

2006  
USDA Forest Service Biomass Grant Award  
Project Extension  
October 1, 2008 thru June 23, 2011

“WOODY BIOMASS UTILIZATION ON NATIONAL FOREST SYSTEM LANDS  
TO ACHIEVE UNMET MANAGEMENT NEEDS”

Bi-annual Progress Report: October 1, 2008 – June 23, 2011





**PROJECT TITLE:** Woody Biomass Utilization on National Forest Service Lands to achieve Unmet Management Needs

**GRANT #:** 06-DG-11111169-051

**CFDA#:** 10-674 Technology Marketing Unit (TMU)

**GRANT PERIOD BEGINNING/ENDING:**

June 15, 2006 thru September 30, 2008

**GRANT EXTENSION 1:**

October 1, 2008 thru September 30, 2010

**GRANT EXTENSION 2:**

October 1, 2009 thru June 23, 2011

**BACKGROUND:**

On June 15, 2006 the USDA Forest Service Products Laboratory awarded a grant to Forest Based Economic Development Services, Inc. to address significant forest health concerns on the National Forests in Alabama. Using the USFS Oakmulgee Ranger District and the Alabama Power Gadsden Steam Plant as demonstration areas, the project focused on the removal of small diameter un-merchantable woody material as a cost-effective management tool for Forest Service Lands. Potential benefits of the project include: new market for woody material, habitat improvement for red-cockaded woodpeckers, and development of alternative fuel source for power generation. Grant accomplishments from June 15, 2006 thru December 12, 2008 are included in previous reports submitted to the USDA Forest Service Forest Products Laboratory.

An extension of the grant was approved December 3, 2007 in order to address questions regarding the efficiencies of biomass harvesting and biomass sustainability. The inter-relatedness of biomass harvesting, forest health and the logistics of market creation is a complex issue. The extension will allow for an additional study that evaluates the removal of biomass regarding the available habitat for predator species of root-feeding insects with a sub-study on soil productivity. To fully implement this study, including the control and test plot harvesting, an extension was necessary.

In order to adequately address biomass sustainability, the extension will: 1) determine the consumers, sources and volumes of woody biomass within a 75 mile radius of the Green County Steam Plant, and 2) facilitate the opportunity to test burn wood and coal in collaboration with the Alabama Power Company at Green County Steam Plant.

## **GRANT OBJECTIVES:**

<b>Objective</b>	<b>Description</b>
1	Improve forest health conditions on NFAL lands through utilization of the more cost-effective method of harvesting biomass to achieve forest management objectives.
2	Explore new uses and determine capacity of woody biomass to augment coal fired power generation.
3	Increase the efficiencies in biomass removal, processing, and value of removed woody biomass. Early estimates anticipate a \$210 savings per acre for habitat management over the alternative of paid TSI with the development of processing technology to deliver ¼ “ chips to power generators.
4	Evaluate the response of fuels and under-story vegetation to biomass removal relative to Condition Class.
5	Improve local economies of rural towns and communities by creating new, more stable markets, new enterprises and processing techniques for public and private land managers.

**Objective 1:** Improve forest health conditions on NFAL lands through utilization of the more cost-effective method of harvesting biomass to achieve forest management objectives.

**Responsible Partner:** Talladega National Forest – Oakmulgee District

- **Task:** Forest Service will prepare 500 - 1000 acres of over stocked pine stands for biomass removal using a Stewardship Integrated Resource Contract. When: June, 2006 – June, 2008 (Extension)

February 17, 2009 – The Talladega National Forest, Oakmulgee District submitted a Stewardship Project Proposal to develop two to three Integrated Resource Timber Contracts to address biomass removal on approximately 750 acres. This proposal was approved by the Regional Forester on March 31, 2009. The District has since completed sale layout and volume determination and decided to combine the treatments into two contracts.

On May 1, 2009, the District hosted a “Pre-bid Meeting” for the upcoming contracts. The meeting agenda covered the stewardship contracting and bid process as well as hosted a discussion about new and emerging markets for small diameter wood. Over 50 potential bidders and interested parties attended.



The District is currently preparing the prospectus and contract package on the first sale to be advertised in July 2009. The second contract package is scheduled to be advertised in October 2009.

The agenda and handouts from the meeting are included in Appendix A.

August 10, 2009 Announcement of approximately 285 acres of the Honeysuckle Integrated Resource Timber Sale was distributed to an extensive list of bidders. Bids were opened through September 17, 2009. Several phone calls of interest were received but no bids were received. The USFS made a couple attempts to negotiate for the minimum appraised value during the months of September and October. All attempts were non-responsive. It is intended to re-offer this sale and a second one with similar volumes/acreage in the Spring of 2010. However, it is unlikely that the treatment will be complete prior to the expiration of the grant.

The legal notice of advertisement and bidder letter is included in Appendix B.

June 15, 2010 The August 10<sup>th</sup> announcement received no bidders. Grant partners are working to identify an acceptable contractor that is willing to adapt forestry practices to the needs of the project. It is expected that a second announcement will be released by August of 2010.

September 17, 2010 The closing of the local pellet mill and shift to natural gas by traditional chip markets compounded issues in “biomass” sales offered by the USFS. As of September 17, 2010, no bids for biomass timber sales have been received. USFS is currently working to implement a Stewardship Project Agreement to allow for future biomass harvesting if local market rebounds.

June 23, 2011 (Summary) In March of 2009, the Talladega National Forest, Oakmulgee District submitted the *East of the Cahaba River Project* for stewardship authority. The original intent of the Project

was to remove woody biomass on 741 acres, to achieve certain management objectives and help create a local market for biomass. After soliciting bids for over a year it was determined that local conditions were such that biomass harvesting was not a viable option. In the summer of 2010, the Project was repackaged and the amount of biomass removal was reduced to 119 acres. Again, the project did not receive any bids. Finally, the National Wild Turkey Federation was invited to enter into a partnership arrangement to achieve the biomass removal along with several other habitat improvement tasks. The agreement was formalized in September 2010 with the following work items:

- **Restore 115 acres** of native longleaf pine by removing over-stocked loblolly plantations with a high risk of SPB infestation. Site preparation to be by mulching to mimic biomass removal.
- **Thin 396 acres** of over-stocked loblolly plantations by removal of approximately half of the existing basal area. Within these stands, 66 acres will have biomass removed at a cost of \$350/acre (one unit 85% complete.)
- **Thin 190 acres** of native longleaf to achieve habitat conditions for the red-cockaded woodpecker. Within these stands, 53 acres will have biomass removed at a cost of \$450/acre.



**Figure 1 Area with successful biomass removal. Fuels sampling in progress.**

**Objective 2:** Explore new uses and determine capacity of woody biomass to augment coal fired power generation.

**Responsible Partners:** USFS Oakmulgee Ranger District of the Talladega National Forest  
Southern Company  
Auburn Forest Products Development Center @ Auburn University  
Forest-Based Economic Development Services, Inc.

- **Task:** Test firing 1,000 tons of refined biomass, followed by one or more units selected for long term (1 year) co-firing using up to 20,000 tons of biomass. When: July, 2007 – December, 2007

A grant extension through September, 2010 was approved In order to adequately address biomass sustainability. The extension will: 1) determine the consumers, sources and volumes of woody biomass within a 75 mile radius of the Green County Steam Plant, and 2) facilitate the opportunity to test burn wood and coal in collaboration with the Alabama Power Company at Green County Steam Plant.

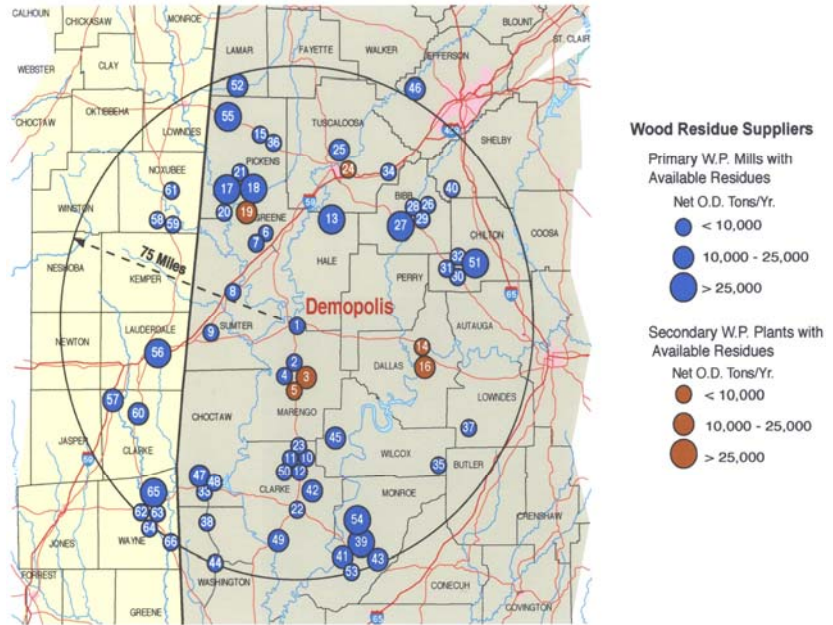
The Green County Steam Plant in Demopolis, if wood were consumed for energy there, would provide a market for wood fuel harvested from the Oakmulgee District of the Talladega National Forest. It was determined that available biomass resources to include agricultural be assessed and evaluated for each identified Steam Plant using a 75 straight line mile radius. This would allow for a more comprehensive evaluation of available biomass resources found within an economically viable hauling distance.

The Green County Steam Plant Assessment, *Biomass Resource Availability Study Within a 75-Mile Radius of the Alabama Power Company Green County Power Plant at Demopolis, Alabama* was completed and included with previous reports. The study determined the consumers, sources and volumes of woody biomass within a 75 mile radius of the Green County Steam Plant near Demopolis, Alabama.

Summary of Findings:

- There is growing interest in the use of woody biomass. The interest not only originates from conventional forest products manufacturing, but increasingly from the bioenergy sector such as the co-firing of wood with coal to produce electricity. To prepare for this potential opportunity in support of the biomass grant project entitled “Woody Biomass Utilization on National Forest System Lands to Achieve Unmet Management Needs”, the Biomass Grant Team commissioned a study by Forest-Based Economic Development Services to assess the woody biomass resources available for this application.
- There are abundant forest residues potentially available within the Plant Green County study area. These resources have been estimated to be approximately 3.8 million green tons per year (1.9 million oven-dry tons). These may be economically attractive in the current market with the cost of \$18-36 per green ton to recover and transport them. Forest residues are generally an under utilized resource, and therefore offer a significant opportunity for certain manufacturing operations that can justify these costs.

- There are abundant wood products mill residues produced and sold within the Plant Green County study area. These resources have been estimated to be approximately 6.9 million green tons per year (3.5 million oven-dry tons). All mill residues are currently utilized, and a new entry will have to compete in the open market for this material. The cost of these residues varies widely depending on the type of residue, the distance from the using operation, and the extent of competing users within the local market .
- Recent trends have increased demand and prices for woody biomass. With continued high prices for fossil fuels and increasing attention from public policy makers regarding the advantages of renewable energy sources, these demand and price trends are expected to continue. Prices for all forms of woody biomass can be expected to increase at real rates.
- With over 10 million green tons of forest and mill residues potentially available, the study area has the resources needed to support the use of wood for energy production at Plant Green County.



**Figure 2-12 Wood Residue Suppliers Within a 75 Mile Radius of Demopolis**

December 15, 2010 (Update) This USFS Biomass Grant results have proven that biomass material can be co-fired with coal and sized to meet user’s specifications. Combinations of economic and regulatory conditions, coupled with the current market decline of wood products, have resulted in a decline in demand for woody biomass in local markets. Sustainable markets for biomass have not materialized as of this writing. Pending congressional mandates for energy efficiency may generate market interest in the future. In anticipation of these mandates, local utilities are currently studying options for existing plants on co-fire or total biomass conversion.



**Figure 2 Residual biomass left on while purchasers work to identify a market. Contract service item not accepted.**

June 23, 2011 (Update) Although Alabama Power is not utilizing woody-biomass from the Oakmulgee District, they have adapted lessons learned under this grant and are using wood to co-fire with coal to produce power.

**Objective 3:** Increase the efficiencies in biomass removal, processing, and value of removed woody biomass. Early estimates anticipate a \$210 savings per acre for habitat management over the alternative of paid TSI with the development of processing technology to deliver 1/4 " chips to power generators.

Responsible Partners: **USFS – Southern Research Station @ Auburn, Alabama**  
**Auburn Forest Products Development Center @ Auburn University**

- **Task:** Field test equipment, techniques, and technologies that will increase efficiencies in harvesting biomass and reducing it to a suitable size for utilization in co-firing energy production plants. When: October, 2006 – June, 2008

Objective 3 components were completed and reported in prior reports. There have been no further developments from the report submitted in December 2008.

**Objective 4:** Evaluate the response of fuels and under-story vegetation to biomass removal relative to Condition Class.

**Responsible Partner:** USFS Oakmulgee Ranger District of the Talladega National Forest

- **Task:** Identify treatment areas, review management history, collect baseline vegetation data, establish and implement a monitoring program. **When: August, 2006 – November, 2007**

On May 1, 2009 at the Pre-bid Meeting for the upcoming biomass contracts to be offered by the Talladega National Forest, Oakmulgee District, researchers working on the “Forest Health Evaluation of Stand Health in Association with Biomass Removal and Standard Silvicultural Practices between Two Land Managers” project presented an overview of the study design to the potential bidders. The District and research students are working to develop specific contract clauses to protect established study plots.

December 12, 2010: Currently under development is a partnership arrangement with US Forest Service, Forest Health and Protection, Auburn University (Dr. Lori Eckhardt), and others to establish the following study, “*Forest Health Evaluation of Stand Health in Association with Biomass Removal and Standard Silvicultural Practices between Two Land Managers*”. This study will evaluate the treatments implemented in Task #1 in comparison with traditional treatments. Parameters to be examined include the response to root-feeding insects, tree vigor (includes soil nutrient status), and vegetation and duff densities. The project began in the fall of 2007 and will continue for 3 years. Insect trapping began in Spring 2008. This report will be used as a baseline evaluation tool for biomass harvesting comparisons.



**Figure 4-1** Oakmulgee District Study Plot

Ongoing: On a separate project funded through the Joint Fire Science Program, researchers from University of Alabama and Birmingham Southern established baseline data collection sites to assess the responses of “time since burn” for reptiles and amphibians, and plant composition and structure. This information, while not a true comparison, could be used to begin defining the biological parameters of condition class.

The Joint Fire Science Program field research was completed in September 2008. While some data analysis continues at the University of Alabama, the final report indicated that the presence-absence relationship of herpetofaunal communities relative to burn interval were not that distinct. However, it is the dynamic mosaic burn intervals that shift across the landscape that are most important.

Relative to the biomass project, it is important to integrate biomass harvesting in the same mosaic burn pattern as fire. Future landscape level projects may need to include size limitations on biomass harvesting or how best to leave inclusions mimicking fire on the landscape.

December 15, 2010 (Update) The USDA/Forest Service has partnered with the National Wild Turkey Federation to perform the biomass removal around the research plot. Work is tentatively scheduled to start in February of 2011. Results from this treatment will enable Dr. Eckhart of Auburn University to conduct post-treatment data collection for the study Forest Health Evaluation of Stand Health in Association with Biomass Removal and Standard Silvicultural Practices between Two Land Managers.

December 15, 2010 (Update) Joint Fire Science Program field research has been completed (attached). The three-year study was performed to determine the presence of reptiles and amphibians before/after prescribed fire. Results indicated the need for additional burning.

June 23, 2011 (Update) The *Forest Health Evaluation of Stand Health in Association with Biomass Removal and Standard Silvicultural Practices between Two Land Managers* was completed by Forest Health and Protection of Auburn University. The goal of the study is to evaluate stand health on the Oakmulgee as it relates to loblolly decline and the relative impact on long-term viability of longleaf pine stands in order to determine cause and effect. Pre-harvest sampling has been completed with the post-harvest sampling to be substantially completed by September 30<sup>th</sup>.

Objectives of the study include:

1. quantify the populations of root and lower stem colonizing beetles (*Hylastes* spp.) and other pine bark beetles, in stressed and healthy pine stands through three different seasonal periods spring, summer and fall;
2. compare populations among stands under various management regimes (biomass extraction [chipping by mechanical extraction], chip dispersal, prescribed burn and thinning during the three seasonal periods;
3. determine tree vigor under various management regimes (including tree and soil nutrient status) during the three seasonal periods;
4. relate all management and site characteristics to changes in populations of root and lower stem colonizing insects while monitoring for changes in forest health condition.

All pre-treatment measurements have been completed with 24 sampling sites established where the biomass and thinning treatments are taking place with controls sites established outside that area. One central plot and three sub-plots identical to it have been established at each selected site. Pines on plots will be rated based on FHM standards to determine crown condition as a vigor and disease indication. Five- and ten-year radial growth will be assessed along with the growth parameters of DBH and height. Resin sampling will be conducted to establish host vigor. Stand conditions such as basal area, vegetation density and duff will also be explored. Soil and foliar samples will be taken to determine nutrient availability and uptake. Plots will be monitored bi-weekly for 2 consecutive years for root-feeding bark beetles.

Four types of insect traps (Lindgren funnel, flight intercept (FIT), pitfall and trap logs) would be installed on each subplot to sample bark beetles and their predators, root and lower stem colonizing beetles and adult root colonizing insects. Each plot would have a total of 9 traps, one of each type per subplot. Traps would be monitored every two weeks year-round for two consecutive years. Beetle catches will be related to forest health condition and silvicultural management actions over key seasonal periods. Results will be used to identify how and when management activities may affect forest health condition and what response bark beetle activity may be based on management activities.

*Initial data suggests that herpetofaunal communities respond to prescribed burning in the Talladega National Forest not by a presence-absence relationship of species between burn intervals, but rather by changes in community composition as a result of shifts in relative abundances of those species.*

Three manuscripts and a thesis are in progress. Post-treatment measurements and insect collections will begin immediately after thinning and biomass removal is completed. The University of Alabama has created a webpage that provides information on species collected at the experiment site ([http://bama.ua.edu/~firegrant/.](http://bama.ua.edu/~firegrant/))



**Objective 5:** Improve local economies of rural towns and communities by creating new, more stable markets, new enterprises and processing techniques for public and private land managers.

**Responsible Partner:** The University of Alabama Center for Economic Development

- **Task:** Expand awareness of biomass resource and potential for management in local communities. Conduct public meetings and outreach. Determine direct and indirect effects to local economies. Determine potential for long-term economic growth. **When: September, 2006 – June, 2008**

December 12, 2010

The University Center for Economic Development (UCED) continues to focus efforts in four strategic areas:

- 1) Coordinating with project partners
- 2) Leading a community planning effort for Bibb County
- 3) Strengthening relationships and communication with elected officials and civic leaders
- 4) Identifying opportunities and preparing feasibility studies for prospective investments

Specific outcomes include:

- 1) Outdoor Recreation and Tourism Plan
- 2) Providing five (5) VISTA (Volunteers In Service to America) interns to support community building, economic development, and planning efforts.

June 23, 2011 (Update)

#### **Bibb County Outdoor Recreation Tourism Plan**

The University Center for Economic Development (UCED) provided a hospitality training workshop for the residents of Bibb County on July, 19, 2010 held at a local bank in Centreville, AL. The workshop training included a presentation by staff of the Center for Economic Development and a Hospitality Handbook that was developed and provided for each participant. The training

curriculum included a variety of hospitality issues such as; “What is hospitality; What does it mean to you; How does hospitality effect tourism”. The workshop training included hands-on exercises that the trainees were able to participate in relating to non-verbal communication, discussion of the power of your voice, how to make a good impression, hospitality tips for retail staff, lodging personnel, and restaurant personnel.

After discussion with Bibb County officials, additional training will be offered through the Bibb Leadership Alumni group during the 2011 year. UCED staff made a presentation to the Alumni Leadership group in October to discuss the additional training. UCED and the Alumni Leadership will work together to ensure that key front-line staff attend the training sessions that will be held in 2011. Additionally, UCED staff will meet with the 2011 Bibb County Leadership Class in January to discuss adopting a hospitality/tourism project for their class project.

#### **AmeriCorps VISTA Volunteers**

Bibb County VISTA staff have been researching and collecting information for the Southeastern Equestrian Trails Conference that will occur in July 2011. This is the first time the conference will be hosted by the State of Alabama. The Vista staff member has developed sponsorship packages and assisted in the overall planning of the conference.

Additionally, the staff member has researched the Talladega National Forest – Oakmulgee District to develop interesting facts and information about how it was started that will be beneficial for the 75<sup>th</sup> anniversary coming up in 2012.

National Public Lands Day was another successful project that the VISTA Staff member worked on. The staff member developed and implemented a plan to build a trail and plant native warm season grasses around a Vernal Pond in front of the Oakmulgee Ranger Station.

#### **West Blocton Coke Ovens Park**

UCED has assisted the Mayor of West Blocton with the upcoming celebration of the West Blocton Coke Ovens Park which is planned for the first quarter of 2011. UCED and staff of Kelly Landscape Architects have collaborated on the development of the park, which is a three phase project that includes construction of a boardwalk, RV park, picnic area and much more.

#### **June 23, 2011**

Dr. Sam Addy of the University of Alabama Center for Economic Development will provide an analysis to estimate the economic impact of utilizing woody biomass for the production of energy.

#### **June 23, 2011**

As a final product for the USDA-Forest Service *Woody Biomass Grant*, project partners will develop a full-color brochure explaining the grant deliverables and accomplishments. This brochure will be distributed to increase awareness of woody biomass availability and utilization. Potential distribution sites include:

- Alabama Forestry Commission
- Alabama Forestry Association
- Alabama League of Municipalities
- Alabama Legislators and Representatives
- Alabama Soil & Water Conservation Districts
- Association of Economic Developers
- Power Utility Plants
- RC&D Councils

## ATTACHMENTS

*The Impact of Prescribed Fire and Season of Burn on Amphibian and Reptile Biodiversity Patterns in Northern Longleaf Ecosystem Restoration.* Unpublished Report #05-2-1-22. University of Alabama Joint Fire Science Program.

*Forest Health Evaluation of Stand Health in Association with Biomass Removal and Standard Silvicultural Practices between Two Land Managers.* Unpublished Report. Menard, Roger. Eckhart, Lori. Ragland, Cynthia. Carter, Emily. Wingfield, Michael J.