Center for Advanced Forestry Systems Annual Updates

Aaron Weiskittel

Director

Meeting Agenda

Center for Advanced Forestry Systems

CAFS Fall IAB Virtual Meeting
1-4 PM EST, November 13, 2023
https://maine.zoom.us/j/3914609418

Hosted by the University of Maine,
Center for Research on Sustainable Forests

IAB Meeting Agenda

Monday, November 13, 2023, Eastern Standard Time

Time	Item	Presenter
1:00 PM	Welcome/Overview	Aaron Weiskittel, UM
1:05 PM	CAFS Lead Site & Phase III Updates	Aaron Weiskittel, UM
Continuing Project Updates		
1:15 PM	16.69. Stand and tree responses to late rotation fertilization	Kim Littke, UW
1:20 PM	19.75. Assessing and mapping regional variation in site carrying capacity	Jaslam Poolakkal, UI
1:25 PM	19.76. Assessing and mapping regional variation in potential site productivity	Rachel Cook, NCSU
1:30 PM	20.78. Intraspecific hydraulic responses of commercial tree seedlings to nursery drought conditioning	Andrei Toca, PU
1:35 PM	20.79. Multi-regional evaluation of new machine learning algorithms for mapping tree species distribution and abundance	Kasey Legaard, UM
1:40 PM	**Continuing Project Discussion**	
1:50 PM	20.80. Using hyperspectral imaging to evaluate forest health risk	Sylvia Park, PU
1:55 PM	20.81. Resilience of soil organic matter to harvesting: A global study of long-term soil productivity	Jeff Hatten, OSU
2:00 PM	20.82. Stand response to thinning: Enhancing response prediction through modeling	Eric Turnblom, UW
2:05 PM	20.84. Physiologic response to commercial fertilization programs in Pacific Northwest forest plantations	Kim Littke, UW
2:10 PM	21.85. Variation in productivity, wood quality & soil carbon of nine conifer species across a gradient in water deficit	Emily Von Blon, OSU
2:15 PM	**Continuing Project Discussion**	
Continuing Project Updates		
2:25 PM	21.87. Linking leaf area index and remote sensing across different forest types	Andrew Trlica, NCSU
2:30 PM	21.88. Quantifying silvicultural treatment effect on lumber quantity and quality in loblolly pine	Joe Dahlen, UGA
2:35 PM	21.89. Quantifying carbon sequestration as a function of silvicultural treatment in loblolly pine	Joe Dahlen, UGA
2:40 PM	21.91. NCSU START	Rachel Cook, NCSU
2:45 PM	21.92. UMaine/UMFK START	Ned Kennedy & Stephanie Landry, UMFK
2:50 PM	22.98. Center for Advanced Forestry Systems Interactive Mapping Platform (CAFSIMP)	Okan Pala, NCSU
2:55 PM	22.99. The effects of dominant tree height definition on loblolly pine growth and yield model outputs	Caddis Fulford, UGA
3:00 PM	**Continuing Project Discussion**	
Continuing Project Updates		
3:10 PM	Use of carbon isotopes for assessing tree response to thinning	Mike Premer, UM
3:15 PM	Site-stand dynamics and pine beetle mortality in ponderosa pine ecosystems	Haley Anderson, UI
3:20 PM	Enhancing Resistance to Fungal Pathogens in Commercial Tree Seedlings	Abby Ferson, UI
3:25 PM	Determination of crown morphological traits using laser scanning in Douglas-fir and loblolly pine genetics trials	Doug Mainwaring, OSU
3:30 PM	Interplay between sampling design and small area estimation to improve timberland inventory	Temesgen Hailemariam, OSU
3:35 PM	**Continuing Project Discussion**	
Concurrent Business Meetings		
3:45 PM	IAB Closed Door Business Meeting	IAB Members
3:45 PM	Site Directors Business Meeting	CAFS Site Directors
4:00 PM	**Adjourn**	

Meeting materials available at: https://crsf.umaine.edu/forest-research/cafs/

Year 4 Take-Aways

- Entering final year of NSF support before officially graduating from the IUCRC program

- Collaboration and engagement remain high
  - Strong participation in June IAB meeting

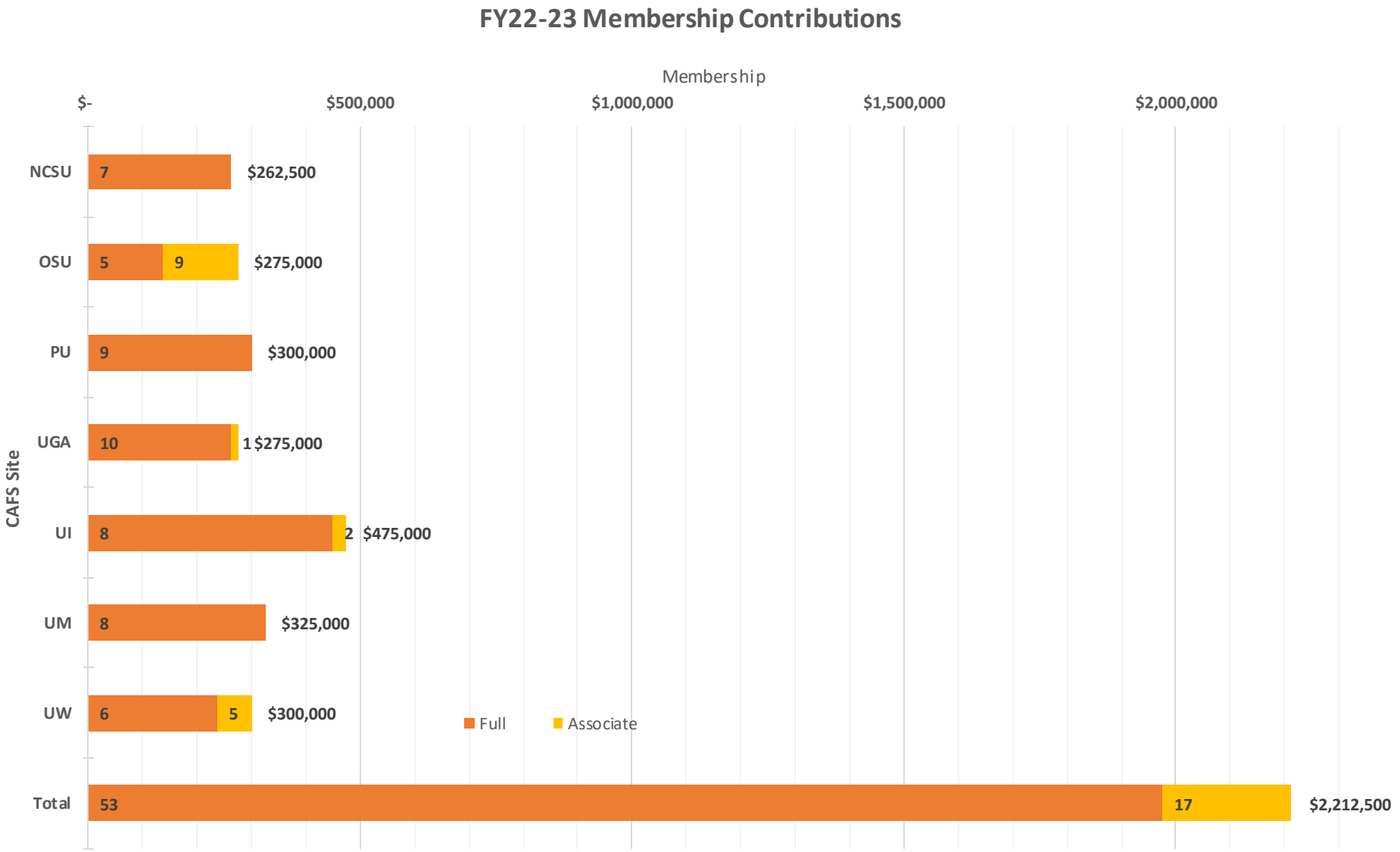
- Need to strategically shift focus on long-term sustainability

CAFS IAB Executive Committee

Site	Member	FirstName	LastName	Email	Role
PU	Arbor America	Guillermo	Pardillo	gpardillo@arboramerica.com	Member
UGA	*PotlatchDeltic*	*Nate*	*Naumann*	*nathaniel.naumann@potlatchdeltic.com*	*Co-Chair*
UM	Seven Islands Land Company	Ian	Prior	iprior@sevenislands.com	Member
UW	Roseburg Forest Products	Pat	Clune	patrick.clune@rfpco.com	Member
UI	Manulife	Zach	Grover	zgrover@manulife.com	Member
NCSU	Timberland Investment Resources, LLC	Corey	Dukes	dukes@tirllc.com	Member
OSU	*Green Diamond*	*Dale*	*Hogg*	*dale.hogg@greendiamond.com*	*Co-Chair*

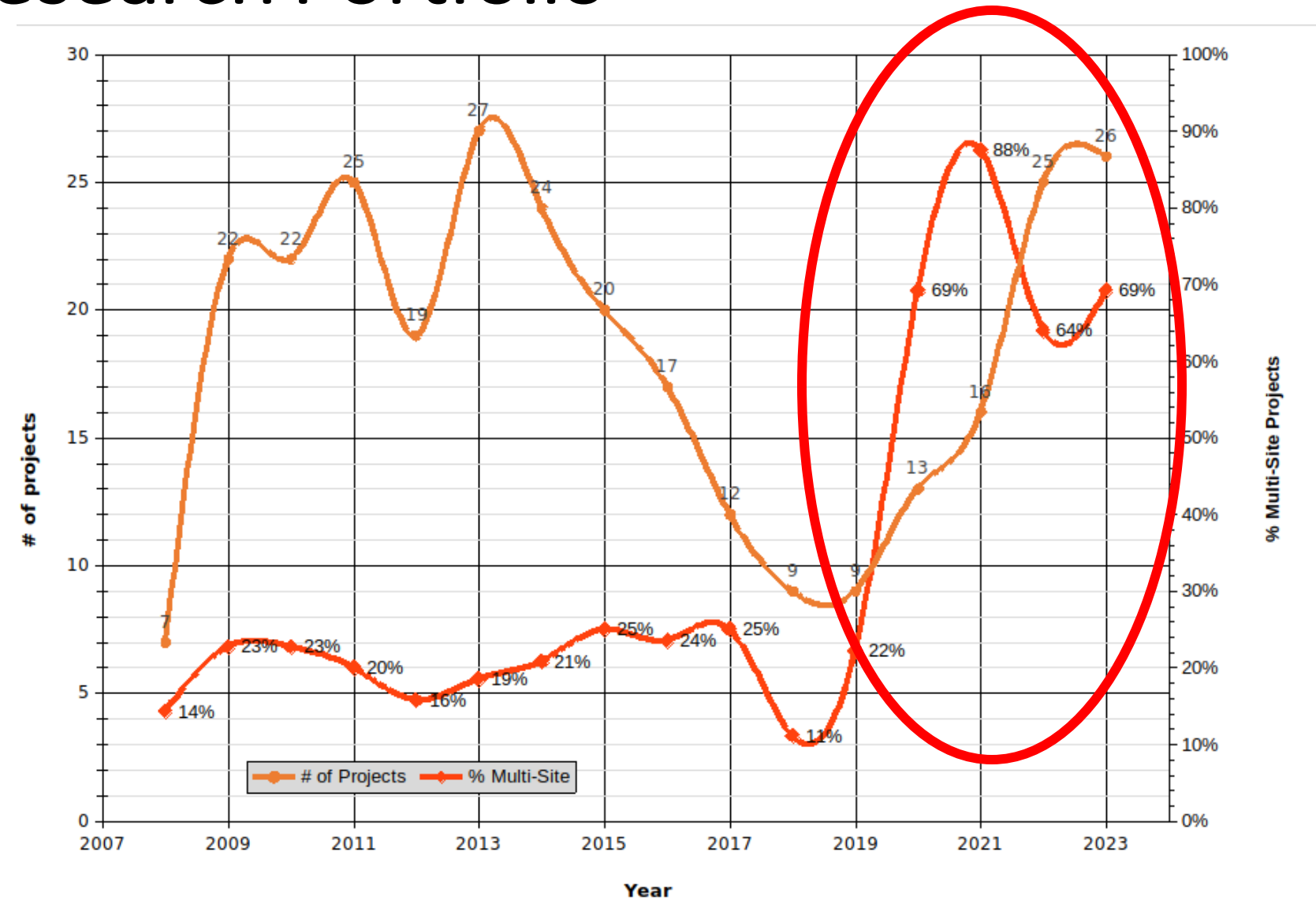
Thanks to their continued service, especially Tom Trembath (Forest Investment Associates) who is retiring

CAFS Membership



Membership remains consistent across sites

Center Research Portfolio



One of the highest # of active projects with ~70% being multi-site, which is unique to Phase III

CAFS Bylaws and Strategic Plan

Center for Advanced Forestry Systems Bylaws

Approved: June 21, 2023

ARTICLE I – Introduction

The following operating procedures will be used to govern the Center for Advanced Forestry Systems (CAFS), a National Science Foundation (NSF) Industry & University Cooperative Research Center (IUCRC). Currently, CAFS comprises the following affiliated universities/sites: (1) University of Maine (lead institution); (2) University of Georgia; (3) University of Idaho; (4) Oregon State University; (5) Purdue University; (6) University of Washington; and (7) North Carolina State University. Current industry members and their annual contributions by university site are provided in **Appendix A – Current CAFS Membership List by Site**. Additional universities and members may join CAFS as specified below. Note that IUCRC Membership Agreement has precedence over the Center Bylaws and Memorandum of Understanding (MOU). The terms of these Bylaws shall be subject to the terms set forth in solicitation NSF 17-516.

ARTICLE II – Purpose

The mission of CAFS is to optimize genetic and cultural management systems to produce high-quality raw forest materials for new and existing products by conducting collaborative research that transcends species, regions, and disciplinary boundaries. CAFS is a multi-university center that works to solve problems through multi-faceted approaches and questions on multiple scales, including molecular, cellular, and individual tree-, stand-, ecosystem-, and landscape-levels.

Research focal areas include, but are not limited to: biological sciences (biotechnology, genomics, ecology, physiology, and soils), management (silviculture, planning, and optimization), data analysis/synthesis (bioinformatics, modeling, and spatial analysis), and inventory methods (remote sensing, terrestrial LiDAR).

Specific objectives of CAFS are:

1. Serve as a national organization for R&D relevant to the forest industry;
2. Coordinate and perform national research activities across multiple sites that align with the prioritized needs of forest industry;
3. Document and communicate key research outcomes to relevant stakeholders;
4. Provide a long-term strategic vision for forest industry research needs;
5. Convene leading scientists from academia and industry who are prepared to address new/unforeseen challenges to the forest industry, such as changing markets; and
6. Create national networking opportunities for universities and forest industry.

ARTICLE III – Organization

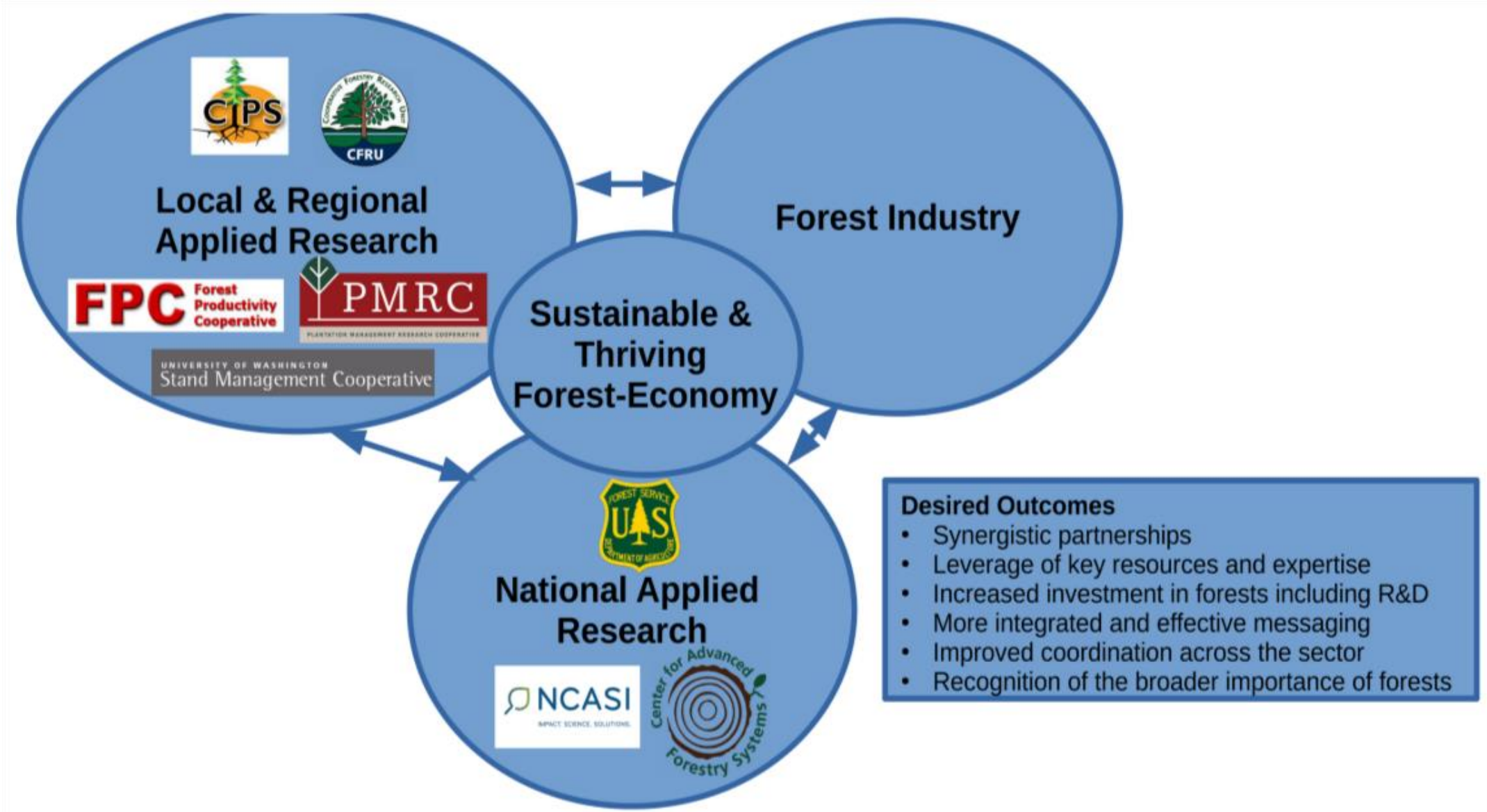
CAFS consists of a Center Director, Site Directors, Project Scientists (individuals with a CAFS-approved research project), IUCRC Academic Leadership Team (CAFS Director and each Site Director), Industry Advisory Board (IAB; composed of representatives from each CAFS member), IAB Executive

Milestone	Fiscal Year				
	18-19	19-20	20-21	21-22	22-23
Apply for & secure NSF Phase III funding	■				
Approve bylaws, strategic plan, & technology roadmap	■				
Initiate research projects identified on technology roadmap	■	■	■		
Revise and refine bylaws, strategic plan, & technology roadmap		■	■	■	■
Secure additional partners including industry, academia, and non-profit sectors.	■	■	■	■	■
Integrate center research and education activities that effectively train and benefit undergraduate and graduate students	■	■	■	■	■
Survey, document, and prioritize industry member research needs	■	■	■	■	■
Plan and host biannual meetings	■	■	■	■	■
Annually report progress, outcomes, and finances	■	■	■	■	■

CAFS Technology Roadmap

	2019	2020	2021	2022	2023	Outcomes
Theme 1: Forest Modeling & Decision-Support Tools **Primary IAB Partners: American Forest Management, Green Diamond, and Campbell Global**						Provide IAB members with improved tools that allow better and more precise forest management and planning
Project 1: Assessing and mapping regional variation in potential site productivity Lead Partners: NCSU, UI, UGA, UW, PU	■	■	■			Better understand how potential site productivity differs across the key forest regions in the US, the most influential factors, and produce high-resolution maps for IAB members to aid planning
Project 2: Assessing and mapping regional variation in site carrying capacity Lead Partners: UI, UM, OSU, VT, UGA, UW	■	■	■			Derive consistent estimates of maximum stand density index, evaluate most influential factors, and provide high-resolution maps to aid management
Project 3: Evaluation and refinement of regional GY models Partners: UM, VT, UGA, OSU, PU			■	■	■	Using the outcomes from Projects 1 and 2, evaluate regional growth and yield behavior and refine as possible
Theme 2: Effective Use of Remote Sensing Technologies **Primary IAB Partners: JD Irving, Rayonier, and Weyerhaeuser**						Evaluate and leverage emerging remote sensing technologies to improve planning
Project 4: Mapping species composition and past disturbance using optical sensors Partners: UI, UM, UGA	■	■	■			Optimal sensors like Landsat and Sentinnel-2 offer the ability to annual map species composition and past disturbance, but have yet to be tests across the US
Project 5: Improving efficiency and accuracy of Enhanced Forest Inventories derived from LiDAR Partners: UW, OSU, UGA, UM	■	■	■	■	■	LiDAR is becoming increasingly used to produce Enhanced Forest Inventories, but uncertainties on ground data, necessary metrics, and modeling method remain.
Project 6: Using hyperspectral imaging to evaluate forest health risk Partners: VT, NCSU, OSU, UM			■	■	■	Forest health risks are extensive and difficult to detect. Hyperspectral imaging from terrestrial and/or airborne sensors can help detection and quantification

Need for CAFS?



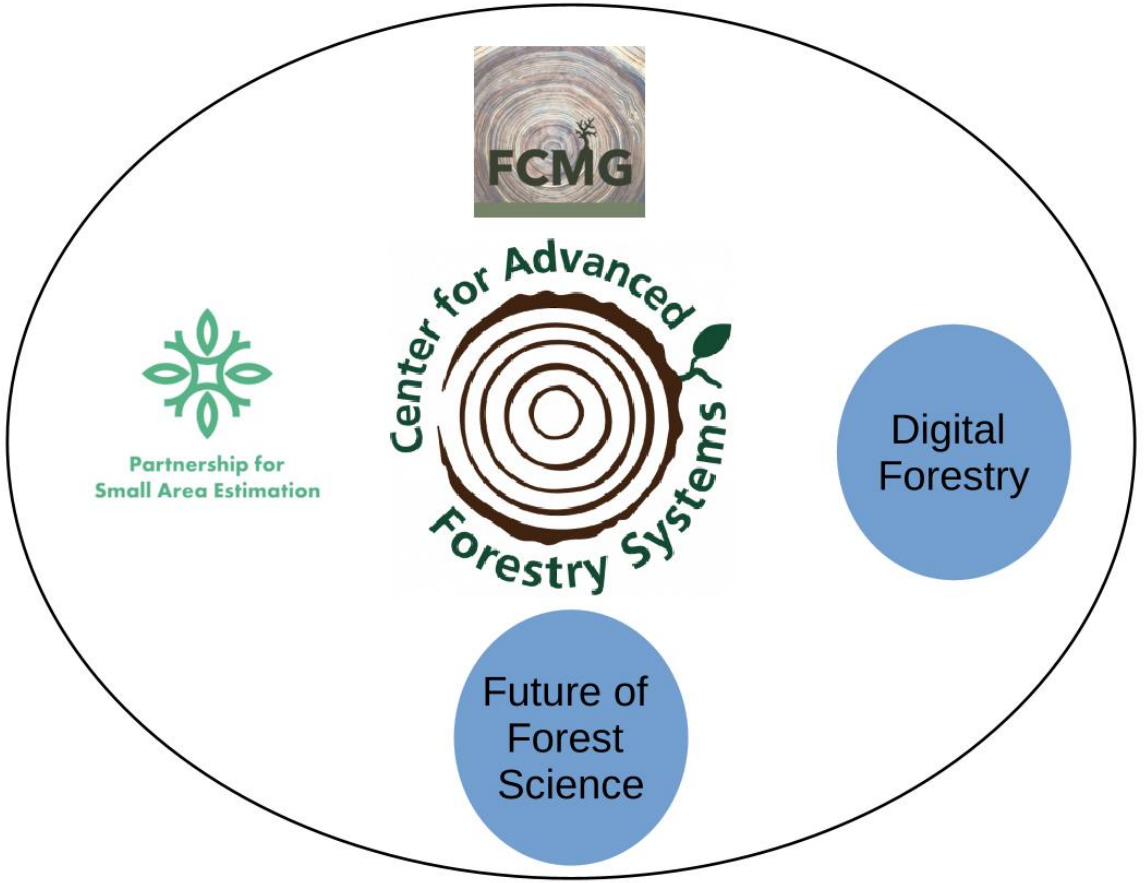
CAFS Future?

Proposal for Small Area Estimation for stand-level optimization on private managed forestlands

The Center for Advanced Forestry Systems (CAFS; https://crsf.umaine.edu/forest-research/cafs/) is a National Science Foundation Industry/University Cooperative Research Center (NSF I/UCRC) bridging top academic forestry research programs, Federal partners, and industry members to solve complex, industry-wide problems. The CAFS Executive Committee is seeking commitment from the industry advisory board (IAB) to partner with one or more university, Federal, and state agency researchers to demonstrate an applied use case for incorporation of small area estimation (SAE) in forest inventory. This would specifically apply to managed private timberlands but could be expanded across the multiple timber types of CONUS. We hope to increase chances of obtaining a SAE working group grant award, by demonstrating the commitment of members to provide supplemental funding, available auxiliary data sources, and private inventory.

Goal: A portfolio of 3-5-year collaborative, national-scale projects to demonstrate the feasibility of incorporating operational SAE techniques into forest inventory on private industrial forestlands. Priority will be given to proposals that:

1. Will demonstrate application across two or more CONUS regions with potentially different regional models.
    a. This will clarify that it is not strictly necessary or desirable to have one national model with auxiliary data sources that underperform when compared to regional variants.
2. Utilize free remote sensed data such as LiDAR, Sentinel, or 3D NAIP in conjunction with ground-based observations.
    a. This demonstrates a low-cost entry barrier and flexible delivery than having to acquire and process new datasets.
3. Demonstrate the ability to incorporate augmented or intensified private plot data and/or additional stand-level information to improve estimates.
    a. Provide an example for how non-FIA datasets such as rare ecological features can be incorporated where additional data is available to improve the estimation.
4. Will produce estimates of relevant industry forest inventory metrics such gross volume/height and aboveground biomass that can be disaggregated



Umbrella organizations that can house multiple research initiatives through targeted RFPs

CAFS June IAB Meeting

- June 11-13, 2024
  - -Edgewater Resort
  - -Madison, WI

- Joint meeting with NCASI Biometrics Working Group

- In-person meeting and field tour

Summary

- CAFS will enter its final year of NSF funding
  - Sites should pursue all potential NSF supplement funding opportunities
- CAFS has effectively demonstrated the ability and importance of multi-site, cross-regional collaboration
- Multiple opportunities for long-term sustainability but need full buy-in

Questions/Comments

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