

Assessment Coordinator's Report - Year 11

Center for Advanced Forestry Products (CAFS)

Sites / NSF Awards

| | |
|--|---------|
| University of Maine (UM) | 1361543 |
| North Carolina State University (NCSU) | 1238324 |
| Oregon State University (OSU) | 1238305 |
| Purdue University (PU) | 1238319 |
| Virginia Tech (VT) | 1238265 |
| University of Georgia (UG) | 1361755 |
| University of Washington (UW) | 1439653 |
| University of Idaho (UI) | 1540045 |
| Auburn University (AU) | 1360860 |

Some sites currently on a No Cost Extension

Year 11 - October 1, 2017 to September 30, 2018

Submitted by Stephen McGregor October 16, 2018

Summary

Provide brief description of current status of center focusing on major changes since last Assessment Coordinator report. Address the following: change in sites, change in leadership/governance of the center/Sites/IAB membership, significant events at IAB companies that might affect participation in the center.

The Center for Advanced Forestry Systems (CAFS) is a collaboration of the forestry research programs at 9 leading universities and over 100 full and associate members who represent the forest industry for the purpose of solving complex, industry-wide problems. As of September 30, 2017 CAFS had completed its 10th successful year as an IUCRC led by Barry Goldfarb at North Carolina State University, the lead institution.

The CAFS mission is to optimize genetic and cultural systems to produce high-quality raw forest materials for new and existing products by conducting collaborative research that transcends traditional species and disciplinary boundaries. Its major goal remains to increase the economic value and utility of plantation forests; thereby enabling foresters to more efficiently produce greater volumes of high-quality wood materials and wood products.

After completing 10 years as a Phase I & II IUCRC the Center is currently reorganizing itself and

preparing to submit a proposal for NSF funding as a Phase III IUCRC. CAFS has continued to operate after September 30, 2017 without NSF funding and it approached NSF for a no-cost-extension (NCE) during the proposal process. The four original sites, NCSU, OSU, PU and VT then individually applied for the NCE. Subsequently in August 2018 NSF awarded the CAFS (University of Maine) supplemental funding to support CAFS during this NCE period. Currently, UM, UW and UGA are planning to participate in the Phase III proposal with the potential inclusion of UI, NCSU, VT, OSU and PU. Auburn University is not planning to participate in the Phase III proposal.

University of Maine Site director Aaron Weiskittel has taken on the leadership role as the new Center Director. Under his guidance CAFS held a Spring IAB Meeting in Burlington, VT in June 12-13, 2018 that was well attended and continued to follow IUCRC guidelines. One feature of CAFS is that the members very active in and values the annual IAB meetings that annually showcase a broad array of ending, continuing, and new projects with strong participation from graduate students, post-doctorate researchers, faculty, and the IAB members.

The previous IAB and Executive Committee Chairperson, Julio Rojas (Weyerhaeuser Corporation) has remained on as the IAB Chairperson during this transition period. The Vice-Chair John Paul McTague (Rayonier, Inc.) has retired and will be replaced.

In summary, the Center for Advanced Forestry Systems is vitally important to the US and international forestry industry. It is a productive collaborative enterprise that has become a national resource within academia and industry because of strong center leadership and organization, a geographically representative set of universities and a wide base of industry and governmental sponsors. The Center also has exceptionally strong, experienced and supportive staff. A genuine strength of the Center is the interest in and willingness of the industry participants to focus on a wide variety of research with various species of plants and trees.

CAFS works to solve problems via multi-faceted approaches to basic problems in molecular, cellular, individual-tree, stand, and ecosystems research. This collaborative consortium involves scientists with expertise in biological sciences including biotechnology, genomics, ecology, ecophysiology, and soils science. It encompasses a broad spectrum of research areas related to forestry management and processing including: growth and yield, stand and plantation management, wood quality, soils and nutrition, genetics and biotechnology, modeling, and remote sensing. CAFS research thrusts combine traditional genetics, biotechnology and silviculture into integrated systems with quantitative models to support decision-making and value enhancement.

SRO Membership Certification

(A Membership Certification from UM is attached at the end of this report)

Center Leadership

Center Leadership structure:

| Role | Name | University or Organization | Email address |
|------------------------|-------------------|-----------------------------------|-------------------------------|
| Center Director | Aaron Weiskittel | University of Maine | aaron.weiskittel@maine.edu |
| Site-Director | Rachel Cook | North Carolina State University | rlcook@ncsu.edu |
| Site-Director | Doug Maguire | Oregon State University | doug.maguire@oregonstate.edu |
| Site-Director | Doug Jacobs | Purdue University | djacobs@purdue.edu |
| Site-Director | Harold Burkhart | Virginia Tech | burkhart@vt.edu |
| Site-Director | Cristian Montes | University of Georgia | crmontes@uga.edu |
| Site-Director | Eric Turnblom | University of Washington | ect@u.washington.edu |
| Site-Director | Mark Coleman | University of Idaho | mcoleman@uidaho.edu |
| Site-Director | Lori Eckhardt | Auburn University | eckhalg@auburn.edu |
| IAB Chair | Julio Rojas | Weyerhaeuser Company | julio.rojas@weyerhaeuser.com |
| IAB Vice-Chair | John Paul McTague | Rayonier, Inc. | JohnPaul.McTague@rayonier.com |
| Assessment Coordinator | Stephen McGregor | McGregor Properties | slm5@psu.edu |
| Admin. Asst. | Meg Fergusson | University of Maine | margaret.fergusson@maine.edu |

Provide brief description of current leadership structure (can be repeated from prior report if no changes since last Assessment Coordinator report) and focus on major changes since last Assessment Coordinator report, e.g., changes in lead university/site leaders.

- Center Leadership – Dr. Aaron Weiskittel of University of Maine replaces former Center Director Dr. Barry Goldfarb of North Carolina University
- IAB Leadership – Drs. Julio Rojas and John Paul McTague continue their roles as IAB Chair and Vice-Chair, but new leadership will be sought in 2018.

Faculty Members Directing I/UCRC Research Projects Funded by IAB

| | Faculty Name | Institution | # Projects |
|---|---------------------|--------------------------|----------------------------------|
| 1 | Aaron Weiskittel | University of Maine | 4 (2 new, 2 ended) |
| 2 | Eric Turnblom | University of Washington | 4 (1 new, 2 ended, 1 continuing) |
| 3 | Lori Eckhardt | Auburn University | 2 ended |
| 4 | Bronson Bullock | University of Georgia | 1 ended |
| 5 | George Newcombe | University of Idaho | 1 continuing |
| 6 | Andrew Nelson | University of Idaho | 1 continuing |
| 7 | Joseph Dahlen | University of Georgia | 1 continuing |
| 8 | Cristian Montes | University of Georgia | 1 continuing |
| | | | |

Provide brief description, no more than one paragraph per site, of activities concerning participation of current faculty researchers in the I/UCRC. Highlight major changes since last Assessment Coordinator report, e.g., addition of new faculty researchers, loss of faculty researchers, attendance of faculty researchers at the IAB meeting.

- All site directors and several faculty with ongoing CAFS projects attended the annual IAB meeting in 2018
- Four new projects proposed for 2018-2019
- New faculty from Virginia Tech, Purdue University, North Carolina State University, and Oregon State University engaged in 2018.

Students Working on I/UCRC Research Projects Funded by IAB

| | Student Name | Student Level and Year * | University | # Projects | Graduation (date) | Internship (list company, denote IAB members) |
|----|---------------------|---------------------------------|--------------------------|-------------------|--------------------------|--|
| 1 | John Mensah | PhD 3rd yr. | Auburn University | 1 | 6/19 | - |
| 2 | Maria Marlin | PhD 2 nd yr. | University of Idaho | 1 | 6/19 | - |
| 3 | Kelsie Grover | PhD 2 nd yr. | University of Idaho | 1 | 6/19 | |
| 4 | Cen Chen | PhD 4 th yr. | University of Maine | 1 | 12/18 | - |
| 5 | Christian Kuehne | PD | University of Maine | 1 | - | - |
| 6 | Kim Littke | PD | University of Washington | 2 | - | - |
| 7 | Jason Cross | MS | University of Washington | 1 | 6/18 | - |
| 8 | Stefani Correa | PhD | University of Washington | 1 | 12/17 | - |
| 9 | Jason James | PhD | University of Washington | 1 | 12/17 | - |
| 10 | John Kirby | PhD | University of Washington | 1 | 12/17 | - |
| 11 | Fletcher Harvey | MS | University of Washington | 1 | 6/18 | - |
| 12 | Pranjal Dwivedi | MS | University of Washington | 1 | 6/18 | - |

* U = undergraduate, BS = completed bachelor's degree, M = master's, PH = Ph.D., PD = Post-doctoral

Provide brief description, no more than one paragraph per site, of current student researchers focusing on highlights and major changes since last Assessment Coordinator report, e.g., addition of new student researchers, graduation of student researchers.

- A total of 6 CAFS graduate students completed their degrees during this reporting period
- Two of these graduate students have been hired by member companies

Current IAB members and attendance at IAB meetings

| | Member Company | Type | Present at Spring IAB Meeting (Burlington VT) June 12-13, 2018 |
|----|---|-----------|--|
| | <i>Auburn University</i> | | |
| 1 | ArborGen | Secondary | No |
| 2 | Arkansas Forestry Commission | Secondary | No |
| 3 | Campbell Global | Secondary | Yes |
| 4 | Delaney Development, Inc. | Affiliate | No |
| 5 | F&W Forestry Services | Affiliate | No |
| 6 | Georgia Forestry Commission | Secondary | No |
| 7 | Hancock Forest Management | Secondary | No |
| 8 | International Forest Company | Secondary | No |
| 9 | K&L Forest Nursery Inc | Secondary | No |
| 10 | North Carolina Forest Service | Secondary | No |
| 11 | Oklahoma Forestry Service | Secondary | No |
| 12 | Plum Creek Timber Company | Secondary | No |
| 13 | Rayonier | Affiliate | Yes |
| 14 | Scotch Lumber Company | Secondary | No |
| 15 | South Carolina Forestry Commission | Secondary | No |
| 16 | Tennessee Division of Forestry | Secondary | No |
| 17 | USDA Forest Service Research | Secondary | Yes |
| 18 | Virginia Department of Forestry | Secondary | No |
| 19 | Westervelt | Affiliate | No |
| 20 | Weyerhaeuser | Secondary | Yes |
| | <i>North Carolina State University</i> | | |
| 21 | April Asia Group | Primary | No |
| 22 | Deforsa | Affiliate | No |
| 23 | Evans Properties | Affiliate | No |
| 24 | Fibria | Primary | No |
| 25 | Florida Grown | Secondary | No |
| 26 | FuturaGene | Secondary | No |
| 27 | Innovatech | Secondary | No |
| 28 | International Forest Company | Secondary | No |
| 29 | Jordan Timberlands, Inc. | Affiliate | No |
| 30 | Klabin S.A. | Secondary | No |
| 31 | Lesco Aviation | Primary | No |
| 32 | OMYA | Primary | No |
| 33 | Red River | Primary | No |

Oregon State University

| | | | |
|----|---|-----------|-----|
| 34 | Campbell Global | Secondary | Yes |
| 35 | Cascade Timber Consulting | Secondary | No |
| 36 | FuturaGene | Primary | No |
| 37 | Green Diamond Resource | Secondary | Yes |
| 38 | Hancock Forest Management | Secondary | No |
| 39 | Lone Rock Timber Co. | Secondary | No |
| 40 | Olympic Resource Management (ORM Inc) | Secondary | No |
| 41 | Oregon Department of Forestry | Secondary | No |
| 42 | Port Blakely Tree Farms | Secondary | No |
| 43 | Rayonier | Secondary | Yes |
| 44 | Roseburg Forest Products | Secondary | No |
| 45 | SAPPI | Primary | No |
| 46 | Seneca Jones Timber Co. | Secondary | No |
| 47 | Starker Forests | Secondary | No |
| 48 | Stimson Lumber Company | Secondary | No |
| 49 | SweTree Technologies | Primary | No |
| 50 | Washington State Dept. of Natural Resources | Primary | No |
| 51 | Weyerhaeuser | Secondary | Yes |

Purdue

| | | | |
|----|--|-----------|-----|
| 52 | American Forest Management | Primary | Yes |
| 53 | Arbor America | Primary | No |
| 54 | Atherton Foundation | Affiliate | No |
| 55 | Cooke Foundation | Primary | No |
| 56 | Fred M. van Eck Foundation for Purdue Univ | Primary | No |
| 57 | IN Hardwood Lumberman's Association | Affiliate | No |
| 58 | Nelson Irrigation | Primary | No |
| 59 | Purdue Research Foundation | Primary | No |
| 60 | Steelcase | Primary | No |
| 61 | USDA Forest Service Research | Primary | Yes |

University of Georgia

| | | | |
|----|------------------------------|-----------|-----|
| 62 | ArborGen | Secondary | No |
| 63 | Beasley Forest Management | Secondary | No |
| 64 | Campbell Global | Secondary | Yes |
| 65 | CatchMark Timber Trust | Secondary | No |
| 66 | Domain Timber Advisors | Secondary | No |
| 67 | F&W Forestry Services | Secondary | No |
| 68 | Forest Investment Associates | Secondary | No |
| 69 | Forest Resource Consultants | Secondary | No |
| 70 | ForesTech International | Secondary | No |
| 71 | Four Rivers Land & Timber | Secondary | No |
| 72 | GMO Threshold Timber | Secondary | No |
| 73 | Hancock Forest Management | Secondary | No |

| | | | |
|----|-----------------------------------|-----------|-----|
| 74 | International Forest Company | Secondary | No |
| 75 | Molpus Timberlands Management | Secondary | No |
| 76 | Potlatch Corporation | Secondary | No |
| 77 | Rayonier | Primary | Yes |
| 78 | Resource Management Services | Secondary | No |
| 79 | Superior Pine Products Company | Secondary | No |
| 80 | Timber Investment Resources (TIR) | Secondary | No |
| 81 | Varn Wood Products, LLC | Secondary | No |
| 82 | Weyerhaeuser | Primary | Yes |

University of Idaho

| | | | |
|----|---|-----------|-----|
| 83 | Hancock Forest Management | Primary | No |
| 84 | Idaho Dept of Lands | Primary | No |
| 85 | Inland Empire Paper Co | Secondary | No |
| 86 | Molpus Timberlands Management | Primary | No |
| 87 | Montana DNRC | Secondary | No |
| 88 | Potlatch Corporation | Primary | No |
| 89 | Stimson Lumber Company | Primary | No |
| 90 | USDA Forest Service Research | Primary | Yes |
| 91 | USDI Bureau of Land Management | Primary | No |
| 92 | Washington State Dept. of Natural Resources | Primary | No |

University of Maine

| | | | |
|-----|--|-----------|-----|
| 93 | Baskahegan Corporation | Secondary | No |
| 94 | BBC Land LLC | Primary | Yes |
| 95 | Clayton Lake Woodlands Holding, LLC | Primary | Yes |
| 96 | J.D. Irving (Irving Woodlands, LLC) | Primary | No |
| 97 | James W. Sewall Co. | Affiliate | No |
| 98 | Katahdin Forest Management, LLC | Secondary | No |
| 99 | Maine Bureau of Parks and Public Lands | Secondary | No |
| 100 | Prentiss and Carlisle Company, Inc. | Primary | No |
| 101 | ReEnergy Holdings LLC | Affiliate | No |
| 102 | Sandy Gray Forest, LLC | Secondary | Yes |
| 103 | SAPPI | Secondary | No |
| 104 | Seven Islands Land Company | Primary | Yes |
| 105 | Snowshoe Timberlands, LLC | Secondary | Yes |
| 106 | Sylvan Timberlands, LLC | Secondary | Yes |
| 107 | The Nature Conservancy | Secondary | No |
| 108 | Wagner Forest Management | Primary | No |
| 109 | Weyerhaeuser | Primary | Yes |

University of Washington

| | | | |
|-----|----------------------------|-----------|-----|
| 110 | American Forest Management | Secondary | Yes |
| 111 | Bureau of Land Management | Primary | No |
| 112 | Campbell Global | Secondary | Yes |
| 113 | Cascade Timber Consulting | Secondary | No |

| | | | |
|-----|---|-----------|-----|
| 114 | Green Crow | Secondary | No |
| 115 | Green Diamond Resource | Primary | Yes |
| 116 | Hampton Affiliates | Secondary | No |
| 117 | Hancock Forest Management | Primary | No |
| 118 | Lewis & Clark Tree Farms | Secondary | No |
| 119 | Lone Rock Timber Co. | Secondary | No |
| 120 | Olympic Resource Management (ORM Inc) | Secondary | No |
| 121 | Oregon Department of Forestry | Primary | No |
| 122 | Pacific Denkmann | Secondary | No |
| 123 | Port Blakely Tree Farms | Secondary | No |
| 124 | Quinault Indian Nation | Secondary | No |
| 125 | Rayonier | Primary | Yes |
| 126 | Roseburg Forest Products | Primary | No |
| 127 | Stimson Lumber Company | Secondary | No |
| 128 | Washington State Dept. of Natural Resources | Primary | No |
| 129 | Weyerhaeuser | Primary | Yes |

Virginia Tech

| | | | |
|-----|---|-----------|-----|
| 130 | American Forest Management | Primary | Yes |
| 131 | ArborGen | Secondary | No |
| 132 | Bayer | Secondary | No |
| 133 | BTG Pactual | Primary | No |
| 134 | Campbell Global | Secondary | Yes |
| 135 | CHS Inc | Secondary | No |
| 136 | Crop Production Services | Secondary | No |
| 137 | Dougherty & Dougherty Forestry Services, Inc. | Secondary | No |
| 138 | Forest & Land Resource Consultants (F&LRC) | Secondary | No |
| 139 | Forest Investment Associates | Primary | No |
| 140 | GreenWood Resources | Affiliate | No |
| 141 | Hancock Forest Management | Primary | No |
| 142 | International Forest Company | Affiliate | No |
| 143 | Leading Edge Geomatics | Secondary | No |
| 144 | Milliken Forestry Co. | Secondary | No |
| 145 | Molpus Timberlands Management | Primary | No |
| 146 | Precision Air | Secondary | No |
| 147 | Rayonier | Primary | Yes |
| 148 | Resource Management Services | Primary | No |
| 149 | Superior Pine Products Company | Secondary | No |
| 150 | Timber Investment Resources (TIR) | Affiliate | No |
| 151 | Westervelt | Secondary | No |
| 152 | Weyerhaeuser | Primary | Yes |

Provide brief description of current IAB membership focusing on major changes since last AC report, e.g., addition of new IAB members, loss of IAB members.

- CAFS has three levels of membership; Primary or “Full” Members, Secondary or “Associate” Members and Affiliate Members. There are 50 Full Members that pay an annual fee of \$25,000. There are 88 Associate Members whose fees range from \$5,000 to \$25,000 dictated by each site and generally based on the size of the organization. And there are 14 Affiliate Members who each pay less than \$5,000 per year. These fees have remained stable since the Center was established.
- Weyerhaeuser Company purchased Plum Creek Timber Company and was merged into Weyerhaeuser.
- Quinault Department of Natural Resources is now called Quinault Indian Nation.

IAB Members That Have Left the Center

| | Member Company | Delegate Name | Email address |
|---|------------------------------|----------------------|---------------------------|
| 1 | Gavilon Fertilizer, LLC | Leigh Hamric | leigh.hamric@yahoo.com |
| 2 | Prestage AgEnergy of NC, LLC | Michael Pope | mpope@prestagefarms.com |
| 3 | Thrash Aviation, Inc. | Jimmy Thrash | THRASHAV1@aol.com |
| 4 | TimberVest | David Zell | zell@timbervest.com |
| 5 | WestRock | John Johnson | john.johnson@westrock.com |

Provide brief description of the context regarding reasons for leaving and extent to which these reasons were influenced by unmet expectations regarding quality of research, center performance, center leadership, or other aspects of center performance.

- Generally these were small members and given changes in finances were unable to afford their dues payment

Management of IAB Member Contact Information

Explain methods used by the Center to maintain contact information of primary IAB member representatives, as well as alternate delegates within the Member Company, in case the primary member representative is unreachable?

- Each Site maintains a current mailing list, which are sent to Center Director annually.
- Each Member has an alternate delegate appointed.
- CAFS maintains a website for member, directors, faculty and other Center stakeholders. This site had been hosted at NCSU (former lead site) and included current information about the Center including a tab for membership, research areas, academic partners (sites) and meetings and reports. This information is in the process of being transferred to the University of Maine as the host (new lead site).

Use of NSF Required Governance Practices for Center

(Source: <http://www.nsf.gov/eng/iip/iucrc/requirements.jsp>)

| NSF Governance Requirement | Yes/No |
|---|--|
| An I/UCRC shall be composed of one or more universities, each of which is a Site. | Yes |
| Each Site shall name a Director who shall be the Principal Investigator for that Site's NSF grant. | Yes |
| Each Site shall create a University Policy Committee composed of administrators from that university to oversee compliance of that Site with the university's policies and procedures. | Yes |
| A Director shall be designated for the entire I/UCRC. She/he shall be either one of the Site directors or a co-principal investigator on one of the Site awards. | Yes |
| The I/UCRC shall define a membership structure for non-university, fee-paying members. | Yes |
| I/UCRC members may include for-profit and not-for-profit organizations (public or private), state and local agencies, or non-NSF federal agencies. A complete definition is found in the solicitation. | Yes |
| The membership structure shall define the types of members, member fees, and the rights of members, including all voting and governance rights, as per the conditions found in the solicitation. | Yes |
| The I/UCRC shall have an Industry Advisory Board (IAB) with one representative from each member. NSF, and/or its authorized representative, has the right, but not the obligation, to attend I/UCRC IAB meetings in their entirety. | Yes |
| The IAB shall elect a Chair. | Yes |
| The IAB shall meet at least twice per year with the meeting schedule and agenda being developed collaboratively with NSF. | Yes, 1 in-person and 1 remote meeting |
| The I/UCRC Leadership Team shall include all Site Directors, I/UCRC Director, and IAB Chair. | Yes |
| All I/UCRC members shall sign a single membership agreement approved by NSF and based on the template provided by NSF. | No, MOU has been formulated and is being signed |
| The membership agreement shall provide that all fee-paying members shall have non-exclusive, royalty-free rights to all intellectual property created by any research funded using member fees. | Yes |
| The I/UCRC shall create Bylaws that define its policies and operations. | No, one has been drafted and will be discussed at the next IAB Meeting |
| The Bylaws shall adhere to the membership agreement and be approved by the IAB and NSF. | No, one has been drafted and will be discussed at the |

| | |
|--|--|
| | next IAB Meeting |
| The Bylaws shall define a voting process for the approval of all research projects funded using member fees. | No, one has been drafted and will be discussed at the next IAB Meeting |
| Research performed by the I/UCRC shall be pre-competitive in nature, and it shall be shared, directed, and funded by the fee-paying members. | Yes |
| All research projects funded by member fees shall be approved by the IAB using the voting process defined in the Bylaws. | Yes |
| NSF shall designate an NSF-funded Assessment Coordinator who shall attend all meetings of the IAB in their entirety, provide guidance to the I/UCRC, and collect data for NSF on the performance of the I/UCRC, from the IAB as well as the Center/Site Directors. | Yes |
| The I/UCRC shall submit an annual report to NSF summarizing the activities of the I/UCRC, including all Sites, and in accordance with NSF's reporting requirements. | Yes |

Highlight non-compliant practices and discuss reasons for non-compliance.

- When the Center was founded it was granted a meeting frequency waiver that permitted CAFS to hold just one IAB meeting annually and remain in good standing. The argument was based on the nature and pace of the technical field of forestry research, wherein research proceeds at a somewhat slower and more deliberate pace than research in the typical I/UCRC. Also, the various Center Sites' coop members typically meet separately one or two times per year. This is being revised and a second, Fall Meeting, is being planned for this current 2018-2019 year.
- Given the leadership transition and planning for a Phase III proposal, several potential issues have been identified and are currently being addressed.
- A Fall 2017 IAB meeting was not scheduled and focus was placed on a Spring 2018 IAB meeting.
- A Fall 2018 IAB and Spring 2019 IAB meeting are currently being organized.
- Bylaws, inter-institutional memorandum of understanding, and industrial agreement have been drafted and will be presented to the Director's Committee and IAB in the Fall of 2018 with a formal vote at the next IAB Spring meeting in June 2019.

Center Collaboration and Alignment with NSF Practices

Please provide description of the Center status relative to each item below. If problems exist, AC should try to identify the source(s) of the problem and suggest potential remedial measures to NSF in the narrative box following each item.

Interaction/synergy among all Center Stakeholders (Academics and IAB members at meetings and in between meetings). Examples include: social hours and banquets during IAB meeting, video or telephone conference calls between IAB meetings.

Provide brief discussion of frequency and quality. Highlight unique or highly effective practices as well as weak and ineffective practices.

- Annual Site meetings allow strong coalition to be formed among members.
- Annual IAB meeting has strong participation from a diversity of backgrounds including graduate students, post-doctoral students, faculty, Site Directors, and IAB members.
- Annual IAB meeting includes social hours and banquets as well as a full day field tour that allow for technology transfer and unique and informal networking opportunities.
- Regular telephone conference calls are scheduled and conducted by the Director's Committee between IAB meetings.
- Regular contact is maintained via email for the Director's Committee.
- CAFS IAB member contact list is being updated and Center Director Aaron Weiskittel's staff is planning more regular communications.

Describe the level of collaboration across university sites and among the center's major stakeholders (center and site leaders, IAB chair, faculty researchers, student researchers, and center support staff) and its impact on center performance.

Provide brief discussion of extent and quality of collaboration and its impact on performance of the center, e.g., use of faculty and student researchers from multiple university sites on the same research project versus research projects conducted with researchers from a single university (silos of research), proportion of all research projects that are collaborative.

- There is strong collaboration across university sites and center stakeholders that is evident at the annual IAB meeting.
- A number of past and current approved research projects include multiple university sites.
- A Fundamental Research Collaborative Grant between University of Maine, University of Georgia, and Virginia Tech was recently completed.

Describe the level of interaction within the IAB with respect to the Center mission/operations and how this interaction influences performance of the center.

Provide brief discussion of extent and quality of interaction among IAB members and its impact on performance of the center, e.g., most or all IAB members participate in discussions and contribute to decision making versus a small number of IAB members that dominate discussions and decision making.

- Representation from a range of IAB members is clear at annual IAB meetings.
- Closed-door discussions at the IAB are engaged and generally supportive.
- Nearly all IAB members see value in CAFS activities and strongly support seeing it continue.

Technology Roadmap:

- **Does the center have a technology roadmap that clearly identifies its research strengths/weakness and opportunities/threats?**
- **Is the IAB directly involved in the technology roadmap creation/updating?**
- **Does the roadmap clearly show the research gaps and voids that need to be filled?**
- **Does selection of member-funded research projects reflect gaps and voids identified in the Center Roadmap?**

Provide brief discussion of quality of the center's technology roadmap and how it is used to guide decision making, new project selection, and strategic growth of the center, e.g., selection of new research projects, addition of new university research sites, recruitment of new IAB members.

- A Technology Roadmap does not currently exist, but IAB members were surveyed at the Spring IAB Meeting in June 2018 on priority research areas.
- This IAB member survey from 2018 indicated strong support across four primary research areas, which included: 1) Remote Sensing, 2) Growth and Yield Modeling, 3) Silviculture and 4) Forest Inventory.
- IAB focal needs were identified and prioritized across these four primary research areas, which will be used to guide the Phase III proposals, future research projects, and the development of the Technology Roadmap.
- If successful with Phase III proposals, a primary focus in 2019 would be placed on the development of a Strategic Plan and Technology Roadmap.

Appendices:

**Compliance with NSF Pre-IAB Meeting Practices
Center for Advanced Forestry Products (CAFS)**

Document compliance with each practice for each IAB meeting in the relevant box. Provide text explanation or interpretation in text box following table.

| Pre-IAB Meeting Practice | No Fall IAB Meeting | Present at Spring IAB Meeting (Burlington VT) June 12-13, 2018 |
|--|----------------------------|---|
| Collect and make accessible in advance of meetings Executive Summaries (following the template found at http://www.nsf.gov/eng/iip/iucrc/exec_summary_portfolios.jsp) for all new project proposals to be presented at the IAB meeting. | - | Yes |
| Clearly document the center project history. List completed projects and currently funded projects. List the cost, and beginning and end dates of each. Update this document prior to every meeting and provide to the IAB. | - | Yes |
| Organize an executive summary of center financial information since the last meeting. Include major categories of income and sources, outlays and purpose, and balances. Keep income from memberships (use governed by the membership agreement, bylaws) separate from other income. Given this overall picture, show funds allocated to current projects and funds remaining for allocation by the center to new projects. Conservatively project future funds for planning purposes. | - | Yes |
| Distribute NDA/CDA documents to all invited guests prior to the meeting with the expectation they be completely executed prior to the meeting. | - | No, there were no invited guests at this meeting |
| Ensure all printed or electronic material conveying results of the center's research clearly state that the content is Center Proprietary and that the Terms of the Center membership agreement apply. | - | Yes |
| Develop and distribute in advance a preliminary agenda for the meeting, outlining main meeting events and start/stop times with which people can plan travel. | - | Yes |

| | | |
|---|---|-----|
| Distribute a detailed final agenda just prior to the meeting. Effective agendas include: <ul style="list-style-type: none">• Project Status• Project Title• Project Presenter• Sufficient time for Discussion of LIFE Forms• Allotted time for closed-door IAB session | - | Yes |
|---|---|-----|

**Compliance with NSF IAB Meeting Practices
Center for Advanced Forestry Products (CAFS)**

Document compliance with each practice for each IAB meeting in the relevant box. Provide text explanation or interpretation in text box following table.

| IAB Meeting Practice | No Fall IAB Meeting | Present at Spring IAB Meeting (Burlington VT) June 12-13, 2018 |
|---|----------------------------|---|
| Sign in all attendees. Provide an attendee list to all of preregistered attendees, and distribute an updated list at the close of the meeting. Most effective lists have faculty, students & postdocs, IAB members, and NSF grouped in their respective categories. List must include complete contact information, must identify "guests" among the members from current members. To showcase students, indicate if master or Ph.D. and year of anticipated graduation. | - | Yes |
| <u>At Point of Registration</u> , "Non-Disclosure Form" is signed by each non-member industrial attendee and collected. | - | No |
| Please indicate the purpose of this meeting: <ul style="list-style-type: none"> • Primarily dedicated to proposal presentations w/ LIFE feedback (+ closed IAB Mtg.). • Primarily dedicated to a technical review of progress w/ LIFE feedback (+ closed IAB Mtg.). • A combination of the two purposes | - | Yes A combination of the two purposes |
| Deliver a Center report to the center that brings members and faculty up-to-date on the center and the university research site(s) including: <ul style="list-style-type: none"> • A review of the center's vision and research roadmap and/or explicit set of center priorities • An update on the current center membership • Attention to outputs of interest of members and faculty (technology transfer impact, product, etc.) from recently completed projects • An update on publication/awards and other highlights • An opportunity for discussion and questions by IAB members about the state-of-the-center • An overview of the upcoming meeting • Material related to projects presented throughout the meeting (including posters) | - | Yes |

| | | |
|--|---|-----|
| <p>Use a common slide master template for all presentations across all sites. Be conscious of maintaining center branding.</p> <ul style="list-style-type: none"> Proposed projects should include proposed schedule, overall and first year deliverables, and proposed budget Ongoing projects must clearly state progress, milestones achieved, and deliverable status from those originally proposed Final project reports should summarize all deliverables and outcomes as well as new directions that have emerged from the work | - | Yes |
| <p>Enforce strict time limits for each project presentation and item in the agenda.</p> | - | Yes |
| <p>“Closed Meeting” sign posted; materials labeled “Center Proprietary”</p> | - | Yes |
| <p>Meeting activities are included that support industry/university networking; such poster sessions, and industry-driven mentoring sessions.</p> | - | Yes |
| <p>Project LIFE assessment forms are completed and discussed by the IAB at each meeting.</p> | - | Yes |
| <p>IAB closed door meeting (NSF and IAB only)</p> <ul style="list-style-type: none"> Work with your IAB Chair the agenda for the IAB closed-door meeting that provides an opportunity for members to raise issues about center policies, procedures and research activities; use of and modification of by-laws if any; Ensure that the IAB has the comprehensive financial update of the center to enable them to make informed funding decisions; <p>Provide the IAB Chair with a well-defined procedures and timetable for selection of research projects</p> | - | Yes |
| <p>Action Items and Plans for Next Semiannual Meeting Make sure to have reviewed the I/UCRC Master Travel Calendar and have consulted with the NSF prior to the meeting regarding the availability of your preferred meeting dates</p> | - | Yes |

Briefly highlight and discuss IAB meeting practices the center is doing exceptionally well, not doing well or not doing at all.

- An “Online Notebook” is provided at the annual IAB Meeting with executive summaries and complete presentation slide sets for each project and proposal presentation. This is an excellent resource available to attendees during the meeting and for members not attending.

**Compliance with NSF Post-IAB Meeting Practices
Center for Advanced Forestry Products (CAFS)**

Document Center compliance with each practice for each IAB meeting in the relevant box. Provide text explanation or interpretation in text box following table.

| Post-IAB Meeting Practice | No Fall IAB Meeting | Present at Spring IAB Meeting (Burlington VT) June 12-13, 2018 |
|--|----------------------------|---|
| Send meeting outcomes to Center participants | - | Yes |
| Forward copy of IAB meeting minutes to IAB | - | Yes |
| Confirm next meeting date | - | Yes |
| Maintain an up-to-date and good quality centralized Webpage for the Center with a secure area (password protected for members) where to promptly save meetings information, research products, and any material related to Center activities. | - | Yes, websites are currently in transition from NCSU to UM |
| Center facilitates opportunities for project related communication (e.g., newsletters, regularly scheduled project conference calls) with the IAB between meetings. | - | Yes |
| Promptly inform the IAB of any invention and publication generated by the Center in compliance with the terms set in the membership agreement and bylaws; | - | Yes |
| Provide accurate and up-to-date information for the I/UCRC directory at http://www.iucrc.org/centers . Instructions for updating and reporting web site information can be found at http://www.nsf.gov/eng/iip/iucrc/directory/instructions.jsp | - | Yes |

NSF Evaluator IAB Meeting Report

Instructions: The evaluator is required to complete and submit the information requested on this form to NSF program manager within a week of the meeting. Please also attach a copy for each meeting to your Evaluator Report for that year.

Evaluator Name Stephen McGregor

Center Name: Center for Advanced Forest Systems (CAFS) NSF Award 1361543 (U. Maine)

IAB Meeting Location: Burlington, VT (Hosted by U of Maine) **Date:** June 12-13, 2018

A. Meeting Status

Please provide meeting attendance information and funding numbers for the current project year in the table below:

| | N of Member Firms Attending¹ | N of Member Representatives Attending² | N of Students Attending | N of Faculty, Scientists and Postdocs Attending | Estimated Membership Fees Generated (Total \$)³ |
|---------------|--|--|--------------------------------|--|---|
| TOTAL: | 12 | 16 | 3 | 8 | \$3.24 Million |

- 1 Includes one company, AFM, who attended by Zoom Web Conferencing.
- 2 Includes two representatives from AFM who attended by Zoom Web Conferencing.
- 3 For FY 2017-2018 as reported by the Center Director in Center Update Report to members.
[67.67% * \$4.79M = \$3.24M]

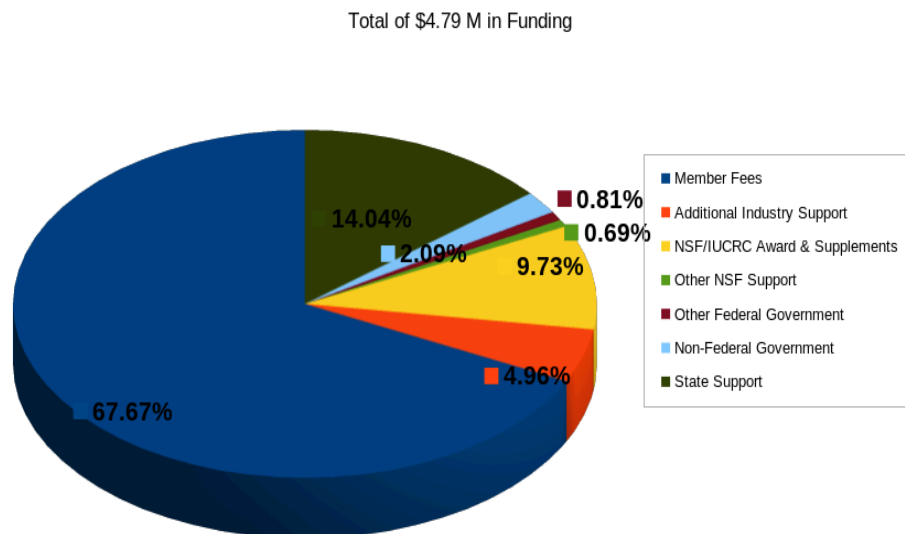
- This was the 11th and a unique meeting for the Center for Advanced Forestry Systems (CAFS). The Center has 9 sites, 4 of which are on a no-cost-extension (NCE) with NSF after their Phase II awards ended September 30, 2017. Of the remaining 5 sites, 4 were still within their Phase II awards and one was still in a Phase I award. This is due to these 5 sites being added to the original 4 sites after the Center began in 2007. This assessment coordinator prepared the following table of the awards as of September 30, 2017:

| Site | Current Phase | Start Date | End Date | Status |
|---------------------------------|----------------------|-------------------|-----------------|---------------|
| North Carolina State University | II | Oct. 1, 2012 | Sept. 30, 2017 | NCE |
| Oregon State University | II | Oct. 1, 2012 | Sept. 30, 2017 | NCE |
| Purdue University | II | Oct. 1, 2012 | Sept. 30, 2017 | NCE |
| Virginia Tech | II | Oct. 1, 2012 | Sept. 30, 2017 | NCE |
| University of Georgia | II | Apr. 15, 2014 | Mar. 31, 2019 | |
| University of Maine | II | Apr. 15, 2014 | Mar. 31, 2019 | |
| University of Washington | II | Sept. 1, 2014 | Aug. 31, 2019 | |
| University of Idaho | II | Aug. 1, 2015 | July 31, 2020 | |
| Auburn University | I | Mar. 1, 2014 | Feb. 28, 2019 | |

- CAFS is planning to submit a Phase III proposal to NSF later this year. Dr. Arron Weiskittel from the University of Maine has accepted the position of new Center Director and is leading CAFS during this transition period and into the future as a Phase III I/UCRC if awarded by NSF.
- An “Online Notebook” was provided to the attendees with executive summaries and a complete presentation slide set for each project and proposal presentation. This was an excellent resource available to attendees during meeting and for members not attending.
- The meeting had 32 attendees; the new Center Director Aaron Weiskittel, 4 university site directors, 16 representatives from 12 member organizations (two members from one company attended by Zoom), 2 faculty, a post-doc, 3 students, 2 project scientists, an administrative assistant, Andree

Marshall from the NSF and this Assessment Coordinator Stephen McGregor.

- The outgoing Center Director Barry Goldfarb and new Center Director Aaron Weiskittel opened the meeting with a welcome, introductions and a Center update. Aaron presented the following Center information in his overview:
 - CAFS Mission: To optimize genetic and cultural systems to produce high-quality raw forest materials for new and existing products by conducting collaborative research that transcends traditional species and disciplinary boundaries.
 - 154 Members:
 - 35 large industry (>500 employees)
 - 92 small industry
 - 21 government agency (state/local/federal)
 - 6 non-profit or foundation
 - Membership Summary:
 - 108 full members (>\$25,000 annual dues)
 - 46 associate members (>\$5,000 and <\$25,000)
 - CAFS Personnel:
 - 1 Center director
 - 9 site directors
 - 35+ other faculty
 - 27 research staff
 - 9 administration
 - 9 post-docs
 - 6 doctoral students
 - 15 masters students
 - 44 undergraduate students
 - CAFS Funding Sources for FY 2016-2017



- The NSF Director Andre Marshall presented an overview and update of the NSF IUCRC Program and comments regarding plans by CAFS to submit a Phase III proposal.
- The two-day agenda (attached) started on day-1 with 14 presentations in 3 technical sessions. The first session was a review of the 5 final project presentations, the second session presented updates on the 5 continuing projects, and the final session contained 4 new proposal presentations. The student researchers and PI's who were all well prepared made excellent presentations. LIFE feedback was

used and member remarks were discussed after each of the 3 sessions.

- The first day concluded with an open IAB business meeting with the directors, followed by a closed IAB meeting with only the members, the NSF representative Andre Marshall and this evaluator. The primary topic was the future of the Center. Most of the discussions centered on maintaining and growing CAFS; making it an even better center. Some key and constructive comments made by the members included:
 - Aaron is a good choice to lead CAFS in Phase III; we have confidence in him.
 - Phase III is an opportunity to “reinvent” CAFS. Develop a new roadmap, reconsider the Center structure and revise its relationship with the coops.
 - The Center should broaden its scope of activities. Look at industry driven problems. A couple examples mentioned were Black Cherry decline and Sugar Maple decline.
 - The funding model for the Center is not working. Funds are going to coop dues and not to the CAFS research budget.
 - Members had an extensive discussion following a comment that the Center missed some past opportunities and the “funding model needs fixed”. The key issues are summarized as follows; CAFS needs to:
 1. Identify 3 or 4 key priority projects (or technical challenges) driven by the industry members.
 2. Generate funds (members and NSF) to attract high quality, broad based, competitive faculty proposals.
 3. Adopt a proposal selection process that yields good industry relevant projects that satisfy the membership’s interests and needs.
 4. Manage the Coop- CAFS relationship to keep both groups active and healthy.
 5. Recruit new Center members across the whole forest products industry supply chain.
- There were good discussions and interactions after the presentations, during the LIFE reviews and during the breaks. Opportunities for networking and socializing were built into the agenda. A dinner and social event was held the evening of day-1.
- A field trip was held the second day that included a visit of the commercial forestry plot at the New England Weyerhaeuser Operations in Danville Vermont and a visit to the Sweet Tree Holdings at Island Pond Vermont that included a Tour of the Willoughby State Forest, Vermont Forests, Parks and Recreation.

Overall meeting impression

- Excellent meeting preparation and execution. Very well directed and coordinated.
- Very good technical presentations with good member interactions and LIFE discussions.
- Active participation by the members in the closed IAB meeting. A very strong desire to continue CAFS into Phase III because of the benefits to Center members and sites. And thanks to NSF, it is the only national forum where the forestry products industry and university researchers meet and work together to tackle industry-wide technical challenges that keep the industry competitive.

Recommendation for actions to be taken by NSF:

- NSF should continue to work with the new Center Director Aaron Weiskittel (U of Maine) and the site directors as they develop future plans for CAFS including a new strategic plan and roadmap, IAB bylaws, and updated membership fee structure leading to a Phase III IUCRC proposal submission. There is significant interest and enthusiasm from the IAB membership and university stakeholders to revitalize CAFS to help it grow, conform to the IUCRC model and achieve self-sufficiency.

Stephen McGregor
CAFS Assessment Coordinator
October 3, 2018

11th Annual Center for Advanced Forestry Systems Industrial Advisory Board Meeting

June 12-13, 2018

*Marriott Courtyard, Burlington Harbor**Independence Room*Meeting webpage: <https://tinyurl.com/ydh7dedm>; Meeting remote access: <https://zoom.us/j/5500820917>**Tuesday, June 12, 2018**

| Time | Title | Presenter |
|-----------------------------------|---|---------------------------------|
| 7:30 AM | Continental Breakfast/Registration | - |
| 8:30 AM | Welcome/Introductions | Aaron Weiskittel, UM |
| 8:45 AM | CAFS Lead Site Update | Barry Goldfarb, NCSU |
| 9:00 AM | Updates on NSF IUCRC Program | Andre Marshall, NSF |
| 9:20 AM | CAFS Evaluator Update | Steve McGregor, Assessment Crd. |
| <i>Final Project Reports</i> | | |
| 9:30 AM | 14.54. Root Development and Morphological Comparisons of Container-grown Pine and Subsequent Productivity after Establishment | Ryan Nadel, AU |
| 9:50 AM | 15.61. Appraising Rotation-age Tree and Stand Characteristics in a 1970s Decadal Cohort of Douglas-fir Plantations in the PNW | Eric Turnblom, UW |
| 10:10 AM | 15.62. Quantifying the Impact of Pine Decline in the Southeastern United States | John Mensah, AU |
| 10:30 AM | Coffee Break | - |
| 10:50 AM | 16.65. Understanding & Modeling Competition Effects on Tree Growth & Stand Development Across Varying Forest Types & Management Intensities | Aaron Weiskittel, UM |
| 11:10 AM | 17.70. The Rise of Commercially Less Desirable Species in Maine: Identification, Characterization, and Associated Driving Factors | Aaron Weiskittel, UM |
| 11:30 AM | Discussion on LIFE forms for Final Projects | All |
| 12:00 PM | Lunch | - |
| <i>Continuing Project Reports</i> | | |
| 1:00 PM | 13.46. Linking Growth Modeling to Product Quality for Loblolly Pine | Joe Dahlen, UGA |
| 1:20 PM | 15.60. Assessing Stand Characteristics of Enhanced Genetics in Loblolly Pine Plantations in the Southeast | Joe Dahlen, UGA |
| 1:40 PM | 16.67. Improving White Pine Seedling Survival by Combining Blister Rust Resistance with Defense-enhancing Endophytes | Maria Marlin, UI |
| 2:00 PM | 16.68. Response of Superior Western Larch Families to Site Quality and Competition Control | Kelsie Grover, UI |
| 2:20 PM | 16.69. Stand and Tree Responses to Late Rotation Fertilization | Kim Littke, UW |
| 2:40 PM | Discussion on LIFE forms for Continuing Projects | All |
| 3:00 PM | Break | - |
| <i>New Proposals</i> | | |
| 3:20 PM | 18.71. Evaluation of silvicultural options for increasing productivity of early successional stands in the Acadian Forest Region | Aaron Weiskittel, UM |
| 3:40 PM | 18.73. Modeling the influence of Spruce Budworm on Forest Productivity | Aaron Weiskittel, UM |
| 4:00 PM | 18.74. UW TBD | Eric Turnblom, UW |
| 4:20 PM | 18.75. UGA TBD | Joe Dahlen, UGA |
| 4:40 PM | Discussion on LIFE forms for New Proposals | All |
| 5:00 PM | Closed IAB Meeting | All |
| 6:00 PM | Adjourn | - |
| 6:30 PM | Dinner (Farmhouse Tap & Grill; 160 Bank St) | - |

Wednesday, June 13, 2018

| Time | Destination | Presenter |
|-------------|--|-----------------------|
| 7:00 AM | Continental Breakfast | - |
| 8:00 AM | Bus departs from near front lobby | - |
| 9:00 AM | Danville, VT; Overview of commercial forestry in New England | Tony D'Amato, UVM |
| 10:00 AM | Weyerhaeuser Operations | Chris Fife, WY |
| 12:00 PM | Lunch | - |
| 1:00 PM | Sweet Tree Holdings, Island Pond, VT | Joe Russo, Sweet Tree |
| 3:00 PM | Tour of Willoughby State Forest, Vermont Forests, Parks and Recreation | Lou Bushey, VT FPR |
| 5:30 PM | Von Trapp Lodge & Bierhall, Stowe, VT | - |
| 6:00 PM | Dinner | - |
| 8:30 PM | Arrive back to hotel | - |

Office of Research and
Sponsored Programs



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Orono, Maine 04469-5717
Tel: 207.581.1484
Fax: 207.581.1446
umaine.edu/orsp
umaine.edu

November 1, 2018

Dr. Andre Marshall
Program Director
Industry/University Cooperative Research Center Program
National Science Foundation
Washington D.C.

RE: Certification of Phase II (2013-2018) Industry Member Fees

Dear Dr. Marshall:

This letter is to certify that during the Phase II award (#1361543) the University of Maine site for the Center for Advanced Forestry Systems (CAFS) has received a total of \$2,409,648 in external member contributions (including: \$2,126,997 in Member Fees, \$152,845 in Additional Industry Support, and \$129,806 in State Support), thereby exceeding the minimum annual minimum of \$200,000 or \$1,000,000 over the five year period required by the National Science Foundation for Phase II IUCRC grants.

Details of each CAFS member's contribution and membership type are provided in the attached form.

I would be pleased to answer any questions that you may have regarding this certification.

Sincerely,

A handwritten signature in black ink, appearing to read 'Chris Boynton', written in a cursive style.

Christopher Boynton
Director of Research & Sponsored Programs
Authorized Institutional Representative
University of Maine

Cc: Professor Aaron Weiskittel

Certification of Membership

Project Title: I/UCRC for University of Maine, Center for Advanced Forestry Systems (CAFS), Phase II

Grant No. IIP - 1361543

Project dates: 4/1/2014 to 3/31/2019

Today date: 12/1/2018

| Member | Type | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
|--|-----------|----------|----------|----------|----------|----------|
| In Cash | | | | | | |
| <u>Member:</u> | | | | | | |
| <ul style="list-style-type: none"> - List Company name, government agency with branch, and trade organizations or associations - For Small Business that received NSF SBIR Phase II matching, only the contribution of the company must be entered. You can enter NSF contribution under the "Others" section found below - Trade organization and associations must sign membership agreement and addendum to be eligible members | | | | | | |
| <u>Type:</u> | | | | | | |
| <ul style="list-style-type: none"> - Specify level of membership based on membership agreement based on agreement (Full/Associate/Observer) - If Government, indicate [Level]/[MIPRID]-ID or [IAA]-ID/[IIP supplement ID] or [Level]-signed if they signed the membership agreement - If members are buying more than one memberships in any given year please indicate number next to type (example: company A buys 2 full memberships for year 1, indicates 2-Full) | | | | | | |
| <u>Year x:</u> | | | | | | |
| <ul style="list-style-type: none"> - Enter membership amount under correspondent year - If member buys multiple years, you must enter each year membership amount under the correspondent year (example: company A buys 3 years memberships in year 1 equivalent to \$150k, you must enter 50k in year 1, 50k in year 2 and 50k in year 3)_ | | | | | | |
| Irving Woodlands, LLC | Full | \$68,804 | \$68,804 | \$68,804 | \$68,804 | \$68,804 |
| Wagner Forest Management | Full | \$62,404 | \$62,404 | \$62,404 | \$57,216 | \$57,216 |
| BBC Land, LLC | Full | \$54,423 | \$54,423 | \$54,423 | \$54,423 | \$54,423 |
| Plum Creek Timber Company, Inc. | Full | \$48,655 | \$48,655 | \$48,655 | - | - |
| Weyerhaeuser | Full | - | - | - | \$47,376 | \$47,249 |
| Prentiss and Carlisle Company, Inc. | Full | \$44,026 | \$44,026 | \$44,026 | \$43,300 | \$43,093 |
| Seven Islands Land Company | Full | \$42,354 | \$42,354 | \$42,354 | \$42,630 | \$42,354 |
| Clayton Lake Woodlands Holding, LLC | Full | \$27,180 | \$28,561 | \$28,561 | \$28,561 | \$28,561 |
| Maine Bureau of Parks & Public Lands | Associate | \$23,769 | \$23,769 | \$23,769 | \$24,937 | \$24,937 |

| | | | | | | |
|---------------------------------|-----------|----------|----------|----------|----------|----------|
| SAPPI Fine Paper | Associate | \$23,500 | \$23,500 | \$23,500 | \$23,500 | \$23,500 |
| Katahdin Forest Management, LLC | Associate | \$17,462 | \$17,462 | \$17,462 | \$17,462 | \$17,529 |
| The Nature Conservancy | Associate | \$9,269 | \$9,269 | \$9,269 | \$9,269 | \$9,269 |
| Snowshoe Timberlands, LLC | Associate | \$8,043 | \$8,043 | \$8,043 | \$8,043 | \$8,043 |
| Baskahegan Corporation | Associate | \$6,888 | \$6,888 | \$6,888 | \$6,888 | \$6,888 |
| Sylvan Timberlands, LLC | Associate | \$6,162 | \$6,162 | \$6,162 | \$6,162 | \$6,162 |
| Sandy Gray Forest, LLC | Associate | \$5,000 | \$5,000 | \$5,000 | \$5,000 | \$5,000 |
| James W. Sewall Co. | Associate | - | - | \$5,000 | \$5,000 | \$5,000 |
| Appalachian Mountain Club | Observer | \$3,825 | \$3,825 | \$3,825 | \$3,825 | \$3,825 |
| ReEnergy Holdings, LLC | Observer | \$5,000 | \$5,000 | \$5,000 | \$5,000 | - |
| Downeast Lakes Land Trust | Observer | \$1,974 | \$1,974 | \$1,974 | \$1,974 | \$1,974 |
| Simorg North Forest LLC | Observer | \$3,600 | \$3,600 | \$3,600 | - | - |
| Frontier Forest, LLC | Observer | \$3,115 | \$3,115 | \$3,115 | \$3,115 | \$3,115 |
| EMC Holdings, LLC | Observer | \$1,851 | \$1,851 | \$1,851 | \$1,851 | \$1,851 |
| Baxter State Park, SFMA | Observer | \$1,725 | \$1,725 | \$1,725 | \$1,725 | \$1,725 |
| North Woods Maine, LLC | Observer | \$4,871 | \$4,871 | \$4,871 | \$4,871 | \$4,871 |
| Robbins Lumber Company | Observer | \$1,564 | \$1,564 | \$1,564 | \$1,564 | \$1,564 |
| The Forestland Group, LLC | Observer | \$1,471 | \$1,471 | \$1,471 | \$1,471 | \$1,471 |
| St. John Timber, LLC | Observer | \$1,438 | \$1,438 | \$1,438 | \$1,438 | \$1,438 |
| New England Forestry Foundation | Observer | \$1,000 | \$1,000 | \$1,000 | \$1,000 | \$1,000 |
| Huber Engineered Woods, LLC | Observer | \$1,000 | \$1,000 | \$1,000 | \$1,000 | \$1,000 |
| Forest Society of Maine | Observer | \$1,000 | \$1,000 | \$1,000 | \$1,000 | \$1,000 |
| Mosquito, LLC | Observer | \$1,000 | \$1,000 | \$1,000 | \$1,000 | \$1,000 |
| LandVest | Observer | \$200 | \$200 | \$200 | \$200 | \$200 |
| Field Timberlands | Observer | \$100 | \$100 | \$100 | \$100 | \$100 |
| In Kind | | | | | | |

List name of members that provided in kind contributions.

In the first year of any phase, in kind contributions do not count towards the minimum membership requirement and are to be addressed in the annual report or entered under the section "Others" below. However, with NSF's approval, Phase I can be granted an exception for in-kind totaling to no more than one full membership fee. After the first year of any phase, the Industry Advisory Board must approve all in-kind contributions for membership fees. If in kind contributions are listed, annual report must include IAB certification of approval.

| | | | | | | |
|--|--|------------------|------------------|------------------|------------------|------------------|
| | | | | | | |
| | | | | | | |
| Annual funds certified towards minimum membership requirement** | | \$482,673 | \$484,054 | \$489,054 | \$479,705 | \$474,162 |
| ** Minimum membership requirement is \$400K AND 8 full members for a single site center, \$150k AND 3 full members per site in a multi-site Phase I center, or \$175k AND 3 full members per site in a multi-sites Phase II and III | | | | | | |
| Others | | | | | | |
| List NSF SBIR Phase II contribution, In-Kind contributions that do not count towards the minimum membership requirement, Institution contributions, and any other source of funding that Site Director wishes to list to demonstrate financial status of the site. | | | | | | |
| | | | | | | |
| | | | | | | |
| Site Overall Total Funds (sum of annual funds certified and all other funds) | | | | | | |

Provided by:

Christopher Boynton
 Director of Research & Sponsored Programs
 Authorized Institutional Representative
 University of Maine

July 24, 2018

Program Director
Industry/University Cooperative Research Centers (I/UCRC) Program
Division of Industrial Innovation & Partnerships
National Science Foundation
4201 Wilson Boulevard
Arlington, VA 22230

Dear

This letter is to certify that the University of Washington site of the NSF I/UCRC Center for Advanced Forestry Systems has received at least \$250,000 from 21 NSF-CAFS member contributions during the Phase II program. We are grateful for your guidance of this program and the support of the National Science Foundation for this important work. The University of Washington has received Stand Management Cooperative dues for the current Phase II reporting period 9/01/13- 8/31/18 from the NSF-CAFS members listed in the membership template attached.

The dues include 8% indirect overhead charges, the University's rate for program income, which is in line with the 10% required by NSF I/UCRC (Program Solicitation NSF 17-516, replaced NSF 16-504). The UW will revert back to the federally negotiated off-campus indirect cost rate of 26% when NSF I/UCRC funding is completed. We understand Phase II funding was for a 5-year period.

Thank you for your consideration.

Sincerely,

Danny Lenord
Grant and Contract Administrator
Authorized Signing Official
Office of Sponsored Programs
Direct: 206-543-1872
Email: lienard@uw.edu

Certification of Membership

Project Title: I/UCRC Phase II: University of Idaho Membership in Center for Advanced Forestry Systems
Grant No. IIP- 1540045
Project dates: 08/01/2015 - 07/31/2020
Today date: 07/12/2018

| Member | Type | Year 1 08/01/2015- 07/31/2016 | Year 2 08/01/2016- 07/31/2017 | Year 3 08/01/2017- 07/31/2018 | Year 4 | Year 5 |
|--|-------|-------------------------------------|-------------------------------------|-------------------------------------|--------|--------|
| In Cash | | | | | | |
| <i>Member:</i> | | | | | | |
| <ul style="list-style-type: none"> - List Company name, government agency with branch, and trade organizations or associations - For Small Business that received NSF SBIR Phase II matching, only the contribution of the company must be entered. You can enter NSF contribution under the "Others" section found below - Trade organization and associations must sign membership agreement and addendum to be eligible members | | | | | | |
| <i>Type:</i> | | | | | | |
| <ul style="list-style-type: none"> - Specify level of membership based on membership agreement based on agreement (Full/Associate/Observer) - If Government, indicate [Level]/[MIPRID]-ID or [IAA]-ID/[IIP supplement ID] or [Level]-signed if they signed the membership agreement - If members are buying more than one memberships in any given year please indicate number next to type (example: company A buys 2 full memberships for year 1, indicates 2-Full) | | | | | | |
| <i>Year x:</i> | | | | | | |
| <ul style="list-style-type: none"> - Enter membership amount under correspondent year - If member buys multiple years, you must enter each year membership amount under the correspondent year (example: company A buys 3 years memberships in year 1 equivalent to \$150k, you must enter 50k in year 1, 50k in year 2 and 50k in year 3) | | | | | | |
| Hancock Forest Mgmt | Full | \$76,317 | \$77,650 | \$77,633 | | |
| Idaho Dept of Lands | Full | \$48,437 | \$50,825 | \$53,112 | | |
| Inland Empire Paper Co | Assoc | \$14,238 | \$14,773 | \$15,352 | | |
| Montana DNRC | Assoc | \$15,640 | \$16,248 | \$17,073 | | |
| Potlatch Corporation | Full | \$131,821 | \$133,514 | \$186,688 | | |
| Stimson Lumber Company | Assoc | \$64,656 | \$66,044 | \$70,459 | | |
| USDA Forest Service - Reg 1 | Full | \$35,300 | | | | |
| USDA Forest Service - Reg 6 | Full | \$28,050 | \$28,611 | \$47,907 | | |
| USDI Bureau of Land Mgmt | Assoc | \$19,000 | \$16,022 | | | |
| WA State Dept of Nat Res | Assoc | \$33,899 | \$37,740 | \$57,273 | | |
| Molpus Timberlands Mgmt | Assoc | \$14,898 | \$16,224 | \$27,118 | | |
| Annual funds certified towards minimum membership requirement** | | \$482,256 | \$457,651 | \$552,615 | | |
| ** Minimum membership requirement is \$400K AND 8 full members for a single site center, \$150k AND 3 full members per site in a multi-site Phase I center, or \$175k AND 3 full members per site in a multi-sites Phase II and III | | | | | | |
| Others | | | | | | |
| <i>List NSF SBIR Phase II contribution, In-Kind contributions that do not count towards the minimum membership requirement, Institution contributions, and any other source of funding that Site Director wishes to list to demonstrate financial status of the site.</i> | | | | | | |
| Site Overall Total Funds (sum of annual funds certified and all other funds) | | \$487,005 | \$457,651 | \$552,615 | | |

Provided by

Signature



Sm 7/12/18

Deborah N. Shaver, Director
 Office of Sponsored Programs
 The Regents of the University of Idaho