard of sustainable forest management. In today's environment of high timber prices and budget constraints, there is significant pressure to harvest more intensively or sell and convert timberlands to other uses. Quantifying and monetizing forest carbon as an asset across the landscape allows working forests to become more diversified. Landowners that are implementing forest carbon projects can benefit from carbon revenue, while also managing their land for long term wood product production. The wood product industry is a critical partner in ensuring working forests can deliver essential wood products, benefit forest owners and achieve sustained climate mitigation benefit.

2) You may have heard about the Administration's tax proposal related to capital gains, like-kind exchanges and stepped-up basis. Many agricultural producers, foresters, and forestland owners have expressed concerned about the potential implications, intended or otherwise, these proposals may have on their operations.

    a. What is your response to any policy, tax or otherwise, that may incentivize forestland owners to either divest their property interest prematurely or take forestland out of production for a period of time that may exceed the life of the commodity?

Answer: ACR supports measures that offer benefits to forest owners who manage forests sustainably and policies should work to incentivize good forest stewardship and management in ways that benefit landowners, while also contributing important wood products to market, and providing numerous ecological services and benefits.

Senate Committee on Agriculture, Nutrition, and Forestry
Federal, State, and Private Forestlands: Opportunities for Addressing Climate change
May 20, 2021
Questions for the Record
Mr. Joe Fox

Ranking Member John Boozman

1) During the hearing and in your written testimony you addressed the climate benefits of biochar. Specifically in an exchange with Senator Fischer, you discussed a pilot program in Nebraska where biochar was added as a feed supplement for cattle. You indicated the results of the pilot demonstrated a decrease in methane production in the cattle, and an increase in animal productivity.

    a. Will you provide more details on this Nebraska biochar pilot?

Through a grant funded by the USDA Forest Service (Forest Service) in partnership with the Nebraska Forest Service, Kansas Forest Service, Wilson Biochar Associates, and High Plains Biochar, LLC, the Great Plains Biochar Initiative (GPBI) aims to improve awareness and market development of biochar in the Great Plains. The Nebraska Forest Service conducted a pilot study to examine potential benefits of providing biochar as a feed supplement to cattle to achieve reduced methane emissions and increased animal productivity. This pilot has demonstrated huge potential for the greater agriculture community.

Preliminary Results of Nebraska Biochar Pilot Study (See Attached Nebraska Beef Cattle Report)

Two metabolism studies were conducted to evaluate the effects of biochar (0, 0.8, or 3% of diet dry matter) on digestibility and methane production in growing and finishing diets for beef cattle. Intake was not affected by biochar inclusion in the growing diet and increased with 0.8% biochar inclusion in the finishing study. Digestibility tended to increase quadratically with biochar inclusion in the growing study while digestibility tended to linearly decrease with biochar inclusion in the finishing study. Methane production (g/d) decreased 10.7% in the growing study and 9.9% in the finishing study with 0.8% biochar compared to no biochar. Methane production was reduced 10.6% and 18.4% in the growing and finishing studies, respectively, when measured as g/lb of intake. Although biochar has not yet been approved by the Food and Drug Administration (FDA) for animal feeding, the initial research shows potential as a methane mitigation strategy in both growing and finishing diets.

Included in our response as an attachment (NE Beef Report (Biochar in Diets)), are the results from the University of Nebraska biochar pilot study. Additionally, here is a link to a video which provides an overview of the Nebraska biochar research:
https://www.youtube.com/watch?v=62aCkRCOYAI

b. What is needed to expand on this successful pilot study?

An expanded research effort in 2020 evaluated biochar included with cattle feed. The study showed neutral impacts on methane emissions. It was realized that the biochar used in the pilot study and the expanded research project were slightly different, which could have impacted the results. As the feeding of biochar did not cause any negative outcomes, further investigation is prudent to determine the proper characteristics of biochar which will provide the greatest environmental benefits (methane emission reduction).

Future Research Needs:

- Broader FDA approval of wood-based biochars for research purposes.
- Collaborate with University of Nebraska-Lincoln engineering and microbiology researchers to evaluate a wide range of biochars (different wood species, different manufacturing processes) to select and research those that show the greatest benefit for methane absorption and microbial community structure within the cattle rumen.
- Complete additional replicable feeding studies with at least 100 animals using the most promising biochars.

c. What are some other potential agricultural applications for biochar?

The Nebraska study demonstrates an example of an innovative use of a forest product that has huge potential benefits for agriculture, particularly cattle producers. Biochar has shown to be beneficial in many areas of agriculture, including nutrient capture in livestock manure. Another study by the Nebraska State Forest Service in cooperation with the University of Nebraska, Lincoln, is being proposed to evaluate the effects of biochar as a cattle feedlot pen amendment to determine its impact on reducing Nitrogen loss from the manure. To our knowledge a large-scale open feedlot pen study has not been completed with biochar as a manure amendment.

Biochar as a feedlot amendment for reducing nitrogen emissions

Over 50% of nitrogen excreted from cattle in the form of manure is volatilized into the atmosphere as ammonia. An additional pilot study is being conducted to evaluate the use of biochar as a feedlot pen amendment to reduce nitrogen emissions. Early results show that in the feedlot pens amended with biochar, the resultant cattle manure has higher nitrogen concentrations than the manure from pens not amended with biochar. This information would suggest that less nitrogen is emitted from the biochar-amended cattle pens. Biochar used in this application to reduce nitrogen emissions can reduce feedlot greenhouse gas emissions and improve the quality of feedlot manure, which is used as a fertilizer in Nebraska's agricultural fields.

Future research needs:

- Expand research efforts

    - Investigate biochar performance with other livestock species (swine, poultry) in addition to cattle
    - Partner with Nebraska livestock producers to expand data collection
    - Measure impacts on phosphorus and carbon emissions
- Evaluate odor impacts
- Research the crop yield and soil quality impacts of the higher nutrient content manure in agricultural soils
- Establish appropriate application rates and methods

Biochar as a soil amendment

Since the advent of intensive agriculture, intensively cultivated soils have lost between 30% and 50% of their original carbon content. Adding biochar, which contains 50% to 90% carbon, could rapidly restore the carbon lost and help improve the soil health of intensively cultivated land. But the impact of biochar may depend on soil texture and other site-specific factors. There is little field data specific to soils found in Nebraska on the effects of adding biochar.

A team of researchers at the University of Nebraska-Lincoln is assessing how biochar applications at different rates affect soil properties and crop production across different soil types, including sandy, low-carbon content, and sloping fields — all of which are common in Nebraska.

The team is studying changes in the physical, chemical, fertility, and biological properties of soil. They are also examining how biochar affects water and wind erosion, greenhouse gas fluxes, nutrient leaching, water storage, and crop yields and are assessing the interrelationships among these properties.

A by-product from the production of biofuels manufactured through pyrolysis, biochar is a very fine charcoal-like material used to improve soil characteristics. Pyrolysis involves heating wood to extremely high temperatures without oxygen, as the presence of oxygen would cause wood to burn, In this instances it converts into mostly pure carbon. The best biochar is produced at temperatures above 350 degrees centigrade. As a soil amendment it lowers acidity and tightly binds undesirable metals so that they are not taken up by plants or leached from the soil. It can also increase soil porosity in tight clays or reduce porosity in soils that drain too quickly such as sand. It creates a favorable medium for the production of micro-organisms that are beneficial to trees.

Importantly, biochar is principally carbon that is near permanently stored. As such its greatest potential may be its use for long term carbon sequestration.[1]By working biochar into the soil a source of nearly pure carbon is being incorporated that is not subject to micro-biological activity. When, for example, wood or some other organic material is incorporated into the soil micro-organisms will eventually break that material down into other compounds, including carbon dioxide which can be released back into the air during soil disturbance.

[1]Biochar: A Home Gardener's Primer. Washington State University Extension Fact Sheet FS147E

Where readily available, it has developed market value. Reclamation of oil drilling sites and as a soil amendment for high value crop operations are common uses. Current research is focused on mobile kilns that can be used on site at projects conducting needed thinning of low value timber.[2] Right now, wide-scale operations have been fairly cost prohibitive due to the need to transport and dispose of the removed, unmerchantable trees and biomass. Mobile biochar kilns could be a potential option to help expand necessary forest management and offer an opportunity to improve local croplands and reduce the production of greenhouse gases from our agricultural sector.

2) The Intergovernmental Panel on Climate Change (IPCC) stated that: "in the long term, a sustainable forest management strategy aimed at maintaining or increasing forest carbon stocks, while producing an annual sustained yield of timber, fiber, or energy from the forest, will generate the largest sustained mitigation benefit."

    a. How do your organizations support our working forests and what role do you see forest manufacturers play in helping to ensure the viability of our working forests?

For more than a century, state forestry agencies have delivered professional forest management and wildfire protection across complex, multi-jurisdictional landscapes with a holistic "all lands, all hands" approach, including through partnerships with the Forest Service. This work supports working healthy forests. In our experience, meaningful, landscape-scale forest restoration doesn't happen without collaboration across the forest sector and ownership boundaries. From Forest Service technicians to certified professional foresters and municipal arborists, to state field foresters and private landowners, together we can work across all land ownerships – federal, tribal, state, and private – to mitigate the most pressing threats America's forests face, including climate change.

State foresters have a long history of serving as conveners of partnerships that work across ownership boundaries to address shared forestry and wildland fire risk issues. Since 2008, states have gathered partners together to develop Forest Action Plans, which prioritize strategies, areas, and actions for all forested land – federal, state, private, urban, and rural.

Our collective efforts will be most effective if available resources are focused on priority issues and landscapes of national importance using the most up to date information identified in the revised 2020 State Forest Action Plans. Supporting the work outlined in Forest Action Plans not only helps address our immediate forest management needs nationwide: it provides economic support to rural communities across the country. Forest Action Plans call for forest health and habitat restoration, hazardous fuels reduction and community wildfire preparedness, reforestation, rural and community tree planting, capacity building for local and volunteer fire departments, and increasing delivery of technical assistance to private forest land owners.

[2]Presentation by Darren McAvoy, Utah State Biomass Resources Group, to NASF. February 2017.

Substantial increases in active forest management and fuel treatments across all landscapes and ownership boundaries are needed in the areas at greatest risk for unwanted wildfire. We need to increase active management to reduce wildland fire risk and create forests that are more resilient to wildfire while helping to increase forest carbon stocks. Without an increase in coordinated forest management, wildfires will continue to pose a threat to the nation's forests, destroy our cherished communities, and irrevocably alter American landscapes. The scale of wildfires and their community impacts far outpace current efforts to prevent them and mitigate the damage they cause. Fire threats are best addressed by a holistic all-lands approach to wildfire response and proactive forest management across federal, state, and private lands.

State forestry agencies employ roughly 7,850 trained foresters and provide more than 270,000 technical assists to private landowners annually. Our agencies are often the first contact a landowner makes when they have questions about managing their forests. However, private landowners face barriers – including unforeseen costs and insufficient technical assistance – that can prevent them from taking necessary management action. As population growth and urbanization increase nationwide, private forest lands are threatened by land use conversion and development. Now more than ever, it is critical that we maintain our privately owned forest lands in a condition that supports the health, prosperity, security, and well-being of all Americans.

Two federal programs that support state forestry agency work are particularly impactful to keeping working forests working. The Forest Stewardship Program is the most extensive family forest-owner assistance program in the country and is delivered in partnership with state forestry agencies, cooperative extension services, certified foresters, conservation districts, and other partners. The Forest Stewardship Program equips private forest landowners with the unbiased,

science-based information they need to sustainably manage their forests now and into the future, helping to keep forests as forests. In addition to delivering technical assistance directly to forestland owners, the Forest Stewardship Program often serves as a gateway to other landowner cost-share assistance programming, like the USDA Environmental Quality Incentives Program (EQIP), state programs, and partner programs, that can help landowners keep their forests working and intact.

The Forest Legacy Program is the most flexible and widely applicable federal program for permanent conservation of forestland and protects environmentally important forest areas that are threatened by conversion to non-forest uses, and provides critical federal assistance to states, private landowners, and conservation groups to protect working forests through permanent conservation easements and fee acquisitions.

Landowners can participate in the Forest Legacy Program by selling their property outright or by retaining ownership and selling only a portion of the property's development rights. In either of these cases, the land's ownership reverts to a state forestry agency or another unit of government. Landowners can also enter into conservation easements, which allows the land to remain in private ownership while ensuring that its environmental values are retained.

By helping to prevent the loss and fragmentation of working forests, the program encourages sustainable forest management and supports strong markets for forest products. Working forests play an important role in sustaining the economic, environmental, and social wellbeing of American communities through the jobs they support and the benefits these carbon rich forest systems provide, such as wildfire threat reduction, clean air and water, wildlife habitat, outdoor recreation space, and a steady supply of timber.

Keeping private forests working is essential to securing the economic, environmental, and social benefits trees provide to society at large. **In order to retain and properly care for their forests, landowners need sources of revenue, making forest products industries absolutely essential to ensuring working forests continue to provide climate benefits.**

Markets for wood provide that source of revenue and are critical to maintaining the health and sustainability of forests in the U.S. They enable the sustainable, carefully planned harvest of trees to optimize stand density and create age class and species diversity – characteristics that are critically important to enhancing wildlife habitat, forest resilience, and balanced harvest cycles. Timber harvest transfers carbon off the forest ecosystem and stores it in wood products like lumber. Residues from harvested wood can be used as an energy source like wood pellets. With good, scientific based forest management, the forest remains forest—it recovers and regrows—resulting in the uptake of carbon from the atmosphere once again. When we use wood products or bioenergy in place of fossil fuels, we avoid the permanent release of fossil fuel-based carbon into the atmosphere, also known as the substitution effect.

Benefitting economically from forests does not diminish the environmental and social value of forests; in fact, it is key to supporting the delivery of environmental and social benefits. **The readily available raw material that sustains the forest industry is produced by landowners who maintain and manage their woodlands in perpetuity.** Emerging markets for wood can serve to complement traditional forest products, thus expanding wood demand and offering landowners more opportunities for active management through commercial harvests.

3) You may have heard about the Administration's tax proposal related to capital gains, like-kind exchanges and stepped-up basis. Many agricultural producers, foresters, and forestland owners have expressed concerned about the potential implications, intended or otherwise, these proposals may have on their operations.

    a. What is your response to any policy, tax or otherwise, that may incentivize forestland owners to either divest their property interest prematurely or take forestland out of production for a period of time that may exceed the life of the commodity?

Nearly 60 percent of America's forestland is in private ownership and nearly two-thirds of that is in family forests, mostly in small holdings. At 272 million acres, these family forests are the nation's largest forest ownership group, owning even more forestland than the federal, state and local governments combined. There are roughly 10 million family forest owners.

Tax policy impacting forest landowners can influence decisions around retention of forests or conversion to other uses. Estate taxes imposed on heirs at the death of the landowner, can represent a significant financial burden for family forest landowners; to the extent that they must liquidate some of the forest's assets. This can cause larger tracts of land to be broken into smaller ownerships that are less likely to be sustainably managed and more prone to conversion to a non-forested use. Or in order to retain the property in its entirety, the new owners may be forced to over-harvest their timber in an unsustainable manner so that they can pay the inheritance tax. Maintaining, or even raising the amount exempted from estate taxes keeps that burden within reason and encourages long-term sustainable management. Allowing the new owners to establish a "stepped up basis" reflecting current market values for their land and timber lowers the capital gains burden when trees are harvested, which in turn can encourage more active management of the land.

President Biden has proposed eliminating the stepped-up basis when capital assets are inherited but has made commitments to exempt family farms. Timber and family forests also need the same exemption.

NASF's 2020 Policy Statement: *Federal Tax Policy and Its Relationship to the Sustainability of Private Forest Lands*, provides additional policy positions related to federal tax policy and forest landowners.

Senator Amy Klobuchar

1) Minnesota has been a national leader in building with mass timber, and we have over 17 million acres of forest. With Chairwoman Stabenow and a bipartisan group of Senators, I helped write the Timber Innovation Act, which was included in the 2018 Farm Bill. This Act has helped spur research and development of innovative wood products and create opportunities for the use of those products, including mass timber, in the construction of tall wood buildings.

    a. Based on your experience, where do we currently stand as a nation in terms of adoption of mass timber as a construction material? What additional actions can this Committee take to further incentivize the use of climate smart products like cross-laminated timber?

Though more commonly produced and utilized in Europe since the late 1990's mass timber has recently gained traction in the US wood products industry with manufacturing facilities starting up across the country. Building codes across the US are being updated to handle mass timber buildings, small changes were made in 2015 and 2018 and revisions have been approved for 2021 allowing for buildings taller than 85 feet. Though the use of mass timber construction materials continues to grow, local building codes have not always kept up with the technology. The recent revisions to the International Building Code (I-Code) should change that, as I-Code has been adopted by all 50 states. The wood construction sector, in particular mass-timber, still faces headwinds from supporters of other less-environmentally friendly construction materials that would be displaced by wood. It is incumbent upon this Committee to make sure any building legislation coming out of Congress is product neutral (ie – does not disadvantage building with wood), and that your colleagues are educated about the false-claims being spread about the safety of building with wood.

If government purchasing policy favored mass timber construction, it could yield even greater carbon storage and greenhouse gas reduction benefits. As a department, USDA should prioritize the procurement of sustainably harvested wood and wood products including mass timber and make sustainably harvested timber a preferred construction material. USDA should also employ consistent messaging among federal, state, local, university partners to promote the benefits of forest products including mass timber compared to conventional construction materials. Finally, USDA should explore opportunities with the Department of Housing and Urban Development (HUD) to promote incentives for wood products including mass timber, for use in federally funded urban renewal projects.

b. How can we ensure that we are still achieving climate and other environmental outcomes while building with mass timber and presumably using more wood? What role, if any, should third-party certification programs play in climate smart forestry practices?

Mass timber products rival steel in strength and fire resistance and are lighter in weight than concrete. Additional benefits include carbon storage and reduced CO2 emissions during construction. The positive environmental attributes of mass timber buildings include a low energy intensity during manufacturing, superior energy efficiency in mass timber structures, and better management of a renewable resource.

Conventional construction materials like steel and concrete, generate greenhouse gases during every phase of their production. By contrast, wood stores carbon offsetting the emission of greenhouse gases. Timber harvest transfers carbon off the forest ecosystem and stores it in wood products like lumber. Residues from harvested wood can be used as an energy source like wood pellets. With good, scientific based forest management, the forest remains forest—it recovers and regrows—resulting in the uptake of carbon from the atmosphere once again. When we use wood products or bioenergy in place of fossil fuels, or traditional climate intensive construction materials, we avoid the permanent release of fossil fuel-based carbon into the atmosphere, also known as the substitution effect.

Wood should be harvested in a carefully planned manner using best management practices that embody sound science, represent community values, continue to provide important environmental benefits, and reflect responsible economics. Research and teaching institutions, private landowners, natural resource agencies, consulting foresters, forest owning/managing businesses, natural resource related non-profits, and certification bodies all play an important role that must evolve and grow as demand for wood may well increase when new uses emerge. Forest Certification is one way to ensure sustainable procurement of wood products, and NASF supports the work being done by all three certification bodies in the United States – the Sustainable Forestry Initiative, Forest Stewardship Council, and American Tree Farm System. However, it is important to recognize that there are many barriers to landowner certification (most notably cost and lack of market return), resulting in less than 25% of private forest lands being certified nationwide. This does not mean the other 75% of forests are not being managed sustainably or for climate benefits however.

It is also important to rely on other sources of data in making sure wood products are being sourced in a way that is climate friendly, in particular the data generated by the Forest Inventory and Analysis (FIA) program. Housed within the Forest Service Research and Development unit, FIA

has been providing information needed to assess forests in the United States across public and private ownerships for almost 90 years. Through a national network of on-the-ground plot measurements and rigorous data processing and analysis, FIA is able to answer the tough questions that scientists and policymakers alike ask about our nation's forest resource. It is through a robust adequately-funded FIA program that we are able to see how much wood is on the landscape to support a growing mass-timber sector, and can monitor how our forests are responding to that increase in utilization.

Senator John Hoeven

1) In your written testimony, you mentioned several NRCS working lands programs, including EQIP, CSP and RCPP. These voluntary programs are well-subscribed by farmers and ranchers in my state. However, I've heard concerns about the paperwork and compliance burdens that prevent some producers from taking advantage of these programs.

    a. Can you share how NRCS working lands programs can be improved to ensure greater accessibility for farmers, foresters and ranchers?

As you point out in your question, these programs are well-subscribed, and often over-subscribed all across the country. Our nations farmers, ranchers and private forestland owners are eager to participate in working lands conservation supported by the federal government. This often creates a situation where those most familiar with the programs, including the bureaucratic and paperwork elements, continue to get federal assistance. In addition to making sure these programs are adequately funded to serve the demand placed on them, Congress and USDA must also place focus on ensuring young and beginning farmers and forest owners, as well as historically underserved populations can navigate complex and confusing applications and compliance challenges.

It is well-documented that landowners who receive technical assistance are much more likely to actively manage their property. This would include seeking financial assistance to implement practices that improve timber quality, enhance wildlife habitat, install water quality protection measures and increase carbon storage. Ensuring that the Forest Stewardship Program is adequately funded gives landowners greater access to technical assistance that can help them secure conservation cost share funding.

Additionally, it is a challenge in many parts of the country for forestland owners to compete for funds in these programs alongside more traditional farm landowners. All NRCS working lands programs would be well-served by ensuring field offices understand and support forest eligibility for the programs, as well as seek to understand whether there are any barriers to forest landowner enrollment. One issue we are aware of and have been working on for many years with USDA is forest management plan compatibility between Forest Stewardship Program plans and EQIP plans. Recognition of this compatibility at the field office level is necessary to avoid burden being placed on forest landowners with Forest Stewardship Program management plans having to redo those plans just to qualify for EQIP funding. Increasing the amount of funds specifically dedicated to forestry practices would further the benefits this program nationally. EQIP dollars allocated to forestry practices in 2019 amounted to about $133 million – just 10% of total EQIP funding in 2019. If combatting global warming is a national priority, EQIP should play a larger role.

Senator Charles Grassley

1) What policies can this committee put in place to increase the amount of timber harvested on national forests so that we can lower the price of lumber?

Due in part to demand driven by COVID-19, construction material prices have seen a huge surge in the past year, including prices for lumber and other wood products. A perfect storm of new home building, remodeling, and DIY projects during the pandemic created an unprecedented demand for new lumber, which in turn has driven up prices and resulted in shortages. Unprecedented stress on the supply chain (including mill shutdowns during the pandemic), coupled with a lack of sawmill infrastructure and trade, labor, and transportation issues have all contributed to the current lumber shortage. In addition, private forests in the US Provide over 90 percent of our domestically-produced forest products with only a small fraction coming from our national forests. In our estimation, the primary driver behind the current price of lumber is not timber supply, rather it is a capacity issue related to limited sawmill infrastructure coupled with labor force shortages to keep up with demand. Increased timber harvesting on federal lands is not likely to impact high lumber prices, and would likely depress timber prices to the detriment of private landowners.

With that being said, NASF does believe many forest management and policy reforms are possible across the federal government that could stimulate and increase national forest system timber harvest to provide for healthier forest conditions. These include streamlining both the National Environmental Policy Act (NEPA) and the Endangered Species Act (ESA) to remove bureaucratic barriers to getting more good work done faster. Additional funding for Good Neighbor Authority (GNA) projects is needed to support improved federal forest health. GNA projects are proven to increase the pace and scale of critical forest treatments, support cross-boundary projects and coordination, and provide job opportunities for rural communities.

Over 30 states have taken the initiative to formalize their commitments to greater partnership and collaboration though shared stewardship agreements with the USDA Forest Service and others. States have played a vital role in ensuring the success of the collaborative shared stewardship framework by coordinating key partners and facilitating active management across all ownerships, including federal lands. State-based approaches to shared stewardship enhance outcomes through shared decision-making and shared priority-setting.

2) From the 1950s through the 1980s annual harvest volume from Forest Service lands often exceeded 10 billion board feet. What amount of board feet do you believe would be a sustainable amount for Forest Service land?

A significant portion of our National Forest System lands are in an unhealthy condition that puts them at risk of wildfire and insect and disease threats. They are not adequately providing environmental benefits including carbon sequestration, clean air and water, and wildlife habitat, and they are not adequately supporting local communities through provision of forest products as envisioned by the Multiple Use Sustained Yield Act. While we cannot put a board foot number on what would be sustainable harvest, we can say that 81 million acres are in need of treatment,

and treating all those acres to a healthy condition would generate billions of additional board feet of timber.[3]

However, one of the big differences between the mid-20th century and today is the significant decline in mill capacity across the country, and particularly in the West. In areas of the country where mill capacity is very low, the Forest Service could not increase its board foot output significantly without a commensurate increase in mill capacity to accept that lumber. Federal policy that ensures a long-term sustainable flow of timber from federal lands is needed before private capital would invest in additional sawmill infrastructure in regions with large acreages of federal ownership. The return of mills to our rural landscapes would provide needed economic stimulus and help the Forest Service better manage its lands.

3) Iowa State University has a long history of conducting and supporting research into the potential benefits of biochar. What are the barriers to the development of biochar so that it can be used more widely by landowners?

The following information can be found in the Council of Western State Foresters (CWSF) Biochar Market Analysis Final Report from 2018. The full report is available here.

Biochar markets have been slow to develop because of high prices and a lack of understanding or articulation of biochar benefits. However, fast growing markets are developing in several areas: green infrastructure for stormwater management in cities; soil water retention in turf, landscaping and urban tree plantings; biochar soil blends for horticulture; biochar seed coatings and root zone applications in field crops; remediation of mine tailings and brownfields; and replacements for activated carbon and carbon black in a variety of industrial uses. Future markets that could be developed with the help of beneficial government policies and investment include use of biochar in animal feed (requires lifting the current restrictions); use of biochar to manage many different kinds of organic waste streams and reduce GHG emissions of manure, compost, digestate and sludge; use of biochar in row crops for improving soil resilience to drought; use in tile drained fields to manage nutrient runoff; restoring natural ecosystems and forests; and for sequestering carbon in soils.

Biochar production, like any business dependent on biomass, is inherently a local and regional activity. Biomass residues that form the feedstocks for biochar are a low value material, but the cost of using them goes up very quickly once they have to be transported. Biochar end products

are also expensive to transport, and even though they have more value than raw biomass, they are still a low bulk-density material and are not cost effective to transport for long distances.

The biochar industry has made great strides in recent years as producers have improved production efficiencies and product quality. Biochar can be made from many feedstocks, including manure and crop waste, but the wood products side of the biochar industry is growing mostly through the mass production of biochar in modified biomass boilers and furnaces. Further innovations are ahead, with the deployment of air curtain burner technology for producing biochar in the field that

3 Forest Service 2013-2027 National Insect and Disease Forest Risk Assessment

can avoid the cost of chipping, grinding and transporting woody biomass to centralized plants.

Producers are finding that economies of scale are available at all scales, from small, low tech batch kilns used in the forest, to combined heat and biochar (CHAB) furnaces that provide heat for buildings and small industries, to large bioenergy facilities. Each scale can take advantage of its relative proximity to feedstocks, appropriate capital investment for the technology level, and any energy co-products. There is no one-size-fits-all for biochar production. As the production costs go down, price reductions will be passed along to users who are eager to include biochar in soil blends, bio-fertilizers and compost, but cannot afford biochar at current prices.

If the industry can overcome several important market barriers, it has bright prospects. Some of these barriers can be addressed by state and federal entities through incentives, R&D funding and policy changes, as discussed above.

However, other barriers are incumbent upon the industry itself to solve. Most crucial are the development of biochar standards to properly identify and categorize biochar materials. The development of the biochar industry could be significantly accelerated by public support for an industry association to solve the standards problem. As yet, it seems that the industry is not profitable enough to fund such an entity by itself.

Biochar can do a lot of good for soils, environmental management in general, and ultimately as an important tool to mitigate the impact of climate change through an innovative use of an emerging forest product.

Biochar Supplementation in Growing and Finishing Diets

Tommy M. Winders
Collin B. Freeman
Brittney A. Mark
Melissa L. Jolly-Breithaupt
Hannah C. Wilson
Jim C. MacDonald
Galen E. Erickson
Andrea K. Watson

Summary with Implications

Two metabolism studies were conducted to evaluate the effects of biochar (0, 0.8, or 3% of diet dry matter) on digestibility and methane production in growing and finishing diets. Intake was not affected by biochar inclusion in the growing diet and increased with 0.8% biochar inclusion in the finishing study. Digestibility tended to increase quadratically with biochar inclusion in the growing study while digestibility tended to linearly decrease with biochar inclusion in the finishing study. Methane production (g/d) decreased 10.7% in the growing study and 9.9% in the finishing study with 0.8% biochar compared to no biochar. Methane production was reduced 10.6% and 18.4% in the growing and finishing studies, respectively, when measured as g/lb of intake. Although biochar is not FDA approved for animal feeding, the initial research shows potential as a methane mitigation strategy in both growing and finishing diets.

Introduction

Energy lost as methane by ruminants can range from 2–12% of gross energy intake (GEI), but is variable depending on multiple things, with diet composition being one factor. Diet composition can be used to manipulate the rumen environment and is a methane mitigation strategy. Biochar is a feed product with potential as a methane inhibitor. Biochar is produced by burning organic matter (OM; typically plant material) at very high temperatures in the absence of oxygen. Although a mode of action is not fully understood, it has been suggested that it adsorbs gas in the rumen resulting in reduced methane eructation. Other theories are that the porous nature of biochar will increase the amount of inert surface area in the rumen, allowing for improved habitat for microbes to reside. This improved habitat may increase microbial growth, allow feeds to be digested more completely, and bring methanogens and methanotrophs together, leading to more complete oxidation of feeds and less methane production.

© The Board Regents of the University of Nebraska. All rights reserved.

Table 1. Composition of diet (DM basis) fed to cattle (Growing trial)

	Biochar, % Inclusion		
Ingredient, % of diet DM	0	0.8	3
Brome hay	21	21	21
Wheat straw	20	20	20
Corn silage	30	30	30
Wet distillers grains plus solubles	22	22	22
Supplement[1]			
Fine ground corn	4.630	3.830	1.630
Biochar	-	0.800	3.000
Limestone	1.320	1.320	1.320
Tallow	0.175	0.175	0.175
Urea	0.500	0.500	0.500
Salt	0.300	0.300	0.300
Beef Trace Mineral[2]	0.050	0.050	0.050
Vitamin A-D-E[3]	0.015	0.015	0.015

[1]Supplement fed at 7% of diet DM

[2]Premix contained 10% Mg, 6% Zn, 2.5% Mn, 0.5% Cu, 0.3% I, and 0.05% Co

[3]Premix contained 1,500 IU of vitamin A, 3,000 IU of vitamin D, and 3.7 IU of vitamin E per g

[4]Formulated to supply Rumensin-90 (Elanco Animal Health; Greenfield, IN) at 18 g/ton

Procedure

Growing Experiment

Six crossbred steers (initial BW 1166 lb; standard deviation = 35 lb) were used in a 6-period crossover design. Steers were blocked by body weight (BW) and assigned randomly within block to 1 of 3 treatments. Periods ranged from 14–24 days with 2 consecutive, 23-h periods in the headbox calorimeter. The availability of the calorimeters dictated period length. Diets fed were identical between treatments other than inclusion of biochar (0, 0.8, or 3% of diet dry matter; DM), which displaced fine-ground corn in the supplement (Table 1). The biochar was derived from pine trees and had a composition of 85% carbon, 0.7% nitrogen, and was 94% OM on a DM basis. Diets consisted of 30% corn silage, 21% brome hay, 20% wheat straw, 22% wet distillers grains plus solubles (WDGS), and 7% supplement (DM basis). Urea was included in the supplement of all diets at 0.5% of diet DM and treatments provided 200 mg/animal daily of monensin (Rumensin, Elanco Animal Health, Greenfield, IN).

Diets were fed *ad libitum* twice daily with 50% of daily feed offered at each feeding. Each period consisted of adaptation to the treatments (minimum of 8 d), fecal grab sampling 4 times/d on 4 days leading up to headbox collections, and headbox collections for the final 2 d of the period. Feed and fecal samples were ground through a

Table 2. Composition of diet (DM basis) fed to cattle (Finishing trial)

	Biochar, % Inclusion		
Ingredient, % of diet DM	0	0.8	3
Dry-rolled Corn	53	53	53
Corn silage	15	15	15
Wet distillers grains plus solubles	25	25	25
Supplement[1]			
Fine ground corn	4.630	3.830	1.630
Biochar	-	0.800	3.000
Limestone	1.320	1.320	1.320
Tallow	0.175	0.175	0.175
Urea	0.500	0.500	0.500
Salt	0.300	0.300	0.300
Beef Trace Mineral[2]	0.050	0.050	0.050
Vitamin A-D-E[3]	0.015	0.015	0.015
Rumensin-90[4]	0.010	0.010	0.010

[1]Supplement fed at 7% of diet DM

[2]Premix contained 10% Mg, 6% Zn, 2.5% Mn, 0.5% Cu, 0.3% I, and 0.05% Co

[3]Premix contained 1,500 IU of vitamin A, 3,000 IU of vitamin D, and 3.7 IU of vitamin E per g

[4]Formulated to supply Rumensin-90 (Elanco Animal Health; Greenfield, IN) at 18 g/ton

Table 3. Effect of biochar inclusion on intake and total tract digestibility (Growing trial)

	0	0.8	3	SEM	Lin[1]	Quad[2]
DM						
Intake, lb/d	17.7	17.4	17.3	0.46	0.43	0.64
Digestibility, %	55.7	57.6	54.7	1.12	0.25	0.11
OM						
Intake, lb/d	16.0	15.8	15.7	0.42	0.52	0.74
Digestibility, %	58.6^{ab}	60.6^{a}	57.7^{b}	1.16	0.31	0.10
NDF						
Intake, lb/d	9.35	9.24	9.44	0.24	0.62	0.57
Digestibility, %	50.5^{ab}	52.6^{a}	48.2^{b}	1.55	0.08	0.10
ADF						
Intake, lb/d	6.24	6.22	6.46	0.18	0.13	0.53
Digestibility, %	46.7	48.1	45.0	1.50	0.29	0.35
Energy						
GE intake, Mcal/d	35.3	34.8	34.8	0.93	0.62	0.68
DE intake, Mcal/d	20.5	21.0	20.0	0.51	0.27	0.30

[1]Linear effect on response variables

[2]Quadratic effect on response variables

[a, b] Means within a row with different superscripts are different ($P < 0.10$)

1-mm screen and analyzed for DM, OM, acid detergent fiber (ADF), neutral detergent fiber (NDF), GE and digestible energy (DE). Bomb calorimetry was done to obtain energy values. Acid insoluble ash (AIA) was used as an internal marker and analysis was done on the base diet fed, feed refusals, and fecals to determine digestibility DMD.

Finishing Experiment

The same 6 steers were utilized in a 3-period crossover design. Steers remained in the same BW block and were assigned randomly to 1 of 3 treatments. Similar to the growing experiment, diets fed were identical between treatments other than inclusion of biochar (0, 0.8, or 3% of diet DM), which displaced fine-ground corn in the supplement (Table 2). Diets consisted of 53% dry rolled corn, 15% corn silage, 25% WDGS, and 7% supplement, on a DM basis. Periods were 14 days in length with 2 consecutive 23-hr headbox collections over the last 2 days of each period. Fecal output was estimated by dosing 10 g/d of titanium dioxide in the feed and was used to calculate diet digestibility. All other procedures were the same as described for the growing experiment. At the conclusion of the trial, cattle were euthanized under veterinary supervision and composted because biochar is not an FDA approved feed additive.

Gas emissions

In both experiments, methane emissions were measured through indirect calorimetry using headboxes built at the University of Nebraska–Lincoln. A training period was done before the experiment for steers to become acclimated to the headboxes. One steer was removed from the growing experiment after period two because of a lack of dry matter intake (DMI) while in the headbox, but was re-trained and used during the finishing experiment. Gas samples were collected in foil bags that continuously and evenly filled throughout the 23 h collection period. Gas measurements collected over the 2 d were averaged to obtain 1 value per period for each steer. A 5 d DMI average leading up to the 2 d headbox period was used to report gas emissions on a grams per lb of DMI basis.

Digestibility and gas emissions were analyzed using the MIXED procedure of SAS (SAS Inst. Inc., Cary, NC). Steer within period was the experimental unit and steer was included in the random statement. Probabilities were considered significant at $P \leq 0.10$ and tendencies are discussed at $P \leq 0.15$.

Results

Growing Experiment

DIGESTIBILITY AND ENERGY

All intake, fecal output and digestibility data are reported in Table 3. Dry matter intake (lb/d) did not differ between treatments ($P \geq 0.43$; Table 3), but did increase between periods as a result of the cattle growing, and therefore eating more. There

were no differences between treatments in intake of DM, OM, NDF, or ADF ($P \geq 0.13$). Dry matter digestibility and OM digestibility (OMD) were not different ($P \geq 0.15$) from the control diet at either biochar inclusion. A linear ($P = 0.08$) decrease was observed for NDF digestibility (NDFD) with 3% inclusion of biochar having the lowest digestibility. Gross energy intake (GEI; Mcal/d) and digestible energy intake (DEI; Mcal/d) did not differ between treatments ($P \geq 0.27$).

METHANE PRODUCTION

Reported DMI used for gas emission calculations was a 5 d average prior to cattle entering the headboxes, and was not different between treatments ($P \geq 0.68$; Table 4). Methane production (g/d) tended to decrease quadratically ($P = 0.14$) with the 0.8% biochar treatment reducing methane compared to the 0% treatment. Numerically, the 0.8% biochar treatment reduced methane (g/d) by 11% compared to the control treatment without biochar. Methane production calculated as g/lb of DMI or g/Mcal of GEI was not different between treatments ($P \geq 0.17$). Methane produced per Mcal of DEI was lowest for 0.8% biochar and greatest for the 0% treatment, resulting in a quadratic response ($P = 0.05$).

When combining the two treatments that contained biochar (0.8 and 3%) and comparing to the 0% biochar treatment, methane production (g/d, g/lb DMI, and g/Mcal GEI) tended ($P \leq 0.13$) to be lower for the biochar cattle relative to the control cattle. Methane produced per Mcal of DEI was reduced ($P = 0.07$) for the biochar cattle.

Finishing Experiment

DIGESTIBILITY

Intake of DM, OM, NDF, and ADF all increased quadratically ($P < 0.01$) as biochar inclusion in the diet increased (Table 5). Dry matter digestibility tended to decrease linearly ($P = 0.11$) as biochar inclusion increased, while OMD and ADFD did decrease linearly ($P \leq 0.10$) as biochar inclusion increased.

Table 4. Effect of increasing inclusion of biochar on methane emissions from steers (Growing trial)

	Biochar Inclusion, % DM				*3 Types P-value*		*Bio vs No Bio*[3]
	0	0.8	3	SEM	Lin[1]	Quad[2]	*P*-value
DMI, lb/d	17.4	17.4	17.2	0.4	0.68	0.90	0.70
GE intake, Mcal/d	34.9	34.7	34.8	0.9	0.99	0.85	0.88
DE intake, Mcal/d	20.6	21.1	20.3	0.5	0.50	0.32	0.82
Methane							
g/d	108.8	97.2	100.7	5.1	0.42	0.14	0.11
g/lb DMI	6.25	5.59	5.85	0.30	0.43	0.18	0.13
g/Mcal GE intake	3.10	2.80	2.86	0.13	0.37	0.17	0.11
g/Mcal DE intake	5.27[a]	4.62[b]	4.92[ab]	0.21	0.51	0.05	0.07

[1]Linear effect on response variables

[2]Quadratic effect on response variables

[3]Biochar vs. No biochar inclusion

[a, b]Means within a row with different superscripts are different ($P < 0.10$)

Table 5. Effect of biochar inclusion on intake and total tract digestibility (Finishing trial)

	0	0.8	3	SEM	Lin[1]	Quad[2]
DM						
Intake, lb/d	26.4[a]	28.5[b]	26.8[a]	1.2	0.48	< 0.01
Digestibility, %	71.5	70.0	68.2	1.8	0.12	0.70
OM						
Intake, lb/d	22.5[a]	24.4[b]	22.8[a]	1.0	0.33	< 0.01
Digestibility, %	72.3[a]	70.4[ab]	68.7[b]	1.7	0.10	0.45
NDF						
Intake, lb/d	6.62[a]	7.40[b]	7.47[b]	0.33	< 0.01	< 0.01
Digestibility, %	56.6	54.1	53.4	3.8	0.22	0.43
ADF						
Intake, lb/d	2.82[a]	3.18[b]	3.38[c]	0.13	< 0.01	< 0.01
Digestibility, %	52.4[a]	50.1[a]	41.3[b]	3.8	< 0.01	0.75

[1]Linear effect on response variables

[2]Quadratic effect on response variables

[a,b,c]Means within a row with different superscripts are different ($P < 0.10$)

Table 6. Effect of increasing inclusion of biochar on methane emissions from steers (Finishing trial)

	Biochar Inclusion, % DM				*3 Types P-value*		*Bio vs No Bio*[3]
	0	0.8	3	SEM	Lin[1]	Quad[2]	*P*-value
DMI, lb/d	24.8[a]	28.0[b]	26.3[b]	1.1	0.52	0.01	0.04
Methane							
g/d	141	127	122	19	0.39	0.62	0.32
g/lb DMI	5.65	4.61	4.83	0.66	0.48	0.85	0.22

[1]Linear effect on response variables

[2]Quadratic effect on response variables

[3]Biochar vs. No biochar inclusion

[a, b]Means within a row with different superscripts are different ($P < 0.10$)

METHANE PRODUCTION

Intake used for gas emission calculations increased quadratically ($P = 0.01$) as biochar inclusion increased. When biochar treatments were combined, biochar cattle had greater DMI ($P = 0.04$) than the control. Methane production (g/d and g/lb DMI) was not different between treatments ($P \geq 0.22$) when analyzed as three inclusion levels or as biochar inclusion vs. no biochar inclusion (Table 6). However, methane production (g/d) numerically decreased 9.9% and methane production (g/lb DMI) decreased 18.4% for the 0.8% biochar treatment relative to no biochar. Only 3 periods of data were collected in the finishing experiment (6 periods in the growing experiment) due to cattle becoming too large for the headboxes, which limited statistical power.

While not always statistically significant, there were consistent numerical decreases in methane production with 0.8% biochar inclusion in the diet compared to no biochar. Intake was not hindered with biochar inclusion, and actually increased in the finishing experiment. Feeding 0.8% biochar appears to be sufficient and no further benefits were observed from increasing inclusion to 3% of diet DM. The effects of biochar in the rumen show promise, but are not fully understood and performance data (ADG, efficiency, carcass data) are needed to determine if it is a feasible methane mitigation tool.

Tommy M. Winders, graduate student

Collin B. Freeman, undergraduate student

Brittney A. Mark, undergraduate student

Melissa L. Jolly-Breithaupt, research technician

Hannah C. Wilson, research technician

Jim C. MacDonald, associate professor

Galen E. Erickson, professor

Andrea K. Watson, research assistant professor, University of Nebraska–Lincoln, Department of Animal Science, Lincoln, Neb.

Senate Committee on Agriculture, Nutrition, and Forestry
Federal, State, and Private Forestlands: Opportunities for Addressing Climate change
May 20, 2021
Questions for the Record
Dr. Tony Cheng

Ranking Member John Boozman

1) The Intergovernmental Panel on Climate Change (IPCC) stated that: "in the long term, a sustainable forest management strategy aimed at maintaining or increasing forest carbon stocks, while producing an annual sustained yield of timber, fiber, or energy from the forest, will generate the largest sustained mitigation benefit."

    a. How do your organizations support our working forests and what role do you see forest manufacturers play in helping to ensure the viability of our working forests?

    The Southwest Ecological Restoration Institutes provide forest land managers with current scientific data and knowledge to identify forested areas most in need of forest restoration. We have helped reduce planning and conflict costs by helping a diversity of stakeholders reach "zones of agreement" on hundreds of thousands of acres in Colorado, New Mexico, and northern Arizona, where forest industry can sustainably harvest and utilize woody biomass. Forest industry can help offset the costs of forest restoration on federal public lands. Increasing opportunities to utilize wood fiber from forest restoration to manufacture innovate products, such as cross-laminated timbers and panels, could result in substantial cost offset in areas where zones of agreement exist. The Forest Operations and Utilization program at the Ecological Restoration Institute is leading a SWERI-wide initiative to help forest industry operators maximize economic opportunities from forest restoration projects.

2) You may have heard about the Administration's tax proposal related to capital gains, like-kind exchanges and stepped-up basis. Many agricultural producers, foresters, and forestland owners have expressed concerned about the potential implications, intended or otherwise, these proposals may have on their operations.

    a. What is your response to any policy, tax or otherwise, that may incentivize forestland owners to either divest their property interest prematurely or take forestland out of production for a period of time that may exceed the life of the commodity?

    I am unable to provide a knowledge answer to this question, as the topic lies outside of my area of expertise and experience.

Senator Amy Klobuchar

1) I have been working with Senator Thune to improve conservation data collection and sharing at the Department of Agriculture to better inform farmers and landowners about how to reduce risk, increase profitability, and improve the environment. Our forests can be an effective carbon mitigation solution, but only if we understand their supply and condition through consistent data and analysis.

    a. What role does forest data collection play in mapping trends and evaluating forest stocks?

    There are two types of forest data that are useful for evaluating forest conditions. The first is data collected by field crews, such as those employed by the Forest Inventory and Analysis program. These data provide information about forest growth, mortality and vegetation composition and conditions. The second data type are collected by aircraft or satellites. These data are increasing in resolution and accuracy, and complement (but not replace) field data. Both data sources can tell us about where in a forest carbon is being stored and released, and can be extrapolated to very large areas.

    b. How can USDA resources like the Forest Inventory and Analysis Program better serve carbon mitigation and sequestration outcomes?

    FIA data products are best applied to national or regional perspectives about forest conditions and forest carbon dynamics. The products can be found in the US Forest Service's Resource Planning Act (RPA) reports and the like. FIA data are also used by every state to paint a picture of how much carbon is, and can be, stored or released by forests. It would be great to see a publicly-accessible and user-friendly FIA data "dashboard" of how the USA as a whole and each state is doing in terms of forest carbon mitigation and sequestration.

Senator John Hoeven

1) In your testimony, you mention your support for the Joint Chiefs Program at USDA, a partnership between the Forest Service and Natural Resources Conservation Service (NRCS) to support forest and grassland restoration projects across public and private land. Along with my colleague on this committee, Senator Bennet, I introduced the Joint Chiefs Landscape Restoration Partnership Act of 2021, legislation to authorize the partnership.

    a. Can you discuss how the Joint Chiefs program helps improve fire resilience, soil health and water quality across both public and private landscapes?

    The two Joint Chiefs projects in Colorado that I am most knowledgeable about have really extended forest vegetation treatment work from federal lands into private lands, and visa-versa. In positive ways, Joint Chiefs program has

compelled managers from different jurisdictions to communicate and coordinate with one another about priority forest management projects, and pool and leverage resources to make them happen. In the northern Colorado Joint Chiefs project, the portfolio of federal and private land forest management mitigated the progression of the Cameron Peak Fire that burned from mid-August to late-November. The Joint Chiefs projects were sufficiently large and strategically located so that it prevented the fire from burning catastrophically into private property, where it could have caused significant private property damage and affected source water quality for downstream communities. Without Joint Chiefs, this work would not have been done and we would have likely seen very different outcomes from the Cameron Peak Fire. Senator Bennet saw this firsthand on May 7.

b. In terms of risk mitigation efforts, how important is it that federal and state entities listen to and work with local communities and landowners to arrive at solutions that are practical and effective at reducing fire risk?

In my experience and based on research my colleagues and I have conducted over the past 15 years, the most successful wildfire risk mitigation programs occur when federal and state agency personnel engage local communities and landowners as partners in problem-solving, not as passive consumers of government forest management plans. The kind of work that needs to be done to mitigate forest fire impacts requires thinning out forest stands through tree harvesting, prescribed fire, and strategically managing natural ignition fires – all of which are controversial. Government managers are generally more successful at implementing programs of work when they have taken the time and made a genuine effort to engage local communities and landowners about their own values and concerns first, rather than trying to impose government-crafted plans. This is the case across all types of communities, regardless of their political leanings and viewpoints. Local people of all stripes want to be heard and have their viewpoints valued. There is a substantial amount of forestry-related social science research dating back 30 years supporting this finding.

Senator Charles Grassley

1) What policies can this committee put in place to increase the amount of timber harvested on national forests so that we can lower the price of lumber?

The complexities of the USA's supply-and-demand forces affecting domestic consumer lumber prices is beyond my expertise and experience. I am not knowledgeable about how much lumber would need to be produced from federal public lands to affect downward movement of domestic consumer lumber prices.

2) From the 1950s through the 1980s annual harvest volume from Forest Service lands often exceeded 10 billion board feet. What amount of board feet do you believe would be a sustainable amount for Forest Service land?

Estimating sustainable levels of timber production on National Forest System lands is beyond my expertise and experience. It is my understanding that calculating sustainable timber harvest on national forests involves many variables and subject to a lot of uncertainty. Based on US Forest Service statistics, it appears that over the past two decades, annual harvests have hovered between 2 to 3 billion board feet. However, I am unsure if this is considered sustainable or not.

○