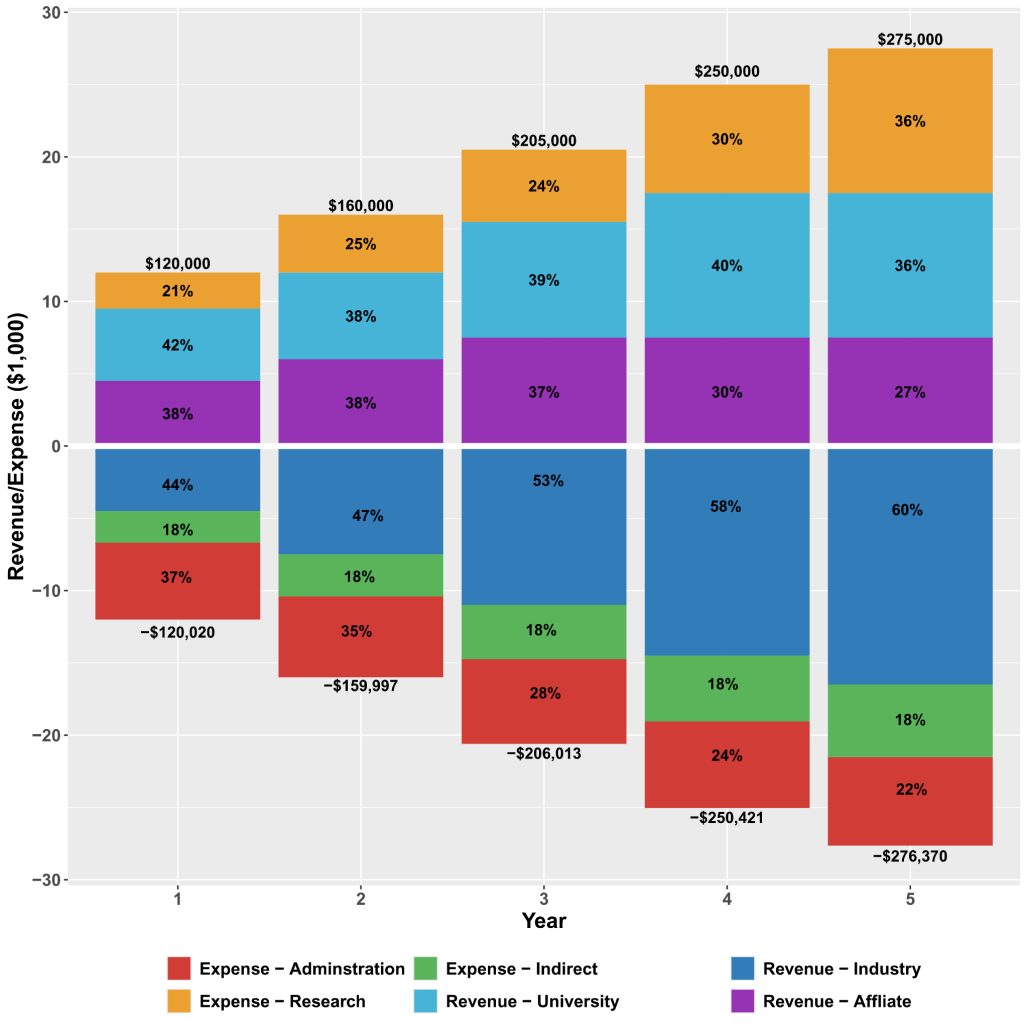
Five-Year Business Plan for the Center for Advanced Forestry System (CAFS)

Aaron Weiskittel, Director
University of Maine, Center for Research on Sustainable Forests

Executive Summary: The Center for Advanced Forestry Systems (CAFS) has been a cornerstone of collaborative forestry research since 2007, addressing critical industry needs through innovative partnerships between universities and industry members. As CAFS approaches the end of its National Science Foundation (NSF) funding in 2024, this five-year business plan outlines a comprehensive strategy to ensure the center's continued impact and sustainability. Building on 15 years of success, CAFS will transition to a self-sustaining model that leverages its established network, expands its research focus to include emerging technologies, and diversifies its funding sources. The plan addresses past criticisms by emphasizing nationally relevant projects, streamlining governance, enhancing the value proposition for members, and improving marketing and communication strategies. With a projected annual budget of $1.5 million by year five, CAFS aims to maintain its position as the premier forestry research collaborative in the United States, driving innovation in forest management, genetics, decision-support tools, and remote sensing applications.



Need: The US forest products industry faces unprecedented challenges, including climate change, evolving markets, technological disruptions, and increased pressure for sustainable practices. CAFS fills a critical gap by providing a national platform for collaborative, industry-relevant research that individual companies or regional cooperatives cannot achieve alone. The need for CAFS has grown more urgent as federal funding for forest-related research has declined from $1.1 billion in 1962 to less than $700 million in 2015. Simultaneously, the industry faces complex issues such as reduced demand for wood pulp, land use changes, increased wildfires, and greater variability in weather patterns. CAFS's unique ability to address these multifaceted, cross-regional issues positions it as an essential resource for the industry's future competitiveness and sustainability.

CAFS is more crucial than ever for the US forest products sector and the nation's forest ecosystems. The need for CAFS has intensified due to several critical factors:

1. *Declining Federal R&D Funding*: As federal funding for forest-related research has plummeted from $1.1 billion in 1962 to less than $700 million in 2015 and likely less than $600 million by 2030, CAFS fills a vital gap in supporting essential research and development in the forestry sector.
2. *Climate Change Challenges*: Forests face unprecedented threats from climate change, including increased wildfire risk, pest outbreaks, and shifting species ranges. CAFS's national scope allows for comprehensive research on climate adaptation strategies across diverse ecosystems.
3. *Technological Revolution*: The rapid advancement of technologies like remote sensing, artificial intelligence, and precision forestry tools requires a coordinated approach to research and implementation. CAFS serves as a central hub for developing and disseminating these innovations.
4. *Market Transitions*: The forest products industry is undergoing significant transitions, with decreasing demand for traditional products like paper and increasing interest in novel biomaterials and ecosystem services. CAFS's research helps the industry navigate these shifts and identify new opportunities.
5. *Cross-Regional Challenges*: Many forestry issues transcend regional boundaries, requiring a national perspective that individual companies or regional cooperatives cannot achieve alone. CAFS's multi-site structure is uniquely positioned to address these complex, large-scale challenges.
6. *Workforce Development*: The forestry sector faces a critical shortage of skilled professionals to handle emerging technologies and multifaceted challenges. CAFS plays a crucial role in training the next generation of forestry leaders through its graduate and post-doctoral programs.
7. *Policy Influence*: As forestry practices are scrutinized more closely, there's a growing need for science-based policy recommendations. CAFS, with its national scope and industry connections, can serve as an honest broker and trusted advisor to

policymakers. This is an important opportunity given the highly regional and fractured nature of the forest products sector, while Federal R&D investments for the sector continue to decline.

8. *Sustainability Pressures*: With growing consumer and regulatory demands for sustainable forest management, CAFS's research on optimizing productivity while enhancing ecosystem services is more relevant than ever.
9. *Industry Consolidation*: As the forest products industry consolidates, with the top five landowners/managers now accounting for nearly 30% of US timberland acreage, there's an increased need for a national research organization that can address the needs of these large-scale operations.
10. *Global Competitiveness*: Continuous innovation is essential to maintaining the US forest products industry's global competitiveness. CAFS's collaborative model accelerates research and development, helping the industry stay ahead in the global market.

Vision: CAFS will be the preeminent national center for advanced collaborative forestry research, driving innovation and sustainability in the forest products industry through multi-disciplinary science and technology development. We envision a future where US forests are managed with cutting-edge precision, balancing productivity, ecosystem services, and resilience to environmental challenges.

Mission: To optimize forest management systems and produce high-quality forest resources through collaborative, multi-disciplinary research that transcends regional and organizational boundaries while fostering the next generation of forest sector leaders and innovators.

Objectives: Key guiding principles and strategic objectives for the next five years include:

1. Maintain and grow membership base to 50 organizations by year five, focusing on diversifying member types to include technology companies and conservation organizations.
2. Secure at least two major federal grants totaling $10 million over five years, targeting programs such as USDA AFRI Sustainable Agriculture System (SAS) and NSF's Ecosystem Science Cluster.
3. Launch five nationally relevant, multi-site research projects annually, ensuring at least 50% address cross-regional challenges.
4. Increase industry adoption of CAFS-developed technologies by 10% year-over-year, as measured by member surveys and case studies.
5. Train 25 graduate students and post-doctoral researchers in advanced forestry systems, focusing on interdisciplinary skills and industry collaboration.
6. Establish CAFS as a go-to resource for policymakers and media on forestry innovation and sustainability issues.

Strategy: CAFS will implement a multi-faceted strategy to ensure its continued relevance and financial viability:

1. Expand research focus to include cutting-edge technologies like remote sensing, artificial intelligence, precision forestry, and climate adaptation strategies.
2. Transition to a hub-and-spoke model with a central administrative core and distributed research nodes at partner universities, enhancing efficiency and leveraging regional expertise.
3. Diversify funding through tiered membership dues, federal grants, private foundation support, and contract research.
4. Enhance members' value proposition by providing exclusive access to research outcomes, networking opportunities, talent pipeline, and customized technology transfer programs.
5. Streamline governance to improve decision-making and responsiveness to sector needs, including establishing a Technology Advisory Committee.
6. Develop a robust marketing and communication strategy to increase visibility and demonstrate value to current and potential members.
7. Implement a systematic approach to technology translation, ensuring industry partners effectively adopt research outcomes.

Annual Milestones:

Year 1:
- Implement a new governance structure and tiered membership model
- Secure transition funding from NSF and key industry partners
- Launch remote sensing research program and establish data-sharing protocols
- Develop and begin implementation of a comprehensive marketing and communication strategy

Year 2:
- Establish a central administrative hub and formalize research node agreements with partner universities
- Secure the first major federal grant
- Initiate two new nationally relevant research projects
- Launch CAFS Technology Advisory Committee to facilitate sector adoption of research outcomes

Year 3:
- Achieve 80% retention of existing members uthe nder new model
- Launch industry-sponsored innovation challenge focused on climate-resilient forestry practices
- Develop commercialization pathway for key technologies, including at least one patent application
- Host first annual CAFS Innovation Showcase for members and stakeholders

Year 4:

- Reach 125 member organizations, including at least 3 technology companies new to the forest sector
- Secure second major federal grant
- Host national forestry innovation symposium, attracting 300+ attendees from industry, academia, and government
- Establish CAFS Policy Advisory Group to enhance influence on national forestry policies

Year 5:
- Achieve financial self-sustainability with diverse revenue streams
- Reach 150 member organizations
- Demonstrate the measurable impact of CAFS research on industry practices through comprehensive impact assessment
- Launch CAFS Emerging Leaders Program to foster next-generation forest sector innovators

Membership Levels and Benefits: To address the diverse needs of the forestry sector and enhance CAFS's financial sustainability, we propose the following membership structure:

1. University Cooperative Membership ($15,000 annually): This would include Universities previously part of CAFS, like Plantation Management Research Cooperative (PMRC), Intermountain Forestry Cooperative (IFC), Forest Productivity Cooperative (FPC), Center for Research on Sustainable Forests (CRSF)
    - Benefits:
        i. Ability to participate in all CAFS research activities and meetings
        ii. Eligibility to receive CAFS funding for research projects
        iii. Access to CAFS research outputs and data
        iv. Networking opportunities with industry partners and other researchers
        v. Participation in CAFS working groups and committees
        vi. Co-branding opportunities for research outputs
        vii. Does not include voting rights on project selection or governance matters
2. Industry Organization Membership ($10,000 annually). Examples: Green Diamond, PotlatchDeltic, Weyerhaeuser, Rayonier
    - Benefits:
        i. All benefits of University Cooperative Membership, plus:
            1. Voting rights on project selection and key governance matters
            2. Priority access to CAFS-developed technologies and tools
            3. Customized annual research briefing
            4. Seat on the Industry Advisory Board
            5. Opportunity to propose and sponsor targeted research projects
3. Affiliate Membership ($5,000 annually). Examples: University of Florida, Auburn University, conservation organizations, technology companies new to the forestry sector

- Benefits:
    i. Ability to participate in CAFS research activities and meetings
    ii. Access to CAFS research outputs and data
    iii. Networking opportunities with CAFS members
    iv. Opportunity to collaborate on individual research projects
    v. Participation in CAFS working groups
    vi. Does not include voting rights or eligibility for CAFS research funding

This tiered membership structure allows CAFS to:

1. Maintain strong connections with university-based forestry cooperatives
2. Provide clear value and influence to sector partners
3. Expand its network to include a broader range of partners and expertise

By offering tailored benefits at each level, CAFS can attract a diverse membership base while ensuring that core industry partners maintain a strong voice in the organization's direction. This structure also creates pathways for new entrants to engage with CAFS, potentially leading to increased membership and diversity of perspectives over time. The expanded membership base and clear value proposition at each level will contribute to CAFS's long-term financial sustainability while enhancing its ability to address complex, cross-cutting forestry challenges. This approach addresses past criticisms about unclear membership benefits and limited engagement opportunities for diverse stakeholders.

Budget: The annual target budget will initially grow from $120k in year one to $275k by year five. A detailed annual budget below would primarily cover administration, research, and indirect fees. For administration, annual expenses would support 4 months of salary and fringe for a CAFS Program Manager and Communications Specialist (currently fulfilled by Meg Fergusson) and 1 month of salary and fringe for a Director (currently served by Aaron Weiskittel). The remainder would be spent on approved research projects selected by the IAB, with the number and size of projects increasing annually. These research projects could be led by any of the University Cooperative and/or Industry members with the involvement of an affiliate member.

Revenue						
Item	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Total**
University Cooperative Membership ($15,000 annually)	$45,000	$60,000	$75,000	$75,000	$75,000	$330,000
Industry Organization Membership ($10,000 annually)	$50,000	$60,000	$80,000	$100,000	$100,000	$390,000

Affiliate Membership ($5,000 annually)	$25,000	$40,000	$50,000	$75,000	$100,000	$290,000
Total	***$120,000***	***$160,000***	***$205,000***	***$250,000***	***$275,000***	***$1,010,000***
Expenses						
Administration						
Program Manager & Communications Specialist (Meg Ferguson)	$22,800	$23,484	$24,189	$24,914	$25,662	$22,800
Center Director (Aaron Weiskittel)	$17,400	$17,922	$18,460	$19,013	$19,584	$17,400
Travel	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000
Annual Meeting	$7,500	$8,500	$10,000	$10,000	$10,000	$7,500
Materials & Supplies	$500	$1,000	$1,000	$1,000	$1,000	$500
Total	*$53,200*	*$55,906*	*$58,648*	*$59,928*	*$61,245*	*$53,200*
Research						
Research Project #1	$45,000	$45,000	$50,000	$50,000	$50,000	$240,000
Research Project #2		$30,000	$60,000	$50,000	$45,000	$185,000
Research Project #3	-			$45,000	$35,000	$80,000
Research Project #4	-	-	-		$35,000	
Total	*$45,000*	*$75,000*	*$110,000*	*$145,000*	*$165,000*	*$505,000*
Indirect						
NCASI Foundation	$12,000	$16,000	$20,500	$25,000	$27,500	$101,000
University	$14,620	$18,241	$21,865	$25,993	$28,125	$108,843
Total	*$26,620*	*$34,241*	*$42,365*	*$50,993*	*$55,625*	*$209,843*
Total						
Balance	**$3,380**	**$759**	**$2,635**	**-$993**	**-$625**	**$5,157**

Beyond the initial five-year period, CAFS funding would continue to grow with a targeted annual budget of $500,000 with the following approximate breakdown:
- 50% from membership dues (tiered structure: Primary, Secondary, Affiliate, and Observer)
- 40% from federal grants (e.g., USDA, NSF, DOE)
- 10% from private foundations and contracts
- 10% from technology licensing, events, and training programs

Outcomes: The key outcomes of CAFS will have significant and far-reaching implications for both industry advisory board members and university participants. For industry members,

improved forest productivity and sustainability across U.S. regions will translate to tangible benefits such as a 5-10% increase in timber yield through optimized management practices, a 10-15% reduction in operational costs via precision forestry techniques, and enhanced resilience to climate-related risks, potentially reducing losses by up to 25%. These advancements will be coupled with an increase in market share for U.S. forest products by 5-10% in key international markets, development of at least three new high-value forest products or biomaterials, and a 30% reduction in time-to-market for new products through accelerated R&D. Industry partners will also benefit from the implementation of AI-driven decision support tools, improving operational efficiency by 20%, and the adoption of precision silviculture techniques, reducing input costs by 15-25%.

Simultaneously, university participants will see a surge in high-impact research publications, developing new silvicultural models applicable across diverse forest types, and creating long-term experimental plots for ongoing research and education. Academic institutions will experience increased industry funding for applied research projects, enhanced reputation as leaders in forestry innovation, and improved graduate placement rates in industry positions. Creating new interdisciplinary research programs combining forestry with computer science and engineering will open up new avenues for innovation and funding.

Both industry and academia will benefit from increased collaboration, with the industry gaining access to cutting-edge research and expertise and accelerating innovation cycles. Universities will also see increased opportunities for industry-sponsored research projects and enhanced curriculum relevance to industry needs. Creating a skilled workforce pipeline will provide the industry with access to highly trained graduates, reducing training costs for new hires by up to 30%. At the same time, universities will see higher enrollment in forestry and related programs and improved job placement rates for graduates.

CAFS's establishment as a nationally recognized thought leader will offer industry increased influence on national forestry policies and regulations, and enhanced public perception of the industry's commitment to sustainability. Universities will enjoy an elevated profile in national and international forestry discourse, increased media coverage, and enhanced ability to attract top faculty and research funding.

Environmental benefits will be quantifiable, with industry demonstrating an increase in carbon sequestration by 10-15% through improved management practices and enhanced biodiversity on working forests. This will open up new research opportunities for universities in ecosystem services and environmental economics, along with increased funding opportunities from environmental and conservation organizations.

The economic impact on rural communities will strengthen industry relationships with local partners, while providing universities with new research and outreach opportunities in rural

development and forestry economics. Advancements in forest health management will benefit the sector through early detection systems for pests and diseases, reducing potential losses by up to 40%, while universities will see breakthroughs in forest genetics and tree improvement research.

Finally, creating new value streams from forest ecosystems will allow industry to identify and develop markets for non-timber forest products and monetize ecosystem services. At the same time, universities will explore new research directions in forest bioeconomy and ecosystem services valuation. This comprehensive set of outcomes demonstrates the profound and mutual benefits that CAFS will continue to provide to industry and academic partners, reinforcing its critical role in advancing the forest products sector.

Primary outcome metrics would include:

1. Improved forest productivity and sustainability across US regions, with quantifiable metrics on increased yield and reduced environmental impact
2. Enhanced competitiveness of US forest products industry globally, measured by market share and innovation indices
3. Development and adoption of advanced technologies in forestry practices, including AI-driven decision support tools and precision silviculture techniques
4. Increased collaboration between academia and industry, resulting in faster translation of research to practice
5. Creation of a skilled workforce pipeline for the forestry sector, with CAFS alumni tracking showing high industry placement rates
6. Establishment of CAFS as a nationally recognized thought leader in sustainable forestry innovation

Long-term Sustainability Efforts: To ensure long-term viability beyond the five-year plan, CAFS will:

1. Establish an endowment fund with a target of $1 million by year ten, soliciting major gifts from industry leaders and foundations
2. Develop a robust intellectual property portfolio with recurring licensing revenue, aiming for at least three commercially viable technologies by year five
3. Create a for-profit subsidiary to commercialize high-potential technologies, reinvesting profits into core research activities
4. Expand international partnerships to access global funding opportunities and enhance knowledge exchange
5. Continuously adapt research focus to address emerging industry needs, conducting annual foresight exercises with members

Marketing and Communications Strategy: To address past criticisms of limited visibility and unclear value proposition, CAFS will implement a comprehensive marketing and communications strategy that will

1. Develop a new brand identity that reflects CAFS's national scope and cutting-edge research focus
2. Create targeted messaging for different stakeholder groups (industry, academia, policymakers)
3. Implement a content marketing strategy, including:
    a. Monthly newsletter highlighting research breakthroughs and member success stories
    b. Quarterly webinars on emerging forestry technologies and practices
    c. Annual "State of Forestry Innovation" report
4. Enhance digital presence through:
    a. Redesigned website with member portal and research showcase
    b. Active social media engagement on platforms like LinkedIn and ResearchGate
    c. Search engine optimization to improve visibility for key forestry innovation terms
5. Develop media relationships with forestry trade publications and mainstream science journalists
6. Participate in major industry conferences and events, showcasing CAFS research and member collaborations

Technology Translation: To ensure industry partners effectively adopt research outcomes, CAFS will:

1. Establish a Technology Transfer Advisory Committee to:
    - Assess the commercial potential of research outcomes
    - Manage intellectual property protection and licensing
    - Facilitate industry-researcher connections for technology adoption
2. Implement a stage-gate process for moving technologies from lab to field:
    - Concept validation
    - Prototype development
    - Field testing with member companies
    - Commercialization support
3. Develop customized technology adoption roadmaps for member companies
4. Create a mentorship program pairing researchers with industry experts to guide real-world application of innovations
5. Host annual "Technology Showcase" events for members to experience new tools and techniques firsthand
6. Establish a "CAFS Innovation Fund" to support members in piloting new technologies

Summary: In conclusion, the Center for Advanced Forestry Systems (CAFS) is at a pivotal juncture in its evolution. It is poised to transition from NSF funding to a self-sustaining model

that will continue to drive innovation and sustainability in the U.S. forest products industry. This business plan outlines a robust strategy for CAFS to not only maintain its position as the premier forestry research collaborative but to expand its impact and relevance in an increasingly complex and challenging environment. Key strategies that will propel CAFS forward include:

1. Diversification of research focus, embracing cutting-edge technologies such as remote sensing, artificial intelligence, and precision forestry.
2. Implementation of a hub-and-spoke model to optimize resource allocation and leverage regional expertise.
3. Adopting a tiered membership structure that caters to a broader range of stakeholders while providing clear value propositions.
4. Aggressive pursuit of diverse funding sources, including federal grants, private foundations, and industry contracts.
5. Enhanced emphasis on technology transfer and commercialization to accelerate the adoption of innovations.
6. Development of a comprehensive marketing and communication strategy to increase visibility and demonstrate value.

These strategies address past criticisms and challenges, ensuring that CAFS remains relevant, efficient, and responsive to industry needs. The outcomes of this plan will be transformative for both industry and academic partners. Industry members can expect substantial improvements in productivity, cost efficiency, and global competitiveness. They will gain access to a pipeline of skilled talent, cutting-edge technologies, and increased influence on national forestry policies. Academic participants will benefit from enhanced research opportunities, increased funding, improved graduate placement rates, and elevated institutional profiles in forestry innovation.

Moreover, the broader impacts of CAFS's work will extend to environmental sustainability, rural economic development, and the establishment of new value streams from forest ecosystems. By bridging the gap between academic research and industry application, CAFS will play a crucial role in addressing critical challenges such as climate change adaptation, forest health management, and the development of new bio-based products. As CAFS embarks on this new chapter, it is well-positioned to leverage its 15-year legacy of collaboration and innovation. With a projected annual budget of $0.5 million by year ten and a goal of establishing a $1 million endowment by year ten, CAFS is laying the groundwork for long-term financial sustainability. This will ensure that the center can continue to catalyze forestry innovation, driving the industry forward and contributing to the sustainable management of America's forests for future generations. The success of this plan will not only secure the future of CAFS but will also demonstrate the enduring value of industry-university collaborations in addressing complex, multifaceted challenges. As we move forward, CAFS invites current and potential members, partners, and stakeholders to join us in this exciting journey of discovery, innovation, and sustainable forest management. Together, we can shape the future of forestry and ensure the continued health and productivity of our nation's vital forest resources.