# AUBURN UNIVERSITY
## FOREST HEALTH COOPERATIVE

# ANNUAL REPORT
# FY 2014

**(October 1, 2013 - September 30, 2014)**

**Contents:**

AUBURN UNIVERSITY – FOREST HEALTH COOPERATIVE

# MEMBERSHIP LIST

(FY 2014)

## Full Members:

### Federal

United States Forest Service – NFS
United States Forest Service - SRS

### Forest Industry

Hancock Forest Management
Plum Creek Timber Company
Rayonier
Resource Management Service
Westervelt
Weyerhaeuser

## Associate Members:

### Forest Industry

Delaney Development
Molpus Timber Management
Scotch Lumber Company

### Non-Industrial – Private

ArborGen, LLC

### Consulting Foresters

F & W Forestry

## Sustaining Members:

### Non-Industrial – Private

Alabama Farmers Federation
Burgin Land
International Paper
Forestry & Land Resource Consultants

### Individual Foresters

Beth Richardson

### State

Alabama Forestry Commission

AUBURN UNIVERSITY – FOREST HEALTH COOPERATIVE

# Advisory Board Chairman

**Service Rotation‡**

(November 2014)

| **FISCAL YEAR†** | **Chairman*** |
|---|---|
| | |
| 2011 | Westervelt |
| 2012 | Weyerhaeuser |
| 2013 | US Forest Service |
| 2014 | Hancock Forestry |
| **2015** | **Plum Creek** |
| 2016 | Rayonier |
| 2017 | Westervelt |
| 2018 | Weyerhaeuser |
| 2019 | US Forest Service |
| 2020 | Hancock Forestry |
| 2021 | Plum Creek |
| 2022 | Rayonier |
| 2023 | Westervelt |
| 2024 | Weyerhaeuser |

†Member will conduct the Coop business meeting held in that **fiscal year**.

*First Chairman randomly chosen for FY2011, subsequent Chairman will be alphabetical by company name.

AUBURN UNIVERSITY – FOREST HEALTH COOPERATIVE

Due to the nature of the members and the appearance of
possible impropriety these rules are in place.

# THE EIGHT FUNDAMENTAL RULES OF ANTI-TRUST COMPLIANCE

1. Competitors may not agree on prices they charge for goods they sell.
2. Competitors may not agree on the prices they charge for services.
3. Competitors may not agree on terms of sale.
4. Companies may not use dominant market position to monopolize a market, control prices, or exclude competitors.
5. Competitors may not agree not to compete by allocating customers, territories, or markets.
6. Competitors may not agree not to compete on bids – i.e. bid-rigging.
7. Competitors may not agree on prices for products or services they buy.
8. Competitors may not join in a boycott of suppliers or customers to accomplish anti-competitive ends.

# Rules and Policies
for
# Auburn University
# Forest Health Cooperative

## Re-Approved February 1, 2011

## MEMBERSHIP

1. Membership in the Forest Health Cooperative (FHC) is open to anyone in the southeastern region of the United States.

2. Members are required to pay annual dues which are as follows:

| | |
|---|---|
| Full Member | $10,000 |
| Associate Member | $ 5,000 |
| Maintaining Member | $ 2,500 |
| Sustaining Member | $ 500 |

3. Sustaining Members receive access to FHC Webpage, annual Newsletter, Priority Email and Telephone Consulting, and participation in Members Only Workshops and may participate at the Annual Advisory Meeting, but cannot serve on the Advisory Council. Maintaining Members receive the benefits of Sustaining Members, and Research and Technical Reports. Associate Members receive the benefits of the Maintaining Members, and Field Consulting and Laboratory Diagnostics. Full members receive all the benefits of Associate, Maintaining and Sustaining Members and serve on the Advisory Council and have full voting powers with respect to research program and budgetary decisions.

4. Membership is for one year beginning October 1. Membership may be terminated by either the member organization or by Auburn University by giving 60 days written notice before October 1.

5. Membership will be contingent on signing a memorandum of agreement with Auburn University.

6. After September 30, 2009, all new members at all levels will be required to contribute 1-3 x their annual membership dues in addition to their annual membership dues. The number of annual contributions will depend upon the year of membership beyond 2008.

| Year of Joining | Contributions to Forest Health Cooperative |
|---|---|
| 2008 | 1 Annual Membership |
| 2009 | 1 Annual Membership + 1 Annual Membership |
| 2010 | 1 Annual Membership + 2 Annual Membership |
| 2011 and beyond | 1 Annual Membership + 3 Annual Membership |

## ORGANIZATION

1. The Dean, School of Forestry and Wildlife Sciences, Associate Director Agricultural Experiment Station of Auburn University in consultation with the Forest Health Cooperative Executive Committee, will appoint the Forest Health Cooperative's Director.

   The Director will be responsible for:
   - A. Directing the activities of the Forest Health Cooperative;
   - B. Employing a competent staff;
   - C. Developing the Forest Health Cooperative's direction in conjunction with the Advisory Council;
   - D. Ensuring each member participates to a threshold level; and
   - E. Reporting research accomplishments to the Advisory Council

2. The Advisory Council will have an annual meeting in the first quarter of each fiscal year.

3. An Advisory Council consisting of one representative from each full member shall be established to:
   - A. Act as a liaison between the organization and the Director;
   - B. Develop Forest Health Cooperative policies;
   - C. Advise the Director on the Forest Health Cooperative's direction;
   - D. Approve the annual budget and membership fee.

4. An Executive Committee consisting of three Advisory Council members and the Director shall have the authority to meet and conduct routine business in the name of the Advisory Council. One Executive Committee member will be appointed annually according to a rotating schedule and will serve for 3 years. The Advisory Council chairman will be the senior member of the Executive Committee and will preside at the Executive Committee and Advisory meetings.

5. Contact representatives will be designated by each cooperating member/organization. This individual may or may not be the same person serving on the Advisory Council. Contact Representatives will be directly involved in research established with each member organization.

6. All information will be available to all members in the Forest Health Cooperative.

7. All members agree to keep confidential the data and information given to them for future publications and limit the spread of information to non-members that would benefit without paying annual FHC dues.

## DUES and BUDGET

1. Membership dues will be set by the Advisory Council at its annual meeting.

2. The Cooperative will operate on the fiscal year October 1 to September 30. Invoices for membership fees will be sent to all member organizations on October 1 of each year, or by special arrangement with the individual organization.

## RULES CHANGES

1. Changes in, deletions from, and additions to the membership rules may be adopted by a two-thirds vote of advisory members in attendance at regularly scheduled or special sessions of the Advisory Council.

## DIVISION OF RESPONSIBILITIES BETWEEN AUBURN UNIVERSITY AND MEMBER ORGANIZATIONS IN THE AUBURN UNIVERSITY FOREST HEALTH DYNAMICS LABORATORY COOPERATIVE

1. Study plans will be developed by Auburn University in conjunction with the Cooperative's Advisory Council. Responsibilities for cooperative research will be delineated in individual study plans.

2. Auburn will do data analysis and processing, as well as manuscript preparation, and will insure timely distribution of results to cooperators.

3. Auburn University graduate students will be utilized to work on specific forest health problems.

4. All cooperators will be responsible for adhering to the study plans.

5. Information will be disseminated at annual Advisory meeting and in an annual Newsletter and Research Reports to members. A web site dedicated to Forest Health with the Cooperatives' research will be maintained by School of Forestry & Wildlife Sciences.

6. Results will also be disseminated at local, regional and national forest related meetings.

7. Site visits for risk assessment and diagnostic evaluations will be conducted by Auburn University staff. Full members get 2 days/yr, Associate Members get 1 day/ yr. Additional days are $1000 per day for all membership classes.

8. Laboratory diagnostic evaluations will be conducted by Auburn University staff. Full members get 10 sent in samples per year; Associate Members get 5 sent in samples per year. Additional samples are $100 per sample for all membership classes.

AUBURN UNIVERSITY – FOREST HEALTH COOPERATIVE

# FY15 ADVISORY MEETING AGENDA

| **TIME** | **EVENT** | **SPEAKER** |
|---|---|---|
| *Tuesday – June 24* | | |
| 6:00 – 8:00 | Registration and Social | |
| *Wednesday – June 25* | | |
| 8:30 – | Depart for field trip | Dr. Lori Eckhardt<br>Director |
| | Stop 1 - Plum Creek | |
| | Stop 2 - Plum Creek | |
| **11:30 – 12:30** | **LUNCH (box lunches)** | |
| | Stop 3 - Rayonier<br>Stop 4 - Rayonier | |
| 5:00 - | Return from field trip | |
| **6:00 – ???** | **SOCIAL AND DINNER** | |
| *Thursday – June 26* | | |
| **7:00 – 7:30** | **Breakfast** | |
| 7:30 – 7:45 | Forest Health Cooperative Diagnostics Laboratory Update and Sudden Oak Death Survey Laboratory Update | Tessa Bauman<br>Research Associate |
| 7:45 – 8:00 | Field evaluation of a controlled vapor delivery method in an IPM system for loblolly pine | Dr. Lori Eckhardt<br>Director |
| 8:00 – 8:30 | Relationship between phenolic defense capacity and seedling morphology among 15 loblolly pine families | Dr. Mary Anne Sword<br>USFS-SRS |
| 8:30 – 9:00 | RW19 and Burn Study Update | Tessa Bauman<br>Research Associate |
| 9:00 – 9:30 | Interactions of future climate change scenarios of elevated tropospheric ozone and decreasing | Dr. Ryan Nadel<br>Postdoctoral |

| | | |
|---|---|---|
| | rainfall amounts with loblolly pine decline | Fellow |
| **9:30 – 9:45** | **Break** | |
| 9:45 – 10:00 | Associations of ophiostomatoid fungi and *Hylastes* beetles in Georgia and Alabama | Tessa Bauman<br>Research Associate |
| 10:00 – 10:45 | Modeling for wood chemistry, stiffness, and disease resistance: an update | Dr. Brian Via<br>SFWS Faculty |
| 10:45 – 11:15 | Assessing mychorrhizal communities in cogongrass invaded and non-invaded loblolly pine stands | Adam Trautwig<br>MS Student |
| 11:15 – 11:30 | Determining fungal communities associated with the bark beetle *Dendroctonus approximates* in Mexico and Central America | Tessa Bauman<br>Research Associate |
| 11:30 – 12:00 | Commercial forestry in South Africa: The role of integrated pest management | Dr. Ryan Nadel<br>Postdoctoral Fellow |
| **12:00 – 1:00** | **LUNCH** | |
| 1:00 – 1:30 | Invasive Species Update | Dr. Nancy Loewenstein<br>SFWS Faculty |
| 1:30 – 1:45 | Variation in resistance of *P. taeda* families against *Leptographium* root infecting fungi: Year 3 Results | Dr. Lori Eckhardt<br>Director |
| 1:45 – 2:00 | Rapid identification of Pitch Canker | Dr. Ryan Nadel<br>Postdoctoral Fellow |
| 2:00 – 3:30 | Science Meeting | |
| **3:30 – 3:45** | **BREAK** | |
| 3:45 – 4:30 | Business Meeting | Dr. Lori Eckhardt<br>Director |
| 4:30 – 5:00 | Budget Review | Dr. Lori Eckhardt<br>Director |
| 5:00 | Adjourn – Have a Safe Trip Home! | |

AUBURN UNIVERSITY – FOREST HEALTH COOPERATIVE

# FY 2015 ADVISORY COMMITTEE MEETING

Americus, GA
June 24 and 25, 2014

# MINUTES

The Science Meeting opened with Dr. Ryan Nadel presenting a new research project. This research proposes to elucidate the impact of pine decline on forest productivity in the Southeastern United States. Details of the proposal were given in a handout.

Open discussion followed the presentation. Dr. Nadel, Robert Burgin, Alan Wilson, Bruce DeHaan, Dr. Lori Eckhardt, Chris Rosier, Dr. Mary Ann Sayer and David Wilkinson discussed site selection and the logistics of setting up the project. The need to begin with a small, pilot study for preliminary data to pursue outside funding was related. Topics included history and genetics, thinning and fertilization timing, stand characteristics, location and accessibility. How to measure and quantify changes in physiology were also interjected, as well as the behavior of pest beetles. Alan Wilson discussed a need for more detail before the project could be presented to industry members. Wilson Edwards opened the topic of how to parse the cost of the project among members. David Wilkinson also mentioned keeping data in house until the project is finalized and Alan Wilson suggested restricting what is presented. David Wilkinson, Dr. Eckhardt and Mary Ann Sayer detailed the use of a digital root scanner. Robert Burgin identified Raymond Harper as a potential funding source. Measurements concerning water and nutrient physiology were discussed in detail. Chris Rosier and Alan Wilson put forth using c-clones for the project sites. Alan Wilson and David Wilkinson requested that details be provided and how the costs will be distributed among members within three weeks, so that feedback can be provided.

Dr. Eckhardt requested a volunteer to grow the 2016 seedlings.

Angela Hall with Plum Creek will be the FY2015 Board Chairman.

Accomplishments 2014 were given (listed in the meeting booklet).

New MOA had to be made and all original signers will need to re-sign. Elizabeth will send it out. Harry Labhart for Westervelt, Al Lyons for Hancock, Wilson Edwards for Weyerhauser

Individual research projects in the work plan were updated and their status given.

The FY2015 Work Plan was presented. Dr. Eckhardt is still awaiting decisions from organizational funding bodies. The need to decide which families will be used and who will grow the seedlings for the 2016 Resistance Study was put forth by Dr. Eckhardt.

Technology Transfer and Cooperative Development were highlighted. Dr. Eckhardt went over website issues and requested members to communicate any problems they have had or do have. The website will be updated with data from current projects and the decline map by end of summer. David Wilkinson proposed a research update in the newsletter, on the website and to send out announcements to keep clients updated. A link to the School of Forestry archived seminars will be provided. Reports (2013, 2014) will go out by the end of the week. Consultancy, short courses and availability for them were discussed. Alan asked that an email be sent out in January. CFE's for the meeting were available. The Advisory Committee Meeting was discussed (June 24-25, 2015) and the location of Andalusia was offered. Alan Wilson mentioned the Silviculture Meeting in Knoxville, TN and CAFS membership.

The FY2013 and proposed FY2014-2016 Budgets were discussed.

Chris Rosier, Angela Hall, Mary Anne Sayer and Luke Penney requested they be added to the website and mailing list.

Adjourn.

AUBURN UNIVERSITY – FOREST HEALTH COOPERATIVE

# FY2014 BUDGET - PROJECTED VERSUS ACTUAL

**(Final)**

| | FISCAL YEAR (Oct. 1, 2013 - Sept. 30, 2014) | | |
|---|---|---|---|
| | **FY14 (Projected)** | **FY 14 (Actual)** | **Difference** |
| **REVENUE** | | | |
| Carryover from Previous Year | 112,288 | 112,288 | (0) |
| Current Year's Income | 95,500 | 114,500 | 19,000 |
| **Total Revenue** | **207,788** | **226,788** | **19,000** |
| | | | |
| **EXPENDITURES** | | | |
| **Personnel Costs** | | | |
| Professional/Non-Faculty | 35,620 | 25,810 | 9,810 |
| Technician/Staff | 24,400 | 0 | 24,400 |
| Graduate Assistants | 18,100 | 5,110 | 12,990 |
| Other Personnel (Student Wages) | 0 | 22,516 | (22,516) |
| Employee Benefits (ESTIMATED) | 19,040 | 8,131 | 10,909 |
| **Total Personnel Costs** | **97,160** | **61,567** | 35,593 |
| | | | |
| **Operating Costs** | | | |
| Travel/Vehicle Mileage | 12,000 | 4,347 | 7,653 |
| Supplies/Equipment | 8,000 | 17,875 | (9,875) |
| **Total Operating Costs** | **20,000** | **22,223** | (2,223) |
| | | | |
| **Total Expenditures** | **117,160** | **83,790** | 33,370 |
| | | | |
| **CARRYOVER FOR NEXT YEAR** | **90,628** | **142,998** | 52,370 |

AUBURN UNIVERSITY – FOREST HEALTH COOPERATIVE

# THREE YEAR FINANCIAL STATEMENT

(June 2014)

(SOD and CAFS Grants Paying for Professional in FY2015)

| | FISCAL YEAR October 1 - September 30 | | |
|---|---|---|---|
| | **FY15** (Projected) | **FY16** (Projected) | **FY17** (Projected) |
| **REVENUE** | | | |
| Carryover from Previous Year | 142,998 | 174,503 | 182,436 |
| Current Year's Income | 88,000 | 96,000 | 96,000 |
| **Total Revenue** | **230,998** | **270,503** | **278,436** |
| **EXPENDITURES** | | | |
| **Personnel Costs** | | | |
| Professional/Non-Faculty | 0 | 24,100 | 24,100 |
| Technician/Staff | 0 | 0 | 0 |
| Graduate Assistants | 35,640 | 35,640 | 35,640 |
| Other | 0 | 0 | 0 |
| Professional Benefits (ESTIMATED) | 0 | 7,471 | 7,471 |
| GA Benefits (ESTIMATED) | 855 | 855 | 855 |
| **Total Personnel Costs** | **36,495** | **68,066** | **68,066** |
| **Operating Costs** | | | |
| Travel/Mileage | 8,000 | 8,000 | 8,000 |
| Supplies/Equipment | 12,000 | 12,000 | 12,000 |
| **Total Operating Costs** | **20,000** | **20,000** | **20,000** |
| **Total Expenditures** | **56,495** | **88,066** | **88,066** |
| **CARRYOVER FOR NEXT YEAR** | **174,503** | **182,436** | **190,370** |

# INCOME STRUCTURE – FY 2015

| | | |
|---|---|---|
| **Dues** | Full Member | $10,000/year |
| | Associate Member | $ 5,000/year |
| **Annual Income** | Dues | $ 93,500 |
| | Auburn | $ 471,538 |
| | External* | $ 763,296 |
| | Total | $1,328,334 |

*For every dollar of dues, Coop Members receive $133 of research and technology.*

**We are still hoping for some outstanding grants to increase our external dollar amount for FY15!*

# INCOME STRUCTURE – FY 2015

| Fiscal Year | $$ of Research and Technology per $ of Dues Paid |
|---|---|
| FY 2008 | $ 41 |
| FY 2009 | $ 59 |
| FY 2010 | $ 62 |
| FY 2011 | $ 69 |
| FY 2012 | $ 78 |
| FY 2013 | $108 |
| FY 2014 | $125 |
| FY 2015 | $133 |

AUBURN UNIVERSITY – FOREST HEALTH COOPERATIVE

# FY 2014 ACCOMPLISHMENTS

## As presented to the Forest Health Cooperative Advisory Committee

**Dr. Lori G Eckhardt - Director**

**6/25/2014**

AUBURN UNIVERSITY - FOREST HEALTH COOPERATIVE

# FY 2014 WORK PLAN
## GOAL A: RESEARCH

### Objective 1. Identify research projects

Seedling production and forest health in the Southeastern United States – in cooperation with the Southern Forestry Nursery Management Cooperative.

- ***Accomplishments: Funded by NSF***

Testing of a rapid PCR Screening test for the presence of *Fusarium circinatum*, the causal agent of pitch canker on pine planting material – FHM for supplies, travel and postdoc. *Year 2

- ***Accomplishments: Funded by USFS Forest Health Protection grant.***

Identification of Climate Effects on Microbial Symbionts of Longleaf Pine - in collaboration with CERL personnel and University of Mississippi for all travel and supplies. *Year 2

- ***Accomplishments: Funded by ERDC-CERL.***

Interactions of future climate change scenarios of elevated tropospheric ozone and decreasing rainfall amounts with loblolly pine decline. *Year 2

- ***Accomplishments: Funded by HATCH.***

Identification of cogongrass effects on microbial symbionts and physiological vigor of loblolly pine. *Year 2

- ***Accomplishments: Funded by SFWS.***

Forest health evaluation of stand health in association with biomass removal and standard silvicultural practices – FHP, USFS for all travel, supplies and student worker. *Year 2

- ***Accomplishments: Refunded by USFS National Forest System.***

Sudden Oak Death (*Phytophthora ramorum*) Detection Survey (Stream Sampling) in AL and MS – FHM, USFS for all travel, supplies and laboratory technician. *Year 4

- ***Accomplishments: Refunded by USFS Forest Health Monitoring grant.***

Wood chemistry and disease resistance – SFWS, Forest Products Development Center. *Year 2

- ***Accomplishments: Funded by Forest Products Development Center***

Mycorrhizal fungal colonization and disease resistance – SFWS and University of Mississippi for all travel, supplies and graduate student stipend. *Year 2

- ***Accomplishments: Funded by SFWS***

*Pinus* related diseases and molecular aspects - Collaboration between SFWS and FABI – University of Pretoria South Africa for travel and supplies and a graduate student stipend at UP. *Year 2

- ***Accomplishments: Funded by SFWS and FABI***

## Objective 2. Recruit graduate students

There are two openings for a graduate student in the Coop:

1. Closed - Resistance of *Pinus taeda* families under artificial inoculations with native and non-native *Leptographium* species involved in premature mortality.

   - ***Accomplishments: Pratima Devkota (PhD Student) starting August 2014.***

2. Open – Root disease model to determine how pine decline and annosum root rot interact.

   - ***Accomplishments: Search underway***

3. Closed - Interactions of future climate change scenarios of elevated tropospheric ozone and decreasing rainfall amounts with loblolly pine decline.

   - ***Accomplishments: Jeff Chieppa (MS Student) started January 2013.***

4. Closed - Identification of cogongrass effects on microbial symbionts and physiological vigor of loblolly pine.

   - ***Accomplishments: Adam Trautwig (MS Student) started August 2013.***

## Objective 3. Initiate research projects: Determine location, cooperators, and set up research plots dependent upon projects chosen by the membership.

Cogongrass and ecologically based weed management strategies: Impacts on insect diversity and pine decline in the southeastern United States. Data about possible research stands is currently being collected. Stands will be visited in December and plots installed in January. Current members with possible available stands are Rayonier, Delaney Development Inc, Sizemore & Sizemore, Forest Investment Associates, and Westervelt.

- ***Accomplishments: Project completed and Ben Brunson graduated August 2013. Two manuscripts in preparation.***

Resistance of *Pinus taeda* families under artificial inoculations with native and non-native *Leptographium* species involved in premature mortality. Working with the Tree Improvement Cooperative to determine families to be tested for tolerance/resistance.

- ***Accomplishments: Year one and two screening is complete and paper published. Data is currently being analyzed from the year three screening. Families were chosen and sown at Weyerhaeuser nursery in Arkansas for FY15.***

Mature root inoculation of families from screening study found in the LGEPop study in GA and FL (Study 3 of the Resistance of *Pinus taeda* families under artificial inoculations with native and non-native *Leptographium* species involved in premature mortality under different nutritional regimes project).

- ***Accomplishments: Research Report being written for 2012 inoculations. More inoculations to be made June 2014 to include families added for the FY14 and FY15 screening.***

Hylastes population dynamics and forest health evaluation in association with thinning and fertilization on new RW19 in Georgia – Funding through FHP and FHC.

- ***Accomplishments: Plots for the RW-19 study were identified in Spring of 2012, on land managed by Rayonier in Georgia. Study plots and insect traps were installed in the summer, and an initial ten weeks of insect data was collected pre-study thinning treatments. The insect traps will be reinstalled after treatment application. Insect collections will continue for one year once traps are reinstalled. Plot data will be collected for tree measurements and vigor, root infection, and resin summer 2014.***

Evaluation of stand health in association with biomass removal and standard silvicultural practices – Funding through USFS National Forest System and Alabama Power.

- ***Accomplishments: Plots identified. Treatments complete. Insect traps installed February 2014.***

Wood chemistry and disease resistance – SFWS, Forest Products Development Center.

- ***Accomplishments: Families selected from the screening study and LGEPop on Plum Creek and Rayonier property. Trees harvested on Plum Creek and Rayonier property Spring 2014, currently being processed in the forest products lab.***

Field evaluation of a controlled vapor delivery method in an integrated pest management system for citrus and loblolly pine – Funded through AU-IGP in collaboration with AU Chemical Engineering.

- ***Accomplishments: Project compete. Data being analyzed and Research Report being prepared.***

Identification of Climate Effects on Microbial Symbionts of Longleaf Pine - in collaboration with CERL personnel and University of Mississippi for all travel and supplies.

- ***Accomplishments: Plots identified. Year one sampling at Fort Benning and Eglin AFB completed and year two sampling underway. Sequencing underway at University of Mississippi.***

Interactions of future climate change scenarios of elevated tropospheric ozone and decreasing rainfall amounts with loblolly pine decline.

- ***Accomplishments: (Ozone) Seedlings were potted in January 2013 (2 susceptible and 2 tolerant families – as determined by the screening trial). Seedlings were acclimated to ozone treatment and were inoculated the week of May 28, 2013. All data has been taken and is currently being analyzed.***
- ***Accomplishments: (Drought) Seedlings were potted in December 2013(2 susceptible and 2 tolerant families – as determined by the screening trial). Seedlings were inoculated the week of May 5, 2014. Data is currently being collected.***

Identification of cogongrass effects on microbial symbionts and physiological vigor of loblolly pine.

- ***Accomplishments: Intact soil cores taken November 2013 and May 2014. Data being collected and analyzed. Microbial biomass collected April 2014 and being analyzed.***

# GOAL B: TECHNOLOGY TRANSFER

## Objective 1. Serve as a clearinghouse of information related to forest health issues.

**Maintain and Update Forest Health Cooperative Web Site**
The Forest Health Cooperative Staff will continue to update the Forest Health Cooperative website for use by Forest Health Cooperative Members. (Eckhardt)

- ***Accomplishments: The website is updated. Advisory Agenda's with each speaker's presentation available for Forest Health Cooperative Members. Research Reports and Technical Notes are updated. Changes in Forest Health Cooperative staff updated and current.***

## Objective 2. Efficiently and regularly transfer the results of cooperative research to the membership.

**Research Reports** (Staff)
We plan on producing Research Reports and Technical Notes in FY12 now that research projects are underway.

- ***Accomplishments: Research Report 2013-1 and 2013-5 are on the website and 2014-6 thru2014-12 will be out before the end of the year.***
- Zeng, Y. and Eckhardt, L.G. 2013. Thinning and harvesting effects on root-feeding bark beetle populations dynamics in *Pinus taeda* L. plantations in central Alabama and Georgia. Research Report 2013-05. Forest Health Cooperative, School of Forestry and Wildlife Sciences, Auburn University.
- Meyerpeter, B.M. and Eckhardt, L.G. 2013. Hazard and risk mapping of loblolly pine (*Pinus taeda* L.) decline in the southeastern United States. Research Report 2013-04. Forest Health Cooperative, School of Forestry and Wildlife Sciences, Auburn University.
- Thompson, J.A. and Eckhardt, L.G. 2013. Pretreatment invasive plant survey at the Oakmulgee Ranger District, Talladega National Forest, Alabama. Research Report 2013-03. Forest Health Cooperative, School of Forestry and Wildlife Sciences, Auburn University.
- Thompson, J.A. and Eckhardt, L.G. 2013. Efficacy of three insect trap types at the Oakmulgee Ranger District, Talladega National Forest, Alabama. Research Report 2013-02. Forest Health Cooperative, School of Forestry and Wildlife Sciences, Auburn University.
- Thompson, J.A. and Eckhardt, L.G. 2013. Bark and ambrosia beetle diversity at the Oakmulgee Ranger District, Talladega National Forest, Alabama. Research Report 2013-01. Forest Health Cooperative, School of Forestry and Wildlife Sciences, Auburn University.

**Newletters** (Staff)
Newsletter distribution will be planned for September FY2013. Members are encouraged to submit articles.

- ***Accomplishments: A Spring 2013 Newsletter was sent to all Forest Health Cooperative Members, approximately 20 on the mailing list.***

## Objective 3. Provide a limited consultancy function to the membership in the area of forest health.

**Individual and Organized Contacts**
An on-going activity and is handled as individual situations and cases arise. (Staff)

| | Eckhardt | Bauman | Nadel |
|---|---|---|---|
| **Phone calls** | **42** | **4** | **2** |
| **Letters** | **2** | **31** | **0** |
| **Emails** | **67** | **94** | **4** |
| **Site Visits** | **5** | **3** | **2** |
| **Diagnosis** | **32** | **86** | **0** |

**Short Courses**
Forest Health Short Course will be offered in odd years starting with FY2009. Not enough members signed up for the course in FY2009 or FY2011 and if there is enough interest, a Short Course in Forest Health will be planned for August 2013. (Staff)

- ***Accomplishments: A short course was held June 2012 at the request of membership with 35 participants. The next short course will be planned for summer 2015.***

# GOAL C: COOP DEVELOPMENT

## Objective 1. Provide for the continual relevancy and efficiency of the Cooperative research and technology transfer programs.

**Advisory Committee Meeting**
The FY14 Advisory Committee Meeting will be held the third week in June 2014. A 2 day meeting will be planned. If there are any meetings that conflict with this time frame, let us know and we can try and accommodate Advisory Members. (Eckhardt/Bauman).

- ***Forest Health Advisory Meeting held in Auburn on June 25-26, 2014***

**Forest Health Cooperative Membership**
The Forest Health Cooperative staff should make an effort to recruit new members. (Staff)

- ***Looking for new members.***

**Update the Cooperative Membership Directory**
An on-going activity. (Bowersock/Eckhardt)

- ***Accomplishments: Membership directory updated and loaded onto website.***

## Objective 2. Increase the visibility and effectiveness of the Cooperative as a source of information on issues related to forest health.

**Presentations at Meetings**
Forest Health Cooperative staff will continue to be encouraged to participate as a speaker or attendee in regional and national meetings. (Staff)

- ***Accomplishments: Forest Health Cooperative Staff gave 37 presentations and published 5 articles on the subject of Forest Health.***

- *Via, B.K. and Eckhardt, L.G. 2014. A new modelling strategy for Pinus taeda genetic families: connection of chemistry to products and disease. The Institute for Commercial Forestry Research & The Department of Agriculture, Forestry & Fisheries 6th Forest Science Symposium, Pietermaritzburg, South Africa.*
- *Piculell, B.J., Hoeksema, J.D., and Eckhardt, L.G. 2013. The good and the bad: trade-offs between disease resistance and symbionts in loblolly pine. 32nd New Phytologist Symposium on Plant interactions with other orgaisms: molecules, ecology and evolution. Buenos Aires, Argentina.*
- *Chappelka, A.H., Eckhardt, L.G., and Chieppa, J. 2013. Interaction of future climate change scenarios of elevated tropospheric ozone and decreasing rainfall amounts with loblolly pine decline. Western Insect Forest Disease Work Conference, Alberta Canada.*
- *Eckhardt, L.G. 2013. Latest developments in pine decline research, disease development and management. International Congress of Plant Pathology. Beijing, China.*
- *Eckhardt, L.G., Via, B.K., and Enebak, S.A. 2014. Selection of genetically superior trees for disease resistance as a function of wood chemistry. CAFS IAB Meeting, The Coeur d'Alene Resort, Idaho*
- *Chieppa, J.J., Chappelka, A.H., and Eckhardt, L.G. 2014. Interaction of altered tropospheric ozone concentrations with loblolly pine decline. CAFS IAB Meeting, The Coeur d'Alene Resort, Idaho*
- *Eckhardt, L.G. , Ditchkoff, S.S. , Duong, T.A. , De Beer, Z.W. , and Wingfield, M.J. 2014. Two new ophiostomatoid species isolated from soil on snouts of feral hogs damaging pine roots in Georgia, USA. International Wild Pig Conference Science & Management, Montgomery, AL*
- *Chieppa, J.J., Chappelka, A.H., and Eckhardt, L.G. 2014. Interaction of altered tropospheric ozone concentrations with loblolly pine decline. Research Week 2014, Auburn University, AL.*
- *Trautwig, A.N., Eckhardt, L.G., and Hoeksema, J.D. 2014. Mycorrhizal Communities in Imperata cylindrical Invaded and Non-Invaded Commercial Pinus taeda Stands. Research Week 2014, Auburn University, AL.*

- *Acquah, G., Via, B.K., Fasina, O. and Eckhardt, L.G. 2014. Nondestructive prediction of the chemical and thermal properties of forest biomass using near infrared spectroscopy. Research Week 2014, Auburn University, AL.*
- *Eckhardt, L.G. and Neuman, R. 2014. Field trial of a controlled vapor delivery method in an IPM system. Research Week 2014, Auburn University, AL*
- *Chieppa, J.J., Chappelka, A.H., and Eckhardt, L.G. 2014. Interaction of altered tropospheric ozone concentrations with loblolly pine decline. Graduate Student Forum, Auburn University, AL.*
- *Trautwig, A.N., Eckhardt, L.G., and Hoeksema, J.D. 2014. Mycorrhizal Communities in Imperata cylindrical Invaded and Non-Invaded Commercial Pinus taeda Stands. Graduate Student Forum, Auburn University, AL.*
- *Acquah, G., Via, B.K., Fasina, O. and Eckhardt, L.G. 2014. Nondestructive prediction of the chemical and thermal properties of forest biomass using near infrared spectroscopy. Graduate Student Forum, Auburn University, AL.*
- *Piculell, B.J., Hoeksema, J.D., and Eckhardt, L.G. 2014. The good and the bad: trade-offs between disease resistance and symbionts in loblolly pine. South-wide Forest Disease Workshop, Andalusia, AL.*
- *Riggins, J., Little, N., and Eckhardt, L. 2014. Subterranean termites and ophiostomatoid fungi: a secret symbiosis? South-wide Forest Disease Workshop, Andalusia, AL.*
- *Sword-Sayer, M.A., Singh, A., Eckhardt, L.G., and Sung, S.J. 2014. Assessment of defense capacity among 15 loblolly pine families. South-wide Forest Disease Workshop, Andalusia, AL.*
- *Carter, E.A., Hess, N., Goddard, A., and Eckhardt, L.G. 2014. Soil characteristics of loblolly decline sites in Alabama. South-wide Forest Disease Workshop, Andalusia, AL.*
- *Via, B.K., Eckhardt, L.G., and Acquah, G. 2014. Genetic selection of loblolly pine (Pinus taeda L.) with near infared spectroscopy combined root disease resistance and forest products. South-wide Forest Disease Workshop, Andalusia, AL.*
- *Trautwig, A.N., Eckhardt, L.G., and Hoeksema, J.D. 2014. Mycorrhizal Communities in Imperata cylindrical Invaded and Non-Invaded Commercial Pinus taeda Stands. South-wide Forest Disease Workshop, Andalusia, AL.*
- *Chieppa, J.J., Chappelka, A.H., and Eckhardt, L.G. 2014. Interaction of altered tropospheric ozone concentrations with loblolly pine decline. South-wide Forest Disease Workshop, Andalusia, AL.*
- *Bauman, T.A., Eckhardt, L.G., Menard, R.D., de Beer, Z.W., Sediles, A., and Wingfield, M.J. 2014. Determining fungal communities associated with the bark beetle Dendroctonus approximatus in Mexico and Central America. South-wide Forest Disease Workshop, Andalusia, AL.*
- *Piculell, B.J., Hoeksema, J.D., and Eckhardt, L.G. 2013. The good and the bad: trade-offs between disease resistance and symbionts in loblolly pine. 32$^{nd}$ New Phytologist Symposium on Plant interactions with other orgaisms: molecules, ecology and evolution. Buenos Aires, Argentina.*
- *Chappelka, A.H., Eckhardt, L.G., and Chieppa, J. 2013. Interactions of future climate change scenarios of elevated tropospheric ozone and decreasing rainfall amounts with loblolly pine decline. AHC-NECC Annual Working Group Meeting, Durham, NH.*

- *Chieppa, J.J., Chappelka, A.H., and Eckhardt, L.G. 2014. Interaction of altered tropospheric ozone concentrations with loblolly pine decline. Southeastern Society of American Foresters Annual Meeting, Panama City, FL.*
- *Bauman, T.A., Eckhardt, L.G., Menard, R.D., de Beer, Z.W., Sediles, A., and Wingfield, M.J. 2014. Determining fungal communities associated with the bark beetle Dendroctonus approximatus in Mexico and Central America. Southeastern Society of American Foresters Annual Meeting, Panama City, FL.*
- *Acquah, G., Via, B.K., and Eckhardt, L.G. 2014. Nondestructive estimation of the chemical and thermal properties of forest biomass using vibrational spectroscopy and thermogravimetric analysis. Southeastern Society of American Foresters Annual Meeting, Panama City, FL.*
- *Trautwig, A.N., Eckhardt, L.G., and Hoeksema, J.D. 2014. Mycorrhizal Communities in Imperata cylindrical Invaded and Non-Invaded Commercial Pinus taeda Stands. Southeastern Society of American Foresters Annual Meeting, Panama City, FL.*
- *Bauman, T.A., Eckhardt, L.G., Menard, R.D., Ward, J.D., and Sediles, A. 2014. Evaluation of mortality in natural stands of Pinus oocarpa and Pinus caribeae in Nicaragua. Southeastern Society of American Foresters Annual Meeting, Panama City, FL.*
- *Bauman, T.A., Matusick, G., Menard, R.D., and Eckhardt, L.G. 2014. Pinus taeda roots represent a suitable host substrate for developing Hylastes spp. of bark beetles in Alabama, USA. Southeastern Society of American Foresters Annual Meeting, Panama City, FL.*
- *Chieppa, J.J., Chappelka, A.H., and Eckhardt, L.G. 2014. Interactions of altered rainfall concentrations with loblolly pine decline. Southeastern Society of American Foresters Annual Meeting, Panama City, FL.*
- *Bauman, T.A., Eckhardt, L.G., Menard, R.D., Ward, J.D., and Sediles, A. 2014. Evaluation of mortality in natural stands of Pinus oocarpa and Pinus caribeae in Nicaragua. South-wide Forest Disease Workshop, Andalusia, AL.*
- *Acquah, G., Via, B., Eckhardt, L., and Fasina, O. 2014. Screening loblolly pine families for wood chemistry. South-wide Forest Disease Workshop, Andalusia, AL.*
- *Bauman, T.A., Matusick, G., Menard, R.D., and Eckhardt, L.G. 2014. Pinus taeda roots represent a suitable host substrate for developing Hylastes spp. of bark beetles in Alabama, USA. South-wide Forest Disease Workshop, Andalusia, AL.*
- *Chieppa, J.J., Chappelka, A.H., and Eckhardt, L.G. 2014. Interactions of altered rainfall concentrations with loblolly pine decline. South-wide Forest Disease Workshop, Andalusia, AL.*
- *Piculell, B.J., Hoeksema, J.D., and Eckhardt, L.G. 2013. The good and the bad: trade-offs between disease resistance and symbionts in loblolly pine. 32nd New Phytologist Symposium on Plant interactions with other orgaisms: molecules, ecology and evolution. Buenos Aires, Argentina.*
- *Chieppa, J., Chappelka, A. and Eckhardt, L. 2013. Interactions of future climate change scenarios of elevated tropospheric ozone and decreased rainfall amounts with loblolly pine decline. Joint American Phytopathological Society and Mycological Society of America Meeting, Austin, TX.*

**Publications**
Forest Health Cooperative staff are encouraged to publish research results in scientific journals. (Staff)

- *Riggins, J.J., Little, N.S., and Eckhardt, L.G. 2014. Correlation between infection by ophiostomatoid fungi and the presence of eastern subterranean termite (Reticulitermes spp.) in loblolly pine (Pinus taeda) roots. Agric For Entol. 00:in press.*
- *Duong, T.A., de Beer, Z.W., Wingfield, B.D., Eckhardt, L.G., and Wingfield, M.J. 2014. Microsatellite and mating-type markers reveal unexpected patterns of genetic diversity in the pine root-infecting fungus Grosmannia alacris. Phytopathology.:in press. DOI: 10.1111/ppa.12231.*
- *Singh, A., Anderson, D, and Eckhardt, L.G. 2014. Variation in resistance of loblolly pine (Pinus taeda L.) families against Leptographium and Grosmannia root fungi. For. Path.: in press. DOI: 10.1111/efp.12100.*
- *Enloe, S.F., Loewenstein, N.J., Held, D.W., Eckhardt, L.G., and Lauer, D.K. 2014. Impacts of prescribed fire, glyphosate, and seeding on cogongrass, species richness and species diversity in longleaf pine. Invasive Plant Science and Management. 6:536-544.*
- *Zeng, Y., Kidd, R., and Eckhardt, L.G. 2013. The Effect of thinning and clear-cut on changes in the relative abundance of root-feeding beetle (Coleoptera: Curculionidae) in Pinus taeda plantations in Central Alabama and Georgia. Pest Manag. Sci. DOI 10.1002/ps.3624.*

**Extramural Funding of Forest Health Cooperative Projects**
Forest Health Cooperative staff will continue to be encouraged to locate and generate extramural funding opportunities directly related to forest health. (Staff)

- ***Accomplishments: Forest Health Cooperative Staff were awarded the following grants totaling $663,296.***

- Eckhardt and Enebak. 2014. Sudden Oak Death – *Phytophpora ramorum* surveys - $36,000.
- Enebak and Eckhardt. 2014. Testing of a rapid PCR Screening test for the presence of *Fusarium circinatum*, the causal agent of pitch canker on pine planting material – FHM - $150,000.
- Enebak and Eckhardt. 2014. Seedling production and forest health in the Southeastern United States – NSF-CAFS - $300,000 ($150,000 to FHC).
- Hoeksema and Eckhardt. 2014. Identification of climate effects on microbial symbionts of longleaf pine - ERDC-SERL - $50,000.
- Eckhardt. 2014. Biomass thinning effects on *Hylastes* populations – USFS National Forest System and Alabama Power - $16,810.
- Eckhardt. 2014. Root disease model – SFWS - $64,500.
- Hoeksema and Eckhardt. 2014. Mycorrhizal fungal colonization and disease resistance – SFWS and University of Mississippi - $25,000.
- Via and Eckhardt. 2014. Wood chemistry and disease resistance. SFWS - $5,000.

- Chappelka and Eckhardt. 2013. Interactions of future climate change scenarios of elevated tropospheric ozone and decreasing rainfall amounts with loblolly pine decline – HATCH - $49,986.
- Eckhardt and Enebak. 2013. Sudden Oak Death – *Phytophpora ramorum* surveys - $36,000.
- Eckhardt and Wingfield. 2013 *Pinus* related diseases and molecular aspects. SFWS and FABI – University of Pretoria South Africa for travel and supplies and a graduate student stipend at UP - $30,000.
- Via and Eckhardt. 2013. Rapid assessment tools for the genetic improvement of forest products and bioenergy – HATCH - $50,000.

AUBURN UNIVERSITY – FOREST HEALTH COOPERATIVE

# FY 2015 PROPOSED WORK PLAN

## As presented to the Forest Health Cooperative Advisory Committee

**Dr. Lori G Eckhardt - Director**

**6/25/2014**

AUBURN UNIVERSITY - FOREST HEALTH COOPERATIVE

# FY 2015 WORK PLAN

## GOAL A: RESEARCH

### Objective 1. Identify research projects

Proposed FY2015:

1. Novel analytical tools for the selection of superior loblolly pine genotypes for improved plant health, fuels, and chemicals – NIFA-AFRI for travel, supplies, graduate students and post-doc $494,377 – *Decision expected July 2014*
2. Ecology of siricids and fungal associates in southeastern pine forests: potential for biological control and competition – APHIS for travel, supplies and graduate student $99,493 - *Decision pending dependent upon continuation of funds*
3. A *Hylastes* species-*Leptographium* species mutualism and *Pinus palustris* restoration – DoD (3 years) $211,404
4. *Hylastes* population dynamics and forest health evaluation in association with thinning and burning (3 years) $281,218
5. Exploring soil microbial communities as mediators of complex threats to southern conifers – Agriculture and Food Research Initiative Competitive Grant (3 years) $497,000 - W*ill resubmit fall with modifications if suitable RFP released*
6. Sudden Oak Death (*Phytophthora ramorum*) Detection Survey (Stream Sampling) in AL and MS – FHM, USFS for all travel, supplies and laboratory technician $36,000 – *Will submit March 2015*

Newly Funded FY2014:

1. Seedling production and forest health in the Southeastern United States – NSF-CAFS - $300,000.
2. Rapid assessment tools for the genetic improvement of forest products and bioenergy – HATCH for travel, supplies and graduate student $50,000.
3. Sudden Oak Death (*Phytophthora ramorum*) Detection Survey (Stream Sampling) in AL and MS – FHM, USFS for all travel, supplies and laboratory technician $36,000
4. Testing of a rapid PCR Screening test for the presence of *Fusarium circinatum*, the causal agent of pitch canker on pine planting material – FHM for supplies, travel and postdoc - $150,000

Funded FY2013:

1. Identification of Climate Effects on Microbial Symbionts of Longleaf Pine – ERDC-CERL in collaboration with CERL personnel (Ryan Busby) and University of Mississippi for all travel and supplies - $50,000
2. Interactions of future climate change scenarios of elevated tropospheric ozone and decreasing rainfall amounts with loblolly pine decline – HATCH for all travel, supplies and graduate student - $49,986.
3. Sudden Oak Death (*Phytophthora ramorum*) Detection Survey (Stream Sampling) in AL and MS – FHM, USFS for all travel, supplies and laboratory technician $36,000.
4. Field evaluation of a controlled vapor delivery method in an integrated pest management system for citrus and loblolly pine – AU-IGP in collaboration with AU Chemical Engineering for all travel, supplies and student worker - $97,000
5. Root disease model to determine how pine decline and annosum root rot interact – SFWS for travel, supplies, graduate student stipend - $64,000
6. Mycorrhizal fungal colonization and disease resistance – SFWS and University of Mississippi for all travel, supplies and graduate student stipend - $25,000
7. Wood chemistry and disease resistance – SFWS and Forest Products Development Center (to get preliminary data for larger grant) $5,000
8. Collaboration between SFWS and FABI – University of Pretoria South Africa to work on *Pinus* related diseases and molecular aspects. $5,000 per participant (3 years)

Funded FY2012:

- Hylastes population dynamics and forest health evaluation in association with thinning and fertilization on new RW19 in Louisiana – Funding through FHP and FHC
- Delineating loblolly pine decline in the Southeast using FHM/FIA data – submitted to FHM, USFS for all travel and supplies associated with the project $35,000 – (Funded Year 2 for $17,000)
- Sudden Oak Death (*Phytophthora ramorum*) Detection Survey (Stream Sampling) in AL and MS – FHM, USFS for all travel, supplies and laboratory technician $47,000
- Mature root inoculation of families from screening study found in the LGEPop study in GA and FL (Study 3 of the Resistance of *Pinus taeda* families under artificial inoculations with native and non-native *Leptographium* species involved in premature mortality under different nutritional regimes project) – SFWS and Forest Health Cooperative.

## Objective 2. Recruit graduate students

Currently searching for masters student for FY2014 starting Fall to continue family screening.

## Objective 3. Initiate and continue research projects: Determine location, cooperators, and set up research plots dependent upon projects chosen by the membership.

Resistance of *Pinus taeda* families under artificial inoculations with native and non-native *Leptographium* species involved in premature mortality.

1. Family screening data being collected and analyzed for FY14.
2. Families for FY15 screening being grown by Weyerhaeuser.
3. Families for FY16 screening will be determined and a growing location needs to be found (Rayonier grew FY11 and FY12 seedlings; Plum Creek grew FY13 seedlings; Arborgen grew FY14 seedlings; Weyerhaeuser growing FY15).

Hylastes population dynamics and forest health evaluation in association with thinning and fertilization.

1. Plots and insect traps installed on the RW19 study in FL (Rayonier and Plum Creek). Pre-treatment data collected and being analyzed. Post data collection underway.

Forest health evaluation of stand health in association with biomass removal and standard silvicultural practices between two land managers.

1. Collect insects and analyze against treatments.

Mature root inoculation of families from screening study found in the LGEPop study in GA and FL (Study 3 of the Resistance of *Pinus taeda* families under artificial inoculations with native and non-native *Leptographium* species involved in premature mortality under different nutritional regimes project).

1. Families chosen for FY15 screening will be checked against LGEPop study to determine if there are more inoculations to take place summer 2014.

Identification of cogongrass effects on microbial symbionts and physiological vigor of loblolly pine.

1. Microbial biomass to be collected July and October 2014. Data analyzed.
2. Mycorhizzae identified.

Blue-stain fungi associated with feral hogs causing rooting damage in longleaf and loblolly pine stands.

1. Working on manuscripts for publication.

Wood chemistry and disease resistance.

1. Plum Creek site (near Nahunta, GA) and Rayonier site (near Yulee, FL) has been harvested and trees are being processed for NIR.

Mycorrhizal fungal colonization and disease resistance.

1. Analyzing data (Ole Miss).

# GOAL B: TECHNOLOGY TRANSFER

## Objective 1. Serve as a clearinghouse of information related to forest health issues.

**Maintain and Update Forest Health Cooperative Web Site**
The Forest Health Cooperative Staff will continue to update the Forest Health Cooperative website for use by Forest Health Cooperative Members. (Eckhardt)

**Leveraging Forest Health Cooperative Data**
The Forest Health Cooperative staff will continue to stress the importance of the Cooperative membership and when possible, leverage Cooperative information for grant proposals. (Staff)

## Objective 2. Efficiently and regularly transfer the results of cooperative research to the membership.

**Research Reports** (Staff)
We plan on producing Research Reports and Technical Notes in FY15.

**Newsletters**
Newsletter distribution will be planned for 2015. Members are encouraged to submit articles.

## Objective 3. Provide a limited consultancy function to the membership in the area of forest health.

**Individual and Organized Contacts**
An on-going activity and is handled as individual situations and cases arise. (Eckhardt/Bauman)

**Short Courses**
The Forest Health Cooperative will offer a Forest Health Short Course in Auburn for member personnel in July 2015. We need a minimum of 20 attendees and will survey the membership in January 2015 for interest.

# GOAL C: COOP DEVELOPMENT

## Objective 1. Provide for the continual relevancy and efficiency of the Cooperative research and technology transfer programs.

**Advisory Committee Meeting**
The FY16 Advisory Committee Meeting will be held in June 2015. A 2 day meeting will be planned. If there are any meetings that conflict with this time frame, let us know and we can try and accommodate Advisory Members. (Eckhardt/Bowersock)

**Forest Health Cooperative Membership**
The Forest Health Cooperative staff should make an effort to recruit new members. (Staff)

**Update the Cooperative Membership Directory**
An on-going activity with an updated directory distributed annually. (Bowersock)

## Objective 2. Increase the visibility and effectiveness of the Cooperative as a source of information on issues related to forest health.

**Presentations at Meetings**
Forest Health Cooperative staff will continue to be encouraged to participate as a speaker or attendee in regional and national meetings. (Staff)

**Publications**
Forest Health Cooperative staff members are encouraged to publish research results in scientific journals. (Staff)

**Extramural Funding of Forest Health Cooperative Projects**
Forest Health Cooperative staff will continue to be encouraged to locate and generate extramural funding opportunities directly related forest health.

**Interaction with other Research Cooperatives**
The Forest Health Cooperative staff will make efforts to interact, attend, work with other regional and national forest research Cooperatives in an attempt to broaden and strengthen research ties that can benefit forest health.