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Mr. Hohenstein and Dr. Meyer:

The Society of American Foresters (SAF) welcomes the opportunity to provide comments on President Biden's Executive Order on Tackling the Climate Crisis at Home and Abroad.

SAF is the national scientific and educational organization representing over 9,000 forestry and related natural resources professionals across the United States. Founded in 1900 by Gifford Pinchot, SAF promotes science-based, sustainable management and stewardship of the nation's public and private forests. Our members include professionals in public and private settings, researchers, CEOs, administrators, educators, and students.

Forestry and natural resources professionals are key allies in tackling climate change and improving the overall health and resilience of ecosystems across public and private lands. Working with and through private landowners, federal and state agencies, tribes, nonprofits, and local communities, our members provide a direct connection to science-based solutions to complex natural resource challenges across the landscape. Through science-based, professional management, we can restore and enhance our nation's forests to better meet changing environmental, social, and economic needs.

Forests play an essential role in regulating global atmospheric greenhouse gases (GHG) while providing essential ecosystem services like clean water, wildlife habitat, recreational opportunities, and forest products that, in turn, store carbon (Deal et al. 2017, Buotte et al. 2019). Forests store approximately 68% of US terrestrial carbon stocks and forest ecosystems comprise more than 90% of the land

sequestration capacity (EPA, 2016) and offset about 15% of US fossil fuel emissions (Woodall et al, 2015).

Two active, complementary forest management approaches are fundamental to addressing climate change: (1) mitigation, in which forests themselves and resultant forest products are used to sequester carbon, forest biomass is used to provide substitute renewable energy, and GHG emissions are avoided through complementary product substitution (wood for carbon-intensive fossil fuel consumer goods) and resilient forest composition and structure; and (2) adaptation, which involves positioning forests and their associated benefits in order to become more resistant and resilient to uncertain future disturbances as they become more likely in the face of changing climate conditions.

Below are recommendations and ideas based on the principles above. SAF and its members will serve as resources and allies in your efforts moving forward. We welcome your feedback and collaboration and look forward to working together on these and other important issues.

1. Climate-Smart Agriculture and Forestry Questions

A. How should USDA utilize programs, funding and financing capacities, and other authorities, to encourage the voluntary adoption of climate-smart agricultural and forestry practices on working farms, ranches, and forest lands?

SAF believes that “climate-smart forestry” should consistently recognize the positive role that forest management plays in: (1) mitigating GHG emissions through the sequestration of atmospheric carbon in resilient, well-managed forests (trees and soil), producing wood-based products to replace both non-renewable materials and fossil fuel-based energy sources; and (2) adapting to future climate patterns through active forest management that reduces the risk of stand-replacing wildfire and other climate-driven disturbance emissions and avoids land-use changes from forests. (See SAF National Position Statement, *Forest Management, Carbon, and Climate Change*).

Traditional silvicultural treatments focused on wood, water, wildlife, and aesthetic values are fully amenable to enhancing carbon storage and reducing emissions from forest management (Tappeiner et al. 2015). Choices regarding even-aged or uneven-aged management regimes, species composition, slash disposal following harvests, site preparation, timing and intensity of intermediate harvests, fertilization, and rotation length/entry cycles can all be modified to increase carbon storage and reduce carbon emissions.

Successfully adapting our forests and forest management practices to climate change will require explicit and long-term investments in research, education, and outreach to aid in management for these changes. This includes direct monetary support to private landowners and public agencies to explore and implement the technologies and practices that can be used to mitigate carbon emissions and adapt to changing climate conditions, and associated assistance programs for local communities to implement the necessary changes.

A hands-off and/or one-size-fits-all approach will not suffice. All forests have value and serve different (often simultaneous) purposes and provide a variety of co-benefits. The role of forest and agricultural lands cannot be overstated as we look to create a more sustainable society. These lands provide the significant opportunity to accomplish natural carbon capture and storage while at the same time

providing the food, fuel, and fiber needed to support over seven billion people today and a projected nine to ten billion by 2050.

(1) How can USDA leverage *existing* policies and programs to encourage the voluntary adoption of agricultural [and forestry practices] that sequester carbon, reduce greenhouse emissions, and ensure resiliency to climate change?

Enhancing the role of forests in reducing GHG emissions through sequestration requires keeping forests as forests, keeping those forests healthy, and, where appropriate, increasing the forestland base through afforestation and restoration of degraded lands. The following are recommendations and ideas related to current programs, policies, and management activities.

Support Private Forest Owners and Working Forests

USFS Forest Stewardship Program (FSP): Helps landowners plan sustainable management, including carbon friendly and climate-smart practices, and implement reforestation. FSP is the most extensive family forest-owner assistance program in the country, administered by the USDA Forest Service (USFS), and delivered in partnership with state forestry agencies, cooperative extension services, certified foresters, conservation districts, and other partners.

- Proposing increased funding for FSP through the President’s Budget Request is one way USDA can signal support for this program to Congress and help increase on-the-ground technical assistance.

USFS Forest Legacy (FLP): Offers the most flexible and widely applicable federal program for permanent conservation of forestland and protection from development, and provides critical federal assistance to states, private landowners, and conservation groups to protect working forests through permanent conservation easements and fee acquisitions. 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 significant increased funding levels commensurate with the increased funding provided to the LWCF by the GAOA. Increased priority should be placed on projects that can demonstrate an increase in carbon sequestration.
- USFS 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.

NRCS Environmental Quality Incentives Program (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. Funding available for forestry practices within EQIP should increase to further support adoption of climate-smart forestry practices.

NRCS 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 bundle of enhancements should be constructed around extending contracts for tree plantings and optimizing carbon uptake in standing timber. This could be constructed in a manner that also improves water quality and wildlife habitat.

NRCS Conservation Reserve Program (CRP): Offers an annual payment to landowners who take highly erodible lands out of agricultural production. Various land cover types, including trees, are eligible for the program. The 2018 Farm Bill increased the overall cap on program acres, but hardwood tree planting projects are not eligible for “Continuous Sign-up.” That means they are not automatically enrolled and must compete against other projects in the “General Sign-up” process.

- The ranking criteria for “General Sign-up” include air quality improvement, but criteria do not mention carbon sequestration explicitly. A continued increase in the acreage cap, relaxing the maximum on rental payments, and placing greater priority on tree planting would result in increased carbon storage.

NRCS Regional Conservation Partnership Program (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 should be a clear program objective.

NRCS Agricultural Conservation Easement Program (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 involve 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.

Model Climate-Smart Forestry on Federal Lands Support Cross-Boundary Efforts

USFS should model climate-smart forestry practices across the National Forest System. USFS has a critical role to play in practicing and promoting these practices and must work closely with other agencies, state foresters, and stakeholders to leverage maximum effect.

High-level Recommendations (where appropriate based on laws, regulations, and Land and Resource Management Plans):

- Ensure that “climate-smart” forestry practices are consistent with the multiple use mandate for the national forests and with the Land and Resource Management Plans. Where necessary, amend or revise the Plans to consider how best to incorporate climate-smart forestry practices.
- Incorporate strategies for management of post-disturbance events into forest plans in anticipation of fires, insect epidemics and other disturbances (Peterson, 2009). When appropriate, salvaging merchantable timber following fire, insect epidemics, and other disturbances will reduce surface woody fuels (Peterson, 2015) and sequester carbon in wood products.
- Utilize all contracting authorities, including timber sales, Stewardship Contracting, and Good Neighbor Authority (GNA) to accomplish more active management on the ground in an efficient and timely manner, which increases forests’ carbon sequestration capabilities, and increases resistance and resiliency to fires, insect epidemics, and other landscape scale disturbances.
- Increase support and contributions to Shared Stewardship, GNA, Collaborative Forest Landscape Restoration, Tribal Forests Protection Act, and other partnerships and collaboratives with other federal agencies, plus states, local, and tribal governments, and other avenues to leverage resources as a means of increasing the pace and scale of national forest management and climate-smart forestry on non-federal lands.
- Increase precommercial thinning and timber stand improvement programs to maintain vigorous growth that will yield merchantable trees. This will reduce the increase in acreage of small diameter trees while USFS is working to find ways to utilize the current backlog of small diameter trees.
- Invest in reforesting the millions of acres of non-stocked or understocked forests due to recent wildfires and insect epidemics. We recommend an inventory of national forest reforestation needs and close collaboration with states to strategize where planting is most needed based on availability of natural regeneration, soil protection, and wildlife habitat.
- Reduce live and dead fuels and increase forest heterogeneity.
 - Thinning, increasing forest heterogeneity through a mosaic of age classes and size classes, and reducing live and dead fuels will increase forest resistance and resiliency (DeRose, 2014) to fires, insect epidemics, and disease, and reduce the potential for catastrophic wildfires and the associated atmospheric greenhouse gases.
- Conceptualize and implement projects at the landscape scale level.
 - Climate change occurs at the landscape level and for projects to be potentially effective, they need to be conceptualized and implemented at that scale (MFRC, 2011).
 - Silvicultural treatments at a stand scale are most effective when conceived and applied in a landscape context (Anderson, 2011).
 - Several recent papers (Bollenbacher et al 2014, Ontl et al 2019, and Janowiak et al 2014) contain examples of how strategies, approaches, practices, and/or tactics can be generally described at the national level and then refined at regional and/or local levels for on-the-ground implementation.

A. (2) What *new strategies* should USDA explore to encourage voluntary adoption of climate-smart agriculture and forestry practices?

Cohesive Reforestation Strategy

Although many of the 4.25 million acres of forest that are harvested annually today are promptly reforested by private owners and public agencies, meeting the demands of a future population

projected to be 65 percent larger in 2080 requires a cohesive reforestation strategy combining aggressive forest management and increased afforestation.

Aggressive forest management strategies are needed to bring former forests that have been neglected, damaged (e.g., by pest outbreaks, wildfires, or storms) or poorly managed into a healthier, more resilient, more productive condition. But improving and intensifying forest management will not be enough. Afforestation—planting trees on land not forested today—is also needed. Abandoned cropland and brushy, weedy areas of little economic value today can be restored to working forests with determined, persistent, well-coordinated, sustainable forest management practices.

Through this two-pronged cohesive reforestation strategy, positioned within the larger challenges of sustainable, climate-smart forest management, the US could meet multiple land management objectives and societal needs while also reducing costs and losses from pest outbreaks and fires. It will take the combined energy and experience of experts in federal and state agencies, land-grant universities, and forestry professionals to achieve success.

Six bottlenecks to artificial regeneration have recently been outlined: (1) land for planting trees; (2) seed availability; (3) nursery capacity; (4) site preparation capacity; (5) labor force for site preparation, nursery production, and tree planting; and (6) monitoring seedling survival after four or five growing seasons and conducting early stand improvement activities (Guldin 2020).

B. How can partners and stakeholders, including State, local and Tribal governments and the private sector, work with USDA in advancing climate-smart agricultural and forestry practices?

- Some State Forest Action Plans already provide and encourage partners and stakeholders to be fully engaged in cross-boundary and shared stewardship conversations regarding forest health, insect and disease, and wildfire assessments.
 - Improved utilization and expansion of those existing relationships to incorporate dialogue on climate-smart agriculture and forestry practices offers the most expedient opportunity to converse on the topic.
- Increase the funding for and the number of Joint Chiefs projects across the US to improve resilience and incorporate climate-smart treatments on private lands adjacent to or near projects implemented on Forest Service lands.
- Increase utilization of the Tribal Forest Lands Protection Act to accomplish more active management, which also increases the working relationships with Tribes across the US.
 - GNA offers an excellent venue to advance climate-smart forestry practices with community partners, stakeholders, and particularly with Tribal and local governments.

C. How can USDA help support emerging markets for carbon and greenhouse gases where agriculture and forestry can supply carbon benefits?

Legislative Ideas Supported by SAF and Partners

Rural Forests Market Act: seeks to remove barriers for small-scale, family foresters and help them benefit from new economic opportunities through climate solutions like carbon markets.

- Establishes the Rural Forest Market Investment Program that offers guaranteed loans of up to \$150 million for nonprofits and companies to help small and family foresters create and sell forest credits for storing carbon or providing other environmental benefits.
- Provides a climate solution by encouraging forestland owners to adopt voluntary land management practices that draw carbon out of the air and store it in forests.
- Creates new revenue streams for small-scale, family foresters by making it possible to generate innovative credits they can sell in established markets.
- Brings investment into rural communities by reducing the financial risk to private investors who can contribute the upfront financing that makes these projects possible.

Growing Climate Solutions Act: creates a certification program at USDA to help solve technical entry barriers that prevent farmer and forest landowner participation in carbon credit markets.

- 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.

D. What data, tools, and research are needed for USDA to effectively carry out climate-smart agriculture and forestry strategies?

Strengthen the Forest Inventory and Analysis Program

The Forest Inventory and Analysis (FIA) program supplies the backbone of scientific knowledge on the current state of the nation’s forests. This critical information is needed to support sound policy and forest management decisions, both public and private, and is increasingly important for decisions regarding new and expanding markets, including carbon markets. Given the increasing pressures facing our forests—from wildfire, insects and disease, and development—the FIA program is more important now than ever before.

As engaged partners, we are interested in working with USDA and Congress to make program delivery as efficient as possible and to support additional federal investment to implement many of the useful tools outlined in the FIA Strategic Plan, such as urban inventory, increased plot density, and improved carbon and biomass estimates. Further, the 2018 Farm Bill called for “finding efficiencies in the program operations through the use of remote sensing technologies, where appropriate.” There is a need to make FIA data more robust and more useful for emerging uses, such as accurate information regarding carbon stocks, forest sustainability monitoring, wildlife habitat assessments, and much more.

Recommendations:

- **Five-year remeasurement:** Accelerate data collection on the base grid to the congressionally mandated five-year remeasurement cycle nationwide, fully funded with federal appropriations. Strengthening remeasurement capabilities to a consistent nationwide cycle and standard will have broad-ranging benefits including lower uncertainty levels in carbon estimation and more effective evaluation of policy options.

- **Carbon related data:** Work to enhance the program’s ability to collect and report on forest carbon related data. The need for timely information on forest carbon will only continue to expand, and it must be available when critical policy decisions are made.
- **Small area estimation and remote sensing integration:** Improve precision in estimates for smaller geographic areas and categories to address user needs. The program should work to significantly increase the use of remote sensing technology and use this auxiliary data set to provide small area estimates.
 - We recognize that there is concern that relying on remote sensing will take away some of the core strengths of the FIA program, namely the program’s use of long-established plot data. SAF advocates that remote sensing not be used to replace this system but to enhance it. The plot system is essential to maintain and ground-truth remote sensing data.
 - Remote sensing offers incredible advances and opportunities to develop a more complete understanding of forest conditions and provide additional detail that will help all forest owners make better land management decisions.
- **Salary and Expenses Budget Line Item:** While the modernized budget structure implemented in FY21 has resulted in unprecedented levels of transparency, we are concerned that there is not a dedicated salary and expenses line for FIA. Establishing a line item for salary and expenses for the FIA program will help ensure that each research station is spending an appropriate amount of salary and expenses funding on FIA and hiring critical positions to ensure program delivery.

Strengthen the Role of the Resources Planning Act Assessment and Associated Forest Carbon Projection Capabilities

The Resources Planning Act (RPA) Assessments and supporting technical reports produced by the Forest Service RPA research team represent a valuable set of scientific information that is underutilized by stakeholders interested in forests, carbon, and climate. Additionally, stakeholder engagement with the RPA Assessments has been lacking in recent years. To enhance utilization, and strengthen the role of the RPA Assessments, Forest Service leadership should 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. In addition, USDA should continue to seek guidance from the expertise of modelers within the USFS that specialize in combined ecological/economic “futuring.” The modeling work of these scientists is the best way to gauge the carbon impacts of proposed USDA policies in a way that adequately assesses potential economic feedbacks.

Support Life Cycle Analysis and Market Research

USFS, though Life Cycle Analysis (LCA) research and other efforts that increase awareness, acceptance, and use of wood products by key audiences—architects, engineers, insurers, builders, designers, and international standards and codes developers— continue to expand opportunities to keep forests as forests and provide carbon sequestration through the built environment.

Recommendations:

- Continue to fund economic and market development research to enable expanded use of wood products to deliver climate benefits and meet consumer needs in existing and new market areas,

strive to significantly increase carbon storage and energy substitution in wood products, displace GHG emissions from more fossil fuel intensive alternatives and creating higher levels of sequestration as increased demand for wood products stimulates landowner investments in reforestation and forest management.

- Emphasis areas in market development include:
 - Advancing LCA research to document the climate benefits of wood products.
 - Market research about key forest products markets to support strategies to increase understanding of their benefits by key audiences.
 - Understanding how wood market/housing markets adapt to these changes.
 - Discovering how wood can be best positioned to advance climate solutions.
 - Increased understanding of the benefits using wood in the built environment, from housing to commercial construction, to infrastructure projects.
 - How the housing market can advance climate solutions and be better adapted to changes in housing preferences and the extreme impacts of the changing climate.
- Market development also includes educating key audiences through extension, industry promotion, and demonstration and accelerating research to develop innovative wood products through collaborative strategies with the USFS Forest Products Laboratory, universities, and the wood products and construction industries.

Address Reforestation Questions

There is a current and pressing need to address the nation's reforestation backlog. Investments in reforestation research have waned while expanding needs for reforestation are becoming more apparent. Research is needed that:

- Effectively measures and tracks carbon through all forest management practices is needed, providing a direct link to market options and landowner incentive structures.
- Ensures that reforestation policies expand forest carbon benefits without harming current market participants or generating carbon leakage effects.
- Builds on existing research that identifies strategies to minimize leakage, such as encouraging tree planting where timber supply impacts would be minimal.
- Further analyzes ways to address important constraints on planting activities, such as limited seed and nursery capacity, ecological knowledge, and labor availability.

Coordinate Research Priorities

USFS and multiple partners should ensure cooperation and prioritization amongst agencies funding forest related research, especially as it relates to questions associated with forest climate and carbon policy and should work with stakeholders to identify and fund priority science. USFS and partners including the National Institute for Food and Agriculture, the National Science Foundation, and other partner organizations should provide a report to Congress that describes the agencies efforts to ensure cooperation and prioritization amongst all federal agencies funding forest-related research, especially as it relates to questions associated with forest climate and carbon policy and its efforts to work with stakeholders to identify and fund priority science. This effort should help avoid the duplication that often proceeds from working in agency silos and emphasize priorities that advance economic opportunities and science to leverage natural carbon storage solutions.

2. Biofuels, Wood and Other Bioproducts, and Renewable Energy Questions

A. How should USDA utilize programs, funding and financing capacities, and other authorities to encourage greater use of biofuels for transportation, sustainable bioproducts (including wood products), and renewable energy?

Markets for a variety of forest products are needed to facilitate climate-smart management across all ownerships. In parts of the country where markets have disappeared, implementing adequate forest treatments can be very expensive or even cost prohibitive. The following are recommendations related to programs and policies that support these markets.

Overarching Recommendations:

Encourage Solid Wood Product Substitution

Substituting solid wood products for fossil-fuel-intensive products can reduce GHG emissions in several important ways. Life-cycle analyses consistently show that lumber, wood panels, and other solid wood products store more carbon, emit less GHGs, and use less fossil-fuel energy than steel, concrete, brick, or vinyl, whose manufacture is energy intensive and produces substantial emissions (Lippke et al. 2004, Malmshemer et al. 2011). Harvesting temporarily reduces carbon sequestration in the forest by removing biomass and disturbing the soil, but much of the removed biomass is subsequently stored in forest products or otherwise used to substitute for fossil-fuel products or energy.

Solid wood product substitution provides long-term carbon storage that, when combined with appropriate waste and landfill management, can further delay the conversion of wood to GHG emissions, or provide waste wood for power generation to reduce the need for fossil fuel generation.

Encourage Woody Biomass Substitution

The use of woody biomass from forests to produce energy and biochemical products opens two additional opportunities to reduce GHG emissions (see SAF National Position Statement, *Utilization of Woody Biomass for Energy*). One involves using biomass for combined heat and power rather than allowing low-value forest residues to accumulate and decay on site or removing them by open burning. Hundreds of millions of tons of biomass could be generated annually from logging residues, treatments to reduce fuel buildup in fire-prone forests, treatments to improve forest health, fuelwood harvests, forest products industry waste, urban wood residues, and energy plantations (US Department of Energy 2016). Biomass can be burned directly, mixed with coal, or added to oil- and gas-generated electric production processes to reduce GHG emissions (Xi Lu et al. 2019); any such use of biomass for energy can reduce regional dependence on coal, natural gas, diesel, and/or heating oil imports.

The second opportunity is substitution of forest biomass as a feedstock for biofuels and biochemicals, which can be substituted for fossil-derived fuels and chemical production. Fossil-fuel chemical products introduce new, additive pollutants into the atmosphere, whereas biogenic emissions are re-sequestered over time. Substituting cellulosic biomass for fossil fuels greatly reduces carbon emissions (US EPA 2007). Further, the use of forest biomass enhances domestic and regional economic development by supporting rural economies and fostering new industries making value-added bio-based products.

Program and Policy Recommendations:

USFS supports several efforts that promote wood utilization. These are all valuable efforts that should be retained and built upon.

Continue Support for USFS Forest Product Programs

Forest Products Research Lab

- Explore wood use technology transfer, market research/demonstration and continue life cycle analysis work.
- Continue and expand research to help identify economically and technically viable alternative wood products that can be applied at a local scale to utilize wood waste from forest thinning and management activities.

Wood Innovation Grants

- Expand to include technology transfer and projects that address technical and educational barriers to scaling adoption in wood building design and construction.

Mass Timber University Grant Program

- Continue to showcase the architectural and commercial viability of mass timber in building construction. By placing these buildings at institutions of higher education, USFS helps educate the next generation of decision-makers about the benefits of mass timber.

WoodWorks

- Continue to support this program, which provides education and free technical support related to the design, engineering, and construction of commercial and multi-family wood buildings in the US.

Continue Support for 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.

Revise USDA Procurement Policy

The use of low carbon building materials not only reduces the carbon footprint of the built environment but also supports strong forest products markets, which enable private forest owners to invest further in sustainable forest management that enhances forest carbon sequestration, water quality and wildlife habitat. USDA should:

- Revise its procurement policy and Green Building Manual to incorporate the goal of reducing the carbon footprint (including embodied and embedded carbon) by 20% for new, renovated, and rebuilt buildings and prioritize use of wood and wood products from sustainably harvested timber, as a preferred construction material.
- Promote consistent communications across federal, state, local, university institutions to promote the benefits of forest products compared to conventional construction materials. This aligns with the first plank of the Biden Administration’s Climate Innovation Working Group, which calls for “zero net carbon buildings at zero net cost, including carbon-neutral construction materials.”

B. How can incorporating climate-smart agriculture and forestry into biofuel and bioproducts feedstock production systems support rural economies and green jobs?

There are multiple opportunities to increase the amount of carbon stored in agricultural and forest soils, as well as growing more wood and capturing more carbon in forests that can be stored in long-lived products and the use of residues from agriculture and forestry to make biofuels and bioproducts.

Wood Product Examples:

The following are just a few examples of innovate wood products that can support rural economies and green jobs.

Wood Fiber Insulation

With the decline of the US paper industry, wood fiber insulation products¹ (as blown material, batting, or rigid board) can be a tremendous opportunity to use woody biomass to create a long-lived, carbon storing product from residues of manufacturing, logging, and forest thinnings. These products are not currently made to any significant extent in the US. In Europe, wood insulation is often made in a plant co-located with a sawmill and wood engineered manufacturing plant. This integration of production solves many logistic supply chain issues and creates additional jobs in local rural areas.

Biochar

USDA has tremendous opportunities to link up USFS and NRCS programs and land management to produce biochar and then apply it to appropriate agricultural soils through programs like EQIP and the NRCS stewardship practices.

- One of the challenges for the National Forest System and private forest landowners is that burning slash piles is more expedient and cost effective than making biochar. The problem is that market development and supply chain issues need support to get established. Targeting programs in Rural Development to address these issues could help speed up the natural carbon capture and storage opportunity.
- The US has hundreds of thousands of abandoned and current mine sites, on private lands and USFS and BLM lands, that will need restoration. This is another opportunity for USDA and DOI to demonstrate the effectiveness of biochar and help develop market demand.
- The Secretary's office could develop partnerships with private companies that have made public commitments to become carbon negative. It is hard for individual farmers and forest landowners to work out small-scale agreements. USDA could facilitate the development of tools for aggregating carbon value from biochar production, sell the credits, and then the char can be used to ameliorate nutrient problems on dairies, feedlots, chicken, farms, etc. while producing a highly concentrated carbon and nutrient-rich fertilizer that can replace traditional fertilizers.
- The research arms of USDA should focus and coordinate research efforts on biochar market development to target specific needs and avoid redundancy.²

¹ E.g., <https://golab.us/>

² This paper lays out the role of research in helping fill in information gaps related to biochar: <https://www.jswnonline.org/content/76/1/24A>.

Additional suggestions:

- The National Forest System and many private lands have overstocked forests that need thinning to reduce wildfire, insect and disease risks and make them more resilient. Instead of burning in place, slash and small trees can provide feedstock for biorefineries to produce jet fuel, other biofuels and bioproducts.
- Many rural communities do not have access to natural gas and thus use fuel oil or propane for space heating. Programs by Rural Development could help them fund the infrastructure to create district heating systems with heat led electrical production as an additional option. For example, the Burns, Oregon small scale system was assisted by USDA.³
- NRCS stewardship practices that cost share with landowners can increase soil organic matter/carbon through:
 - Cover crops, no till, etc.
 - Addition of biochar to ag or forest soils
 - Agroforestry practices:
 - Wind breaks that produce food and/or biomass
 - Woody crops grown in riparian zones that can provide food and or biomass, such as hybrid hazel nuts.
 - Forest slash disposal methods that produce and retain biochar in the forest.
 - Incentivize perennial crops over annual crops (permaculture)
- Rural Development programs, grants, and loans to:
 - Facilitate the development of supply chains for processing and transporting biomass efficiently.
 - Conversion of farm and forest equipment to biofuels and hybrid electric technologies
 - Process slash in the woods to power equipment.
 - Develop local gasification processing plants that can pipe the gas to a central biorefinery.
 - Potentially use existing natural gas pipeline infrastructure.

C. How can USDA support adoption and production of other renewable energy technologies in rural America, such as renewable natural gas from livestock, biomass power, solar, and wind?

USDA's Rural Utility Service (RUS) agency is a huge opportunity to support the adoption of a variety of renewable energy technologies, given their loan program funds and connections to the rural electric coops. The coops could expand into renewable natural gas and their precursors as well as geothermal and biomass to provide baseload power to balance the variable power from wind and solar. Rural areas can become partners with cities and states that have set targets for becoming carbon neutral, which is going to create jobs in rural areas.

Other program approaches that should be considered include:

- Require RUS to include the social cost of carbon into every project they finance so the economic advantages of renewable energy are factored into their financing decisions.

³ E.g., <https://wisewoodenergy.com/our-work/high-desert-biomass-cooperative>

- Use the financial loan funds of RUS to help fund the development of rural district heating and power systems. These should be hybrid systems using a combination of wind, solar PV and solar thermal, along with biomass, geothermal, hydro and hydro pumped storage where appropriate.
- RUS should partner with the current natural gas pipeline distribution system to look at how and where renewable natural gas can be produced and efficiently tied into their system.
- Biorefineries are likely going to be smaller and more distributed than the current petroleum-based refineries since biomass is not as energy dense and thus costlier to transport. This will benefit local communities that can host these new biorefineries.
 - The development of rural gasification plants that can then pipe precursor gases to larger refineries can help with the transportation cost issue.
 - RUS in partnership with DOE should work with existing energy companies to have joint public/private ventures to work on these solutions.
- Use the Rural Housing programs to finance the retrofitting of existing rural housing for deep energy retrofits which would greatly reduce energy needs and carbon emissions.
 - The retrofits should use cellulose-based fiber insulation which would create a market for biomass locally and be the basis for rural manufacturing of the rigid board, batting and blown in insulation that could then be exported to the cities as HUD funds deep energy retrofits in urban areas. This partnership between rural and urban programs would provide strong synergies for job creation and enhance the development circular biobased economies.
- Use the USDA Biobased Product program to add information to product deployment that indicates the relative carbon footprint of the non-biobased product. A good example is the comparison of cellulose fiber-based insulation to expanded polystyrene (EPS) products, along with fire risk comparisons and off-gassing. This kind of information can help consumers, architects, and other professional designers to make healthier, safer, and lower carbon choices.

3. Addressing Catastrophic Wildfire Questions

A. How should USDA utilize programs, funding and financing capacities, and other authorities to decrease wildfire risk fueled by climate change?

Active forest management, including prescribed burning, and wildland fire management strategies that reduce fire intensity and restore forest health can dramatically reduce GHG emissions (e.g., Bonnicksen 2008; see also SAF National Position Statement, *Wildland Fire Management*).

While fires are a natural and important part of many forest ecosystems in the United States, catastrophic wildfire is caused by a set of complicated and compounding factors—and a lack of adequate resources to realistically anticipate, manage, and recover. Despite increased funding for preparedness and suppression, damage to natural resources, property losses, and smoke-related health impacts continue to grow. Recovery and restoration work cannot come close to keeping pace as record-breaking acres continue to burn each year. Management needs to adapt quickly and radically if we want to restore resilience to fire-prone areas and reduce carbon emissions from wildfires. In the face of a changing climate, we must embrace active and sustainable forest management to bolster forest health and resilience, prioritize funding to diminish today’s fire realities, and anticipate forest restoration needs so that we can recover quickly.

The nation's public forests are drastically and dangerously overgrown. Historic fire suppression policies combined with recent direction in how these public lands are managed have led to forests that are no longer resilient to disturbance events, and many of these lands are turning into net carbon emitters.

Recommendations

- Commit to sustained investment in wildfire mitigation by creating an off-budget solution that provides reliable funding each year to USFS, DOI, and state forestry agencies for the implementation of the highest priority risk-reduction projects is essential to fighting wildfires before they start.
- Fully implement the Wildfire Funding Fix to allow mitigation funding to flow to non-suppression programs that experienced severe budget shortfalls due to “fire borrowing.”
- Increase the utilization of Shared Stewardship Agreements to partner with states to collaborate on fuel reduction and other management projects within those states. These agreements describe how the Forest Service, and each state will cooperate to plan and implement projects across federal, state, and private ownership boundaries. The agreements discuss the need to increase the pace and scale of management actions to reduce risks from wildfire.
- Increase the use of Good Neighbor Authority to increase project capacity in cooperation with states. This will aid the agency in leveraging resources and state funding opportunities to better achieve management activity goals. The authorities permitted were expanded in 2018, allowing greater levels of cooperation under this program.
- Utilize a combination of Stewardship and Timber Sale Contracting authorities. Lack of agency capacity and qualified personnel continues to be a barrier to management goals. Much of the work involved in preparing fuel reduction projects can be completed by the private sector at a reasonable cost, including preparing NEPA compliance documents. The 2018 omnibus budget bill allows for stewardship contracts up to 20 years in length, which may be a good option to explore in some situations. Depending on the project, private contractors can be more cost effective than other agency alternatives.
- Increase the use of Collaborative Forest Landscape Restoration Program projects. Existing law allows the agency to develop projects up to 3,000 acres. In California, USFS has signed MOUs agreeing to strive to treat 500,000 acres per year for hazardous forest fuel reduction. USFS will need to use all the authorities at their disposal to achieve this goal.
- Increase support for the State Fire Assistance and Volunteer Fire Assistance programs to significantly increase the number of hazardous fuels acres treated and help contain wildfire when they are small to reduce fatalities, injuries, loss of homes, and reduce ultimate federal fire-fighting costs.
- Increase the use of prescribed fire to return low intensity fire to our landscapes and make forests and communities more resilient to natural and necessary fire cycles.
 - Air quality regulations can serve as a significant barrier to accomplishing these goals. USDA should work with EPA, state foresters, state air quality regulators, and governors to address the value of prescribed burning and foster shared understanding that planned smoke emissions from prescribed fires pose less risk to human health than mega-emissions from uncontrolled wildfires.
- Utilize relatively recent research for assessing risk and planning management activities at the landscape scale, across private and public boundaries, to better map and prepare for extreme events which are anticipated to increase in frequency. Modifying treatments in critical locations can provide mitigation for fire behavior and effects.

B. How can the various USDA agencies work more cohesively across programs to advance climate-smart forestry practices and reduce the risk of wildfire on all lands?

Support Acceleration of the National Cohesive Wildfire Management Strategy

USDA should work with partners to support the three goals and achieve the vision of the Cohesive Strategy:

- Restore and Maintain Landscapes
 - Landscapes across all jurisdictions are resilient to fire-related disturbances in accordance with management objectives.
- Fire Adapted Communities
 - Human populations and infrastructure can withstand a wildfire without loss of life and property.
- Safe and Effective Wildfire Response
 - All jurisdictions participate in making and implementing safe, effective, and efficient risk-based wildfire management decisions.

Utilize State Forest Action Plans

State Forest Action Plans represent a collaborative priority planning document covering all land ownership types within a state. USDA agencies can work cohesively across programs by working with states to ensure program dollars are hitting the ground in these high priority areas to be the most effective investment to reduce the wildfire risk across all lands. Active communication with state partners is key to effectively administer programs in a strategic manner.

C. What additional data, tools and research are needed for USDA to effectively reduce wildfire risk and manage Federal lands for carbon?

Research needs:

- Collect data, in conjunction with other forest landowners, on wildfire emissions from both treated and untreated units to determine the carbon emission benefits from fuel treatments. With this data, computer models can be modified and utilized as necessary and appropriate. This could lead to modeling that would clearly demonstrate the climate benefits of avoiding wildfire emissions. This data could then be shared with state and local air quality management agencies, demonstrating the benefits of forest treatments, and leading to greater use of prescribed fire as part of the overall management strategy.
- Research into alternative uses for smaller diameter trees and woody biomass debris, such as sustainable aviation fuel, biochar, cross-laminated timbers, and nanocellulose, to name a few. Planned and desired fuel reduction projects will generate thousands of tons of woody biomass each year. Utilizing this material, instead of leaving it onsite to decay or fuel a wildfire, or to be open burned, would avoid increasing the amount of carbon and associated byproducts emitted into the atmosphere—a outcome which is the opposite of climate-smart forestry.
- Modelling and analysis of wildfire behavior in a drying southeastern US, the Rocky Mountains, the southwest that examines likely weather and climatic variability for 10 and 20 and 30 years into the future is needed to help inform management choices that are being made now and in the near future.

- Synthesis of research done to address the phenomenon of “double” and “triple” burns, where a high intensity fire kills all or most of the forest is followed by a second fire 10-30 years later when the downfall from the first fire has created conditions for an intense/severe burn that consumes almost all the downfall and live new forest.

D. What role should partners and stakeholders play, including State, local and Tribal governments, related to addressing wildfires?

In many regions, State and Tribal governments are working together or with various watershed councils and Resource Conservation Districts to develop and implement prescribed fire operations across certain landscapes to successfully reduce the risk of wildfire. Some of these groups are also training individuals and groups to conduct prescribed burns so that they can reintroduce prescribed fire to their ownerships and landscapes, as well as increase the knowledge and acceptance of prescribed fire to reduce wildfire and its effects.

Over the last 10-15 years, local partners, stakeholder groups, and local governments have conducted many fuels treatment projects in the WUI to reduce wildfire risk to neighborhoods. This has been somewhat successful, as demonstrated in communities where the treatments were conducted and then a wildfire moved into and through the treated area.

It is vital that partners, stakeholders, and State, local and Tribal governments be brought into the project early. They need to demonstrate the fuel reduction projects are not only prudent, but also provide benefits and value to the adjoining communities. For Tribal nations, honoring and using “Traditional Ecological Knowledge” is also an important tool and consideration for partners.

4. Environmental Justice and Disadvantaged Communities Questions

Investments in climate-smart forestry practices should benefit all communities. To realize these benefits, USDA must commit to having a broad, diverse, and inclusive stakeholder group actively participate in climate policy-decision making processes to best assess and prioritize local needs. USDA programs and incentives should be structured inclusively and designed to equitably distribute benefits and burdens of climate and agriculture policies. USDA and partners must work together to understand and address institutional barriers to accessing USDA programs.

Conclusion

Forestry and natural resources professionals must continue to play a key role in decisions about the future of our nation’s forests. As you continue to finetune these programs and initiatives, we encourage you to support policies that foster the ability of these scientists and practitioners to create and implement management plans and activities that can adapt to changing conditions and needs.

The 2023 Farm Bill will provide an opportunity to provide additional funding and refine programs to focus on climate change efforts that achieve both mitigation and adaptation objectives related to climate change.

Thank you again for offering the opportunity to provide comments on these important questions. We look forward to working together on this and other efforts that embrace the invaluable expertise of forestry and natural resources professionals. Please consider SAF as a resource and ally moving forward.

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