



U.S. Forestry R&D Priorities Summit

June 2023

Final Report

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Executive Summary

U.S. forest and forest products research and development (R&D) capacity and practical relevance has eroded substantially during the past three decades. Without significant investments and leadership, the global competitiveness of the U.S. forestry and forest products sector, and the associated management and sustainability of America's forests, are at risk. Effectively filling gaps and communicating across stakeholders to solve urgent forest management problems will require establishing a dedicated effort, with dedicated resourcing.

In 2023, a group of over 50 leaders representing more than 25 private, state, federal, and academic organizations came together in a National Summit to scope a new, long-term approach to collectively identify, communicate, coordinate, and advocate for U.S. forest and forest products R&D priorities, capacities, and funding. The group considered the results of a 2020 virtual summit, a national forest management and wood products survey, and a draft vision to create a long-term, funded effort to ensure that ongoing forest R&D addresses the most urgent forest management challenges and meets the needs of decision makers, customers, and communities.

Using comprehensive survey data, Summit participants identified three shared R&D priority areas that merit focus from a future consortium: (1) forest health improvements; (2) climate change adaptation; and (3) wildfire mitigation, with a fourth area - workforce capacity development - identified as an end-goal of the consortium effort. Summit participants also determined three consortium objectives: (1) the efficient use and dissemination of translated science; (2) fostering better alignment between research users, managers, and producers on priorities and resourcing; and (3) the effective translation and communication of the value of forest R&D in ways that resonate with key decision maker audiences.

A proposed consortium will serve as the go-to coordination body for information, priorities, and messaging showcasing the value and relevance of current forestry research and development in the U.S. It will serve as a structured convening forum connecting disparate parts of the forest R&D sector ecosystem and coordinating periodic stakeholder discussions and reports. The consortium will draft educational materials, identify effective messengers, and facilitate alignment of decision makers/managers and producers through consistent and transparent internal communication between members. The consortium's work will be based on voluntary collaboration, transparency, shared trust, science-based outcomes, and respect for a diversity of viewpoints. Dedicated staff will ensure the consortium will provide value to its members and that deliverables are met. What does success look like? In short, decision makers must recognize the value and relevance of forest and forest products R&D and invest resources to rebuild and sustain our national capacity.

Summit Background and Goals

Forests across the United States face major threats, including increasing wildfire, insect and disease outbreaks, invasive plants and animals, climate change, and fragmentation. Forest managers work to mitigate these threats on-the-ground every day. Tremendous new opportunities also exist for the nation's forests, including increasing carbon sequestration and storage to help mitigate climate change, bolstering economies of forest-based communities, providing clean freshwater, increasing biodiversity, expanding urban forests, and connecting the public with nature for numerous health benefits. To adequately address these threats and capture new opportunities for forests will require greater focus on the most important problems facing forest managers across the country.

In 2020, a group of stakeholders representing leadership across the forestry and forest products sector identified the following critical issue: A major limitation to solving the highest-priority problems facing forest managers has been the steady erosion of the capacity and practical relevance of forest research over the past several decades. As a first step, this group proposed a National Summit to identify forest and forest products R&D priorities and a potential plan for spotlighting and amplifying these priorities to increase R&D capacity sector wide. In 2020, eight stakeholder perspectives (State Foresters, family landowners/managers, large private forest owners/managers, forest products industry leaders, environmental NGOs, USFS National Forest System leaders, USFS Research Station Directors, and University research leaders) were gathered in focus groups to discuss Forest and Forest Products Research & Development (R&D) in the United States, with a focus on declining capacity and proposed solutions. Over 73 individuals participated from a range of organizations and shared their perspective on challenges, opportunities, and priority setting. The transcripts from each focus group (held via Zoom) were analyzed and coded for major themes and a final report was produced. One major finding from these focus groups was that R&D priorities and perceived opportunities at the national level were remarkably consistent.

The organizing team felt that a more inclusive and intentional prioritization survey process should be attempted, with a subsequent in-person summit to review the survey results and a vision statement describing how these priorities could be used to rebuild the capacity of forestry and forest products R&D nationwide. The Summit's goals were to: (1) present data on a survey to determine R&D priorities; (2) learn about current R&D production and consumption from a variety of organizations; (3) explore potential ways to build R&D capacity; and (4) discuss a strategy to communicate the value of research to stakeholders and decision-makers.

Summit Participants and Agenda

The Summit included over 50 people representing 25 organizations (Appendix 1I). The agenda included presentations about the virtual summit, results from a national forest management and wood products challenges survey, and potential vision to increase R&D capacity, followed by participant flash talks and group discussions about next steps (Appendix I).

Forest Management/Wood Products Challenges Survey Summary

The national survey was designed in two rounds, following a modified Delphi approach to prioritization. A Delphi approach to consensus-building involves gathering subject matter expert opinion in a first round, and then asking participants to rank order coded statements. This is then repeated, showing participants results from prior rounds, so that they may adjust their rankings if they so choose. The first round collected information about participants' professional profile and one open-ended question asking participants to identify the most important challenges facing either forest management/conservation or wood products. Open responses were thematically coded and then themes were aggregated, keeping only themes that were mentioned more than twice. The resulting 28 themes were presented, with definitions, during a round two survey that asked participants to rank them in order of importance. The initial survey was distributed broadly through associations representing forestry professionals, including the Society of American Foresters, Forest Climate Working Group, National Association of State Foresters, USDA Forest Service, American Wood Council, National Association of Forest Owners, Southern Landowners Network, Intertribal Timber Council, National Association of University Forest Research Programs, and others. Full results from the survey can be found in Appendix III; the top five forestry challenges are:

1. Workforce Issues
2. Forest Health Improvement
3. Climate Change Adaptation
4. Public Perceptions
5. Wildfire Mitigation

While workforce issues are certainly the number one priority in forestry, this may be more difficult to translate to an R&D solution. One element missing from the list was to research indigenous ways of knowing and other forms of knowledge. The answers to critical research questions and how we can better communicate them was considered. Making these priorities relevant to key audiences is essential. Research producers expressed concern that the consortium focus might be too high level and should detail the priorities, so producers know what research questions are relevant.

Summary of Visioning Discussions

Dr. Robert Wagner (Purdue University, Summit organizing team) presented an overview of findings from two studies examining the decline in forest research capacity in the US over the past several decades. This erosion has occurred across federal, university and industry organizations which include a 40% staffing reduction in fields critical to protecting forest health (e.g., entomology and pathology) and a 75% reduction of USFS staffing to advance wood products research. In addition, there has been a 15% decline in number of university forestry professors and USFS scientists since 2002, and a major decline in research units supported by forest industry. On top of this decline in capacity, discussions with national forestry leaders from an earlier R&D summit and a recent study of forest resource dissertation topics indicate a significant decline in research directly addressing the problems of forest managers.

To address the problem of declining forest research capacity and relevancy, a two-pronged approach to solving the problem was developed from how agriculture addresses the same problem:

1. Develop periodic survey of forest managers to identify the highest-priority problems that they face on-the-ground at state, regional, and national levels.
2. Develop a communications program to regularly inform the forest research community, research funding agencies, policy makers, and other leaders about need to solve the highest-priority problems facing forest managers.

The vision (Appendix III) includes building a national consortium of leading national forest-based organizations that represent the concerns of large private forest owners/managers, family forest owners, managers of federal forestlands, state foresters, and forest managers from conservation organizations. The consortium would be responsible for developing and sustaining the two-pronged approach to increasing the relevance and capacity of forest research in the US based on these concepts:

- Support for common efforts to share information and bridge the gaps in data, expertise, research, information transparency, and messaging across disciplines, geographies, institutions, and the supply chain.
- Assistance with the procuring, evaluation, and prioritization of data, information, and research that provide target audiences a better understanding of the value of current R&D efforts and identify urgent gaps that need to be addressed.
- Providing resources, such as funding, access to data, staff expertise, review and advice, towards consortium efforts to enable the success of our common mission.

The forest sector is both diverse and fragmented. This prioritization and capacity-building effort may want to include peripheral organizations at some point but start with our traditional stakeholders. Examples of additional groups that can be engaged in this effort:

- Urban forestry community
- Watershed and water-focused groups
- Wildlife and other ecosystem service-oriented groups
- Architecture, construction, and engineering communities

The distance between research production and consumption should be shortened; ACTIONABLE research should be the focus. In the research continuum, we can think of Basic research (e.g., research to advance knowledge regardless of application) leading to Applied (e.g., research with a clear management application) leading to Operational (research that guides how something is undertaken). The SARE (Sustainable Agriculture Research and Education) grant model, which necessitates researchers finding producers/managers to partner with on all funded projects, might provide a template.

Dedicated staffing will be required to build R&D capacity and promote priorities, because, as the saying goes, "If it's everyone's job, it's no-one's job." Research relevance at all scales (temporal and geographic) need to be improved and research outcomes mapped to managerial boundaries, and to specific decision makers. The consortium might create an interactive map for legislators to pull relevant case studies where research producers met the needs of research consumers and connect current crises, (fire, air quality) to research outcomes to engage decision makers and the public. Research drives the future forestry workforce - we need a

model of who works in the woods and then realign education and training with workforce needs. Workforce development is the end point to all capacity-building efforts.

Challenges to achieving this vision include limited resource capacity, research redundancies, and trade-offs between research and work on the ground. Breakout groups also identified a lack of coordination between the National Institute of Food and Agriculture (NIFA) and U.S. Forest Service.

A consortium was described as “An organization of organizations.” This new organization could be:

- Inclusive
- Broad enough to address many issues
- Different from the past (inclusive of within forestry-sector and outside forestry-sector partners)
 - 1) What do forest managers need to be successful on the ground? What do we need ourselves?
 - 2) What is being asked of us?
 - What has NOT worked - management centric, not including related sectors, campaigns against overly specific threats, inward looking within the sector?
- Inspired by current challenges.
 - Wildfire + climate change

Additional points deemed critical for success:

- Don't let perfect be the enemy of the good.
- We need a clear plan to move forward including the goal (more money, better outcomes).
- Articulate key needs inside and outside:
 - Serving our needs for better science and outcomes.
 - What does broader society need from all forest research?
- Think big, start with small actionable steps.
- Better describe short-term and long-term goals based on a unifying theme.
- Long-term and enduring system to promote forest research.
- System design is critical.
- Strategic refinement of priorities.
- Validate relevancy for additional investment.
- Strengthen alignment between consumption and production.
- Reduce confusion through more coordinated and authoritative research.
- Bring other federal agencies into the conversation.
- Curation of science delivery is an important gap.
- Define impacts beyond priorities.
- Priorities:
 - Who determines them?
 - How do you build a sustainable coalition?
- Focus the consortium on an actionable issue.
- Differentiate between short- and long-term research needs.
- Cultivate outside of core forestry:
 - Groups may not be able to sign on if “advocacy” is used.
 - Meet groups where they are:
 - Connect to their values.

- Make it broad enough to allow groups to see themselves in the list.
- Maybe also consider infiltrating other big groups—agriculture, carbon, water:
 - Can the consortium also serve/participate in other groups?
 - Creating a cohesive identity for forestry may be one purpose of the consortium.

Summary of research consumption and production flash talks

Research Consumption

- The National Fish and Wildlife Foundation described science-informed landscape scale business plans and species-oriented goals. Their focus right now is on wildfire, water, and climate/carbon issues. They are building an in-house tool for equity to include engagement metrics and demographics.
- Rayonier, Inc. described a need to improve productivity, profitability, and sustainability of their forest holdings. They are participating in research cooperatives that focus on customer needs and on process more than topics. They believe we need to convey that forests are important, research is needed to manage forests, and then describe what research is most important.
- The Hardwood Federation described a critical need to change public perceptions around management (cutting down trees). They've found that everyone aspires to wood, but buys non-wood products, indicating a consumer marketing issue. There may also be perception issues around carbon markets, including a concern that these markets are disincentives for harvesting. We need to tell a better carbon story including the full chain of carbon benefits.

Research Production

- NCASI consists of member companies and partners with universities for research and research translation. They use existing empirical data (e.g., FIA, TPO, Biodiversity indicators) to provide estimation and trend analysis, particularly at small areas (mill scale). Their concern is that a sole focus on carbon sequestration can lead to the exclusion of other forest ecosystem services and encourage integration of key concepts. They are focusing on belowground carbon estimation, forest area change, water systems, and fire effects (e.g., restoration needs).
- USFS R&D is focusing on multi-use and cross-boundary research with a clear focus on the wildfire crisis strategy to improve forest resiliency and reduce risk. Other critical topics are water quantity/quality, forest health, urban forestry and sustainable recreation, tribal and indigenous partnerships, forest market economics, biorefineries and other bioproducts markets, and landscape decision-support tools.
- NIFA supports research through capacity (formula) funding like the Hatch and McIntire-Stennis Acts. McIntire-Stennis funding can be up to ½ of the USFS R&D budget but is far below that currently. NIFA runs the AFRI program, authorized by the Farm Bill. In fiscal year 2023, \$405 million was appropriated (discretionary). These funds can be used

at universities, other federal agencies, and NGOs. Program descriptions are developed by the national program and are only incrementally changed (by design).

- Weyerhaeuser has a research group that focuses on production, genetics, health, water, and air quality. Their constituents or clients are their own in-house foresters. They prioritize research based on the return on investment (internally). Through research cooperative involvement, they may publish external research. Their primary concerns are forest health (early mortality and insect/diseases) and markets (mass timber, packaging, pellets). Constituents want research and then become consumers or customers.

Further reflections in this session:

- Production does not equal publications. There are other outputs besides scientific publications that are critical to management success.
- In the past, research scientists had staff, but are now increasingly asked to divide their time on administrative duties and research (add teaching and service if in a university).

Summary of Communication and Strategy

Discussion

The cadence of communication is critical. Some issues create a one-time demand, while other priorities need to be communicated on a regular basis. We need to focus not just on the science but on the value of science. A critical function of a consortium is to identify topical experts clearly (with contact sheets), so that decision-makers know who to call. A point person who is not tied to a specific sub-sector (e.g., large corporate landowners vs. wood products manufacturers) may have a more powerful voice, if they are truly representing the entire forestry sector.

Speaking the language of our key audiences, with a particular focus on rural communities, is critical to an effective promotion of our messaging. We need to ‘show’ decision-makers by highlighting successes at legislative scales - and highlight efficiencies of taxpayer money. We also need the consortium to gather users and consumers who can deliver the message (equivalent of farmers speaking to decision-makers). This communication strategy is NOT a one-way street. The consortium should communicate results of these efforts back to the researchers.

A breakout group was split on the value of “advocacy.” Some thought that the communications work would be critical to the organization’s mission; others thought it would get too close to lobbying and cause uncomfortable conflicts among participants. Some suggested that the consortium will be more effective if it does not include a policy platform, which could create disputes and impact support. Another person suggested that the group will be more effective as an action-oriented “strike force” —convene for a single, specific purpose, attack the problem, then dissolve. Another suggestion is the consortium be more of a convener of ideas, rather than an arm of action, daylighting the science with transparency and without judgment. A different breakout group mentioned that traditional advocacy and communications strategies are falling short. A non-traditional social media and influencer strategy with youth organizations as partners could be considered.

After this session, the large group decided we needed to focus on refining the consortium's objectives and articulating a statement of purpose.

Summary of Purpose Statement Development

A purpose statement is needed but should also remain flexible while being developed. The focus of this purpose statement should be the need to foster better dissemination of translated science knowledge among decision-makers.

Elements of brainstormed purpose statement in one breakout room:

- Identify shared priorities and gaps.
- Foster better alignment between research users and producers.
- Co-develop research to leverage diversity and strategy.
- Communicate to decision-makers that R&D is an essential component to solving problems in our communities and showcase progress on goals.
- Accountability as a model.

Concluding Remarks

As the summit concluded, the room was asked: What does success look like?

The group agreed on the following: **Decision-makers recognize the value of forest and forest products R&D and fund a large initiative to rebuild and sustain our national capacity.**

Forests and forest products are key to creating and sustaining healthy and thriving communities. But to keep pace with the challenges of today and tomorrow, we need to foster innovation and understanding. Through forestry research and development, we can advance solutions that improve our lives and ensure a sustainable future.

The consortium will serve as a champion of forestry research and development in the US – connecting and convening forest-science stakeholders from across disciplines to drive innovation while improving coordination and creating efficiencies for researchers, funders, and stakeholders.

It will be the go-to source for information on the ecosystem of forestry research and development in the US.

Objectives:

- Identify shared priorities and knowledge gaps.
- Promote efficient use and dissemination of translated science.
- Foster better alignment among science stakeholders (consumers) and researchers (producers).
- Bolster decision-makers' understanding of the value of science.

The new consortium should be explicit about offering a collaborative forum where diverse voices and dissenting views are accepted. To go back to their home organizations to make a decision to join this effort, Summit participants need:

- A detailed budget/cost estimate (might be in tiers based on level of commitment).
- A detailed scope of what the organization will do.
- A detailed governance structure (how agendas will be set and decisions made).

The group coalesced around the idea of three documents: (1) a Vision Statement; (2) a Values Statement (this would include a commitment to underserved communities); and (3) a Mission (Scope) Statement. These would accompany the budget estimate and governance structure.

The key next step is a discussion of a potential consortium and corresponding governance/budget structure with key stakeholder groups and their representative organizations.

Appendices

Appendix I: Agenda

US Forestry R&D Priorities Summit
Marriott Marquis 901 Massachusetts Ave NW, Washington, DC 20001
June 6-8, 2023

***Your Talents** will be used to prioritize Research & Development (R&D) priorities for the forestry sector. **Your Time** will be used to listen to evidence, determine what cross-cutting priorities are nationally relevant, and decide what process will work best to prioritize R&D in the future. **Outcomes** will include a consensus-based decision on R&D priorities, a governance process for prioritization, and a strategy to communicate the value of research to stakeholders and decision-makers.*

Tuesday June 6

Rooftop Evening social

Marriot Marquis, 5:30PM

Wednesday June 7

Marriot Marquis

Time	Topic
8:30 -9:00	<i>Registration</i>
9:00 - 9:30	Introductions and Welcome <ul style="list-style-type: none">• What is our goal?
9:30-10:30	The Vision
10:30 - 11:15	Session 1: Progress to Date <ul style="list-style-type: none">• The 2020 Virtual Summit• 2023 Grand Challenges Survey
11:15 - 11:30	<i>Short Break</i>
11:30-12:30	Breakout Roundtables <ul style="list-style-type: none">• Discussion of Vision, Summit, and Survey results
12:30 - 1:30	<i>Lunch</i>
1:30 - 2:15	Session 2: Research Producer Perspectives <ul style="list-style-type: none">• Flashtalks - Current and Emerging R&D
2:15 - 3:00	Session 3: Research Consumer Perspectives <ul style="list-style-type: none">• Flashtalks - Greatest research needs
3:00 - 3:15	<i>Short Break</i>
3:15 - 4:00	Breakout Roundtables <ul style="list-style-type: none">• Mapping emerging topics to current needs

	<ul style="list-style-type: none"> • Settling on Priorities
4:00 - 5:00	How to communicate the value of research to stakeholders and decision-makers <ul style="list-style-type: none"> • Messaging • Strategies
6:00pm	<i>Dinner on your own</i>

Thursday June 8

Marriot Marquis

Time	Topic
8:30 -9:00	<i>Coffee</i>
9:00 - 9:30	Process and Governance <ul style="list-style-type: none"> • Evidence-based prioritization methods • Proposed governance model
9:30 - 10:30	Breakout Roundtables
10:30-11:30	Reconvene and Debrief
11:30-12:00	Closing

Appendix II: List of Organizations (Alphabetical Order)

- Alonso Strategic Consulting, LLC
- American Forest Foundation
- American Forests
- American Wood Council
- Austin Peay State University
- University of Oregon
- Forest Resources Association
- Hardwood Federation
- Michigan State University
 - Department of Forestry
 - Forest Carbon & Climate Program
- National Alliance of Forest Owners
- National Wooden Pallet & Container Association
- NCASI
- Purdue University
- Rayonier Inc.
- Resources for the Future
- Society of American Foresters (Co-Host)
- Sustainable Forestry Initiative
- U.S. Forest Service
 - Research & Development
 - State & Private Forestry
 - International Institute for Tropical Forestry (IITF)
- Yale School of the Environment
- University of Florida
- University of Georgia
- University of Hawai'i at Manoa
- University of Tennessee
- US Endowment for Forestry and Communities (Co-host)
- USDA National Institute of Food and Agriculture
- Weyerhaeuser

Appendix III: Full Survey Results

The national survey was designed in two rounds, following a modified Delphi approach. The study received Michigan State University Institutional Review Board Approval; it was determined to be exempt under 45 CFR 46.104(d) 2(ii), #00009082. The first round collected information about participants' professional profile and one open-ended question asking participants to identify the most important challenges facing either forest management/conservation or wood products. Open responses were thematically coded and then themes were aggregated, keeping only themes that were mentioned more than twice. Then, the resulting 28 themes were presented, with definitions, during a round 2 survey that asked participants to rank them in order of importance. The initial survey was distributed broadly through associations representing forestry professionals, including the Society of American Foresters, Forest Climate Working Group, National Association of State Foresters, USDA Forest Service, American Wood Council, National Association of Forest Owners, Southern Landowners Network, Intertribal Timber Council, National Association of University Forest Research Programs, and others.

The first survey round received 440 responses. About half of respondents were part of a state or federal government agency while another 25% were either private mid-to-large commercial forest owners or worked for a non-governmental organization (Figure 1). About 43% of respondents identified as part of an 'underserved' population, following the US Department of Agriculture definition. Of the respondents, 11% produce research, 72% consume research, and 18% both produce and consume research. The average time within the profession was 21 years with a minimum of 1 year and a maximum of 57 years.

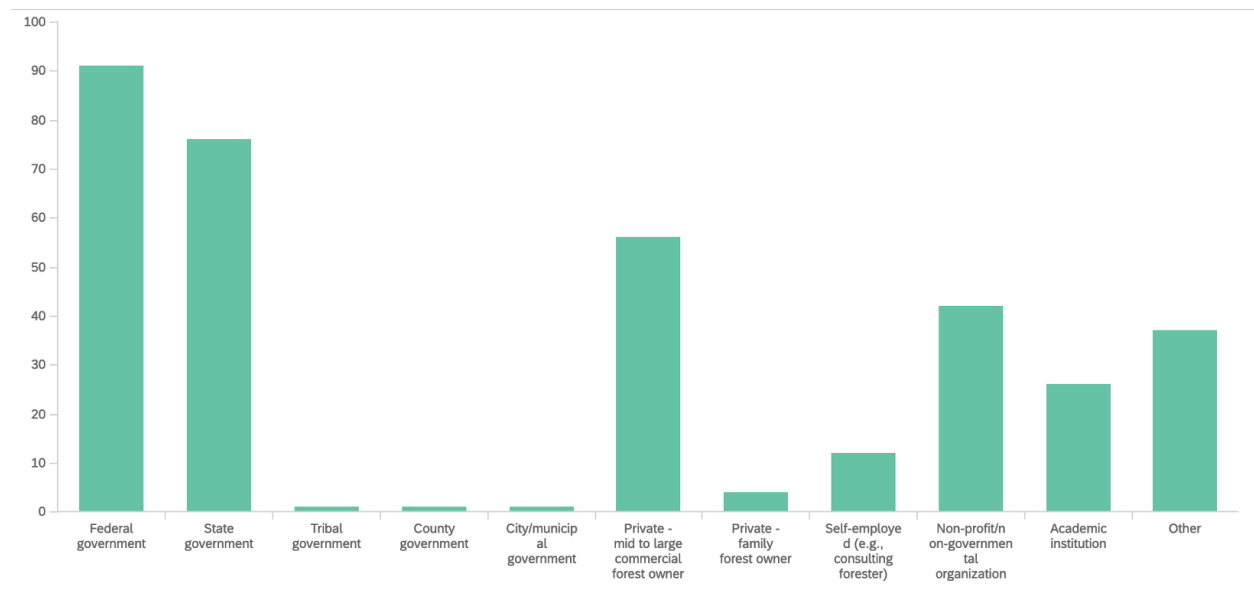


Figure 1: Organizational home of responses

Over 70 themes were identified from these responses and collapsed to 28 themes (Table 1).

Table 1: Themes identified from round 1 coding. Percentage indicates the percentage of responses that mentioned the theme. Note that responses could identify more than one challenge and thus percentages do not add to 100.

Theme	Definition	Percentage
Workforce Issues	Anything pertaining to availability and quality of workers in all segments of the management and wood products supply chain	30
Forest health	Insects, diseases and invasives species	27
Lack of markets	Absent markets including traditional and innovative, with a focus on markets for lower-value wood	21
Climate change adaptation	The effects of climate change on forests, including consideration of how to managed given these changing conditions	15
Public perceptions	How people understand forest management and protection, and general awareness	16
Regulatory environment and barriers	Policies and laws that encourage or discourage forest management and wood products markets	14
Wildfire	Both understanding risks, treating acres, encouraging behavior change, and the overall federal response	13
Fragmentation	Development pressure and changing ownership categories	9
Management misperceptions and negative attitude towards harvesting	Specific to individuals and groups that actively campaign against forest management; social acceptability and social license to harvest	7
Forest Carbon Modeling	Understanding carbon flows and stocks in forests, carbon markets, trade-offs between carbon markets and harvesting, tracking carbon through the supply chain	5
Regeneration	Ability to regenerate forests including nursery capacity	5

Supporting current industry	Industry challenges to maintain current harvesting levels or add capacity	4
Increasing resiliency	Species composition, structure and age diversity, ability to withstand disturbance	3
Science communication	Role of science in policy and communicating information to all stakeholders	3
Ecosystem Services	All services provided by forests, with a special emphasis on non-timber forests (particularly water)	3
Inventory methods and data	Data gaps and new inventory methods that offer greater precision and coverage	3
Reforestation and restoration	Ability to reforest at pace and scale	3
Input costs	Increasing input costs without concurrent increase in value of forest products	1
Climate change mitigation	The role of forests in mitigating climate change	1
Cross-boundary cooperation	Private-public partnerships and private-private cooperation	1
Lack of locally-relevant research	Research that informs local needs	1
Tax policy	Role of tax structure and incentives on management	1
Wood as renewable energy	Public and regulatory environment to encourage wood as an energy source	1
Competitive pricing for wood residuals	Ability to fully utilize residuals from harvesting and primary/secondary processing	1
Declining transportation infrastructure	Road and rail issues for transportation wood from the forest	1
Lack of supply	Mostly focusing on federal challenges with treating acreage and no-bid timber sales	1
Trespassing	Issues with access and ownership	1

Wildlife and endangered species	Both impact of wildlife on regeneration and impact of forest management on wildlife	1
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In Round 2, the categories from Table 1 were offered to participants. They were asked to rank the issues in order of most to least important. The top nine priorities, as ranked by 117 individuals are:

1. Workforce Issues
2. Forest Health
3. Climate change adaptation
4. Wildfire
5. Public Perceptions
6. Lack of markets
7. Management misperceptions and negative attitudes towards harvesting
8. Regulatory environment and barriers
9. Increasing resiliency

Some sample quotes from the top three priorities are presented in Table 2, divided by respondents who were aligned with field forestry vs. the wood products sector vs. 'other'.

Table 2: Example quotes for the top three priorities.

Perspective	Workforce Issues	Forest Health	Climate change adaptation
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Field forestry	“Staffing - not enough people to get all the work done that needs to get done. This leads to thousands of acres not getting treated on time, trees dying and falling over, stands converting to brush, and millions of dollars to restore them to a productive timber stand again whenever we do end up getting to them.”	“Invasive species potentially causing loss of commercially and ecologically important species”	“A method to forecast future potential vegetation types based on predictions of future climate scenarios. For example, a user-friendly tool (with capacity to assess model sensitivity) for land managers across the U.S. to assess forests and plan for forest resiliency.”
Wood Products	“The biggest problem is finding labor to work in mills and for logging jobs.”	“Invasive plants and pests coupled with lack of ability to salvage the woody material”	“Tree planting finance for forest carbon credits”
Other	“Coordinating labor and resources needs among all levels for the reforestation pipeline: seed, nurseries, outplanting, and post-planting monitoring & care.”	“Fire, insect infestation and poor management are the prime causes of tree mortality.”	“Prediction of tree performance under climate change.”

Generally, the raw data and translated coded themes were remarkably consistent regardless of the respondent’s organization, geographic region, or perspective (e.g., field forestry vs. wood products). The small differences by region include specific invasive pest or natural hazard concerns. Differences by organization include different regulatory environments and slightly different perspectives on what public perception issues need to be addressed.

While workforce issues are certainly the number one priority in forestry, R&D may not be able to address the issue. Effective communication was listed as a potential missed priority, but the group agreed that this is linked to public perceptions. One element missing from the list was to research indigenous ways of knowing and other forms of knowledge. We also discussed the answers to critical research questions we already have and how we can better communicate them. We also may need one additional filter on these priorities that sort based on how well people can connect to them - find relevancy with a broader audience. For example, instead of ‘workforce’ we rename it as ‘job creation.’ Many of the research producers in the room articulated that these are broad categories. While broad is good for decision makers, the

consortium should also detail the categories, so producers know what research questions are relevant to the topics. Lastly the public perception priority was perceived as the ultimate goal to change but not necessarily viewed as a research priority. However, several social science research producers in the room challenged this perspective—that it is both an ultimate goal and a potential research theme (how to change public perception—what effectively shapes public discourse).

Appendix IV: Vision statement (as provided to participants in June 2023)



New Approach Needed to Solve Problems Facing Forest Managers in US¹

Threats and Opportunities for US Forests

Forests across the US face major threats, including increasing wildfire, insect and disease outbreaks, invasive plants and animals, climate change, and fragmentation. Forest managers work to mitigate these threats on-the-ground every day.

Tremendous new opportunities also exist for the nation's forests, including increasing carbon sequestration and storage to help mitigate climate change, bolstering economies of forest-based communities, providing clean freshwater, increasing biodiversity, expanding urban forests, and connecting the public with nature for numerous health benefits.

To adequately address these threats and capture new opportunities for forests will require greater focus on the most important problems facing forest managers across the country.

Challenges to Addressing Threats and Capturing Opportunities

A major limitation to solving the highest-priority problems facing forest managers has been the steady erosion of the capacity and practical relevance of forest research over the past several decades.

Declining forest research capacity - Forest and forest products research and development (R&D) capacity in the US has eroded significantly over the past two decades (1,2). The reduction in scientist numbers and funding has occurred across federal, university and industry organizations. For example, the number of professors in university forestry programs declined 10%, US Forest Service scientists decreased 19%, and researchers in forest industry declined by 50% from 2002 to 2016 (2). US Forest Service staffing in fields essential for wood products innovation is only 25% of the level that it was three decades ago (1). Staffing also has been reduced by 40% in fields critical for protecting forest health (e.g., entomology and pathology). As a result, there are substantially fewer experts in the fields of forest management, forest protection, and forest products employed by forest resources organizations than two decades ago. These reductions have occurred during a period when the threats and opportunities for forests in the US have never been greater (3). **Unless we rebuild and sustain this R&D capacity, long-term stewardship of the nation's forests and global competitiveness of the forest products sector are at severe risk.**

Declining relevance of research to forest managers - Results from a recent 2020-21 US Forest and Forest Products R&D Capacity Summit revealed that leaders from large private forest owners/managers, family forest owners, state forestry agencies, the USFS National Forest System, and environmental NGOs, found forest research information to be increasingly irrelevant in helping them solve practical forest management problems (4). Recent findings from a study of doctoral

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