FOREST HEALTH PROGRAM

GEORGIA FORESTRY COMMISSION

Georgia's Forest Health Highlights 2012

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Forest Health Notes

Summary:

The Forest Health Management Group provides statewide leadership and guidance to consulting firms, industry, natural resource managers, landowners, and Georgia Forestry Commission (GFC) foresters on a wide range of forest health related issues. This information and technology transfer allows a diverse group to increase awareness of forest health issues in Georgia and become additional resources in the fight against forest pests. Our forest health staff is increased by each person trained and our team grows by communicating information. Our goal is to train more than our personnel and staff inside the GFC, our goal is to create cooperative partnerships meeting the needs of the landowners and forestry professionals in Georgia.

The GFC foresters incorporated insect, disease, or invasive species advise into 797 management cases involving 53,128 acres for the year. Each Stewardship and Tree Farm plan written in the State of Georgia incorporates advice to landowners concerning forest health issues, and insect and disease advice is incorporated in each plan; 298 plans were presented to landowners with a total acreage of 140,419 acres.

Statewide, forest health training was provided to foresters, resource managers, loggers, public works departments (state and county), nurserymen, regulatory agencies, and landowners on 82 occasions with 3,931 attendees being reached. This training included field days, exhibits, demonstration plots, field training, hands-on education, and classroom presentations. These sessions involve most of the program areas listed in this report.

Our forest health staff conducted five radio interviews with Georgia Public Radio (GPR), and National Public Radio (NPR), nine television interviews were also conducted in the Albany and Atlanta areas in 2012. Our goal is to share our message of Forest Health Management that "Protecting the health of our forest is a top priority of The Georgia Forestry Commission and the people of Georgia."

Special notes of interest:

- ***Pine Health Issues***

  Significant pine health issues in natural pine stands and pine plantations have been observed in various areas in Georgia in recent years. Much of the mortality of pine trees can be attributed to the causes documented in this report including: prolonged drought, annosum root disease, southern pine engraver beetles (*Ips* species), and the southern pine beetle (*Dendroctonus frontalis*). However, the factors associated with thin crowns, declining growth rates, and mortality in some mature loblolly stands and younger loblolly pine plantations, especially in southwestern Georgia and central Alabama, are unclear and have been brought to the attention of Georgia Forestry Commission foresters, among others. Many predisposing factors, biological organisms, and cultural practices may be involved in pine health problems and the role that each may play is a topic of considerable discussion and controversy.

Georgia Forestry Commission forest health foresters and forest health specialist actively participated in discussions concerning pine health issues in the Southeast, and were instrumental in the formation of an "ad hoc Pine Health Working Group" involving University of Georgia and USDA Forest Service scientists. Georgia Forestry Commission participated in a number of meetings, conference calls, a field trip to Southwest Georgia to observe a number of problem stands on private land, which resulted in the USDA Forest Service, Southeastern Research Station funding an ambitious research project lead by Dr. Kamal Gandhi, UGA forest entomologist. The objectives this project is to determine the extent and causes of declining pine growth and pine mortality in Alabama and Georgia. The Georgia Forestry Commission has offered to facilitate the location of potential research sites.

- **Rhizoctonia Seedling Blight:**

Rhizoctonia Seedling Blight of longleaf pine was first observed in Georgia in 2010 causing mortality in seedlings with symptoms appearing first in the grass stage. It was determined that prolific seeding of Partridge Pea created excessive shading conditions of the forest floor, restricted available sunlight and possibly created a microclimate conducive to the success of the unwanted fungus. Rhizoctonia Seedling Blight has been found in Georgia and the Longleaf Alliance has found Rhizoctonia Seedling Blight across Alabama.

Once the problem was recognized as a regional issue, The Longleaf Alliance initiated field studies to recommend herbicide application rates to control partridge pea spread, and a forest health pest alert was issued for the occurrence of Rhizoctonia blight in longleaf pine. Postings can be found on the Georgia Forestry Commission's public web site: (***Rhizoctonia blight in longleaf pine***). http://www.gatrees.org/forest-management/forest-health/alerts-and-updates/LongleafPineMortalityRhizoctoniablightAug2010.pdf

In 2012, the occurrence of Rhizoctonia in young Longleaf plantations has decreased, and many landowners are following the recommendation for using partridge pea in native warm season grass plantings. There have been reports in middle to west Georgia from landowners having problems with reseeding of Partridge Pea. The standard recommendation is to mow infested fields early in spring to restrict Partridge Pea growth and seeding. This appears to be a viable recommendation, but normally mortality has occurred by the time the landowner mows.

This is not a widespread problem and the mortality was limited to relatively small areas in 2012.

- **Tremex woodwasp:**

A new first introduction of **Tremex woodwasp** *(Tremex fuscicornis)* was identified during warehouse trapping in the summer of 2012. This new woodwasp was collected in Elberton, Georgia when a container shipment was opened. The warehouse contact indicated that live wasp were in the container and when opened two of the live wasp were knocked down for collection, several of the remaining wasp left the container and entered the wooded area adjacent to the facility. The samples were submitted to Dr. Rick Hoebeke, Collection Manager, Museum of Natural History, University of Georgia, who initially identified them as a male and female **Tremex woodwasp** *(Tremex fuscicornis)*. This initial identification was confirmed by the USDA-ARS Systematic Entomology Laboratory (SEL).

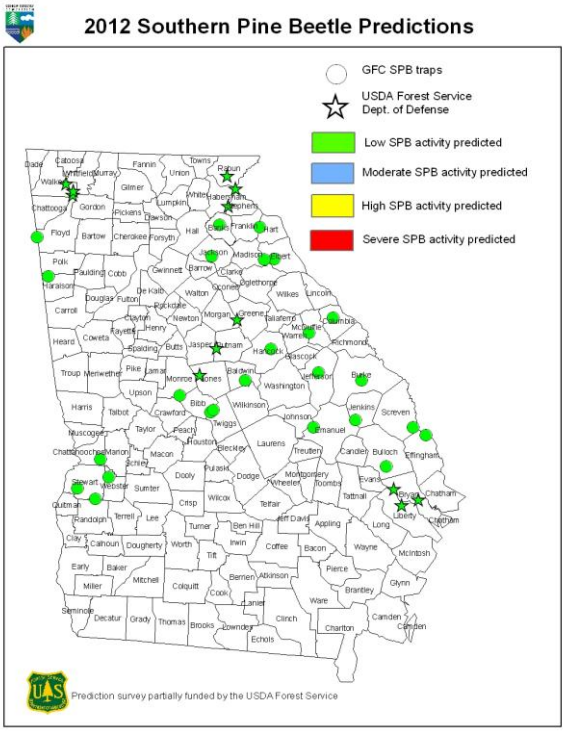
Six (6) early detection baited funnel traps were located around the warehouse where the Tremex woodwasp was found, but to date no Tremex woodwasp have been captured. In 2013, a series of delimit traps will be established around, and inside, the warehouse site to detect any populations that may have established in the area.

The **Tremex Woodwasp** *Tremex fuscicornis* is an insect pest of broadleaf trees. This species prefers stressed trees that are dead or dying in its native range, but in Chile, where it has been introduced, it has caused severe damage to healthy trees. Some of the preferred hosts are: Beech, Poplar, Elm, Maple, Willow, and Oak. From this list of potential host and the introduction area of North Georgia; The Georgia Forestry Commission is taking this new introduction very seriously and has identified this area as a prime site for Early Detection trapping in 2013.

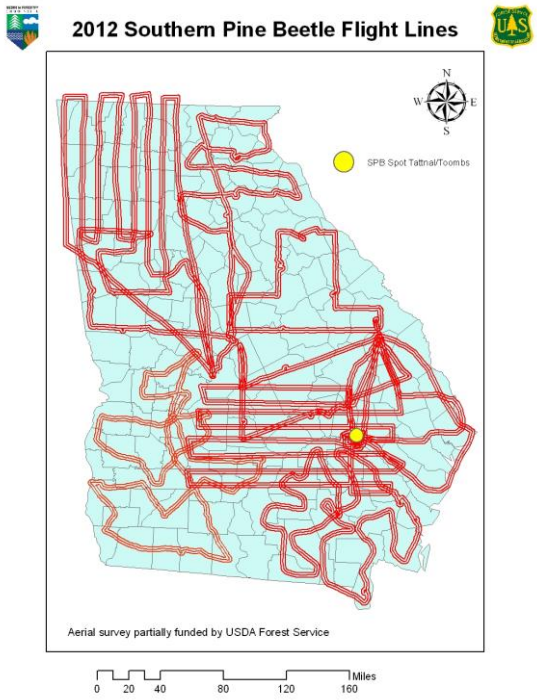
Southern Pine Beetle Pheromone Trapping / Pine Beetle Aerial Survey

The Georgia Forestry Commission (GFC) participates annually in the southern pine beetle (SPB) trapping program, which enables foresters to predict seasonal SPB population levels. This insect has the potential to cause more forest destruction in the southeastern states than all other forest pests combined, so anticipating potential damage is important. Insect traps are deployed in early spring by GFC foresters and are checked weekly for at least four weeks. A model developed by Dr. Ronald Billings (Texas Forest Service) is used to predict population levels. The model is based on the number of southern pine beetles captured and the number of Clerid beetles, a SPB predator, caught in the traps. The history of the trapping program over the past 20 years indicates this model is more than 75 percent accurate.

In the spring southern pine beetle prediction survey, conducted as a cooperative effort between U.S.D.A. Forest Service, Department of Defense (Fort Stewart), and Georgia Forestry Commission a total of 37 traps were placed statewide. All prediction traps in Georgia indicated low SPB populations/activity for 2012, (See 2012 Southern Pine Beetle Prediction Map) http://www.gatrees.org/forest-management/forest-health/pine-bark-beetles/SouthernPineBeetlePredictionTrapping-2012.pdf



Based on the trapping data alone, GFC did not expect to see significant SPB activity in the state this year, and these predictions proved accurate with the low SPB numbers revealed during the aerial survey; with the exception of three counties in South Georgia. One large tract located on the Tattnall/Toombs county line suffered a severe outbreak of SPB in early August 2012 with an estimated 50 – 60 individual infestation over a 3,000 acre tract. Four additional SPB infestations were discovered in Coastal Bryan County near Richmond Hill, Georgia. (These infestations will be discussed under the Aerial Survey portion of this report)



In 2012, GFC Forest Health Specialists flew a 40% statewide survey to detect the presence of southern pine beetle activity. During the early detection flights, in July, little to no mortality was observed due to active beetle infestation across the state. This lack of activity could have been attributed to increased rainfall across the state. In early August a twenty-five acre outbreak of southern pine beetle was reported on the Tattnall/Toombs county line. The tract had a past history of SPB in 2010 with 100 acres harvested to control an infestation. The landowner was given management advice to mitigate future problems, but failure to follow GFC thinning recommendations resulted in the stands growing beyond 20 years old, never thinned, with a basal area in excess of 200 square feet per acre; a prime location for a SPB infestation. To date over 1000 acres has been salvaged on this tract due to southern pine beetle and the landowner is thinning the remaining stands.

Three additional southern pine beetle infestations have been identified on private landowners in Coastal Bryan County in 2012. These spots were reported by a consultant forestry group and salvage operations have been performed. Fort Stewart reported one additional infestation on the federal military reservation in the vicinity of the coastal Bryan County spots. This area has been harvested and buffers have been established.

Annosum Root Disease

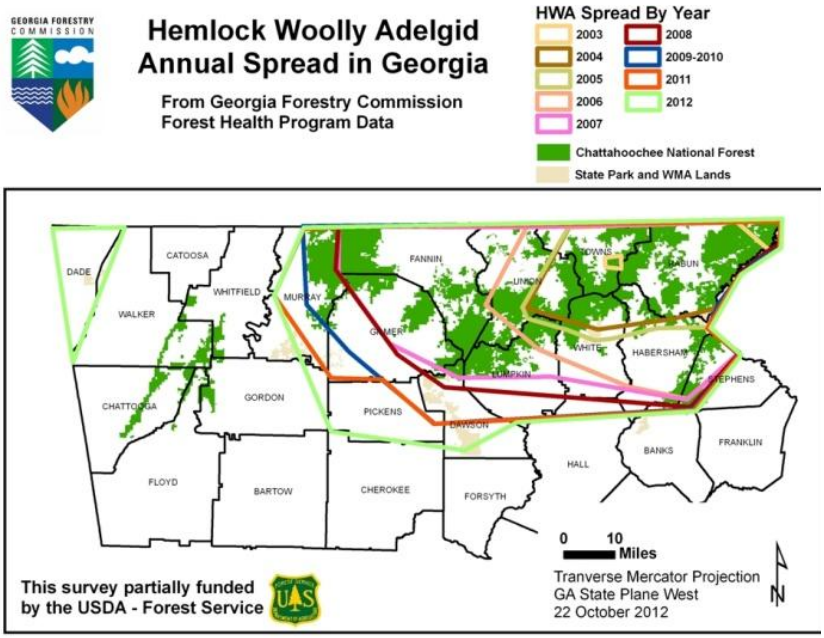
Widespread damage in recently thinned pine plantations (slash and loblolly) was first detected in 2005, and the disease continues to cause ongoing damage with new sites being reported in 2012. Although the incidence of Annosum Root Disease has declined we continue to get calls to investigate infected stands. The primary region with the highest incidence and most severe mortality is a zone from Augusta to Columbus and south for about 75 miles (correlating to the sandhill and upper coastal plain regions). Ongoing educational outreach programs and many one-on-one field visits with professional land managers have resulted in most foresters being able to diagnose this condition.

Michelle Cram, Plant Pathologist, USDA Forest Service and Dr. Sarah Covert Associate Dean of Academic Affairs, University of Georgia's Warnell School of Forestry and Natural Resources have plans to work with *Phlebiopsis gigantea* as a biological control agent for Annosum root disease of pines in Washington County this coming year.

Although GFC field foresters perform the majority of field inspections, the forest health staff responded to **196** forest industry/consultant/GFC forester requests requiring field visits throughout the state. Annosum root disease and pine bark beetles were the primary concern in many of these inspections.

Hemlock Woolley Adelgid

A survey for the hemlock woolly adelgid (HWA) was conducted for the ninth year. One temporary employee worked on this survey, concentrating on the western front of the spread and the isolated pocket of hemlocks in the Northwest corner of the state. HWA has now spread throughout the entire natural range of hemlock in Georgia. Many of the eastern stands are experiencing rapid decline and mortality. The counties with HWA include Rabun, Towns, Union, White, Habersham, Stephens, Lumpkin, Dawson, Fannin, Gilmer, Pickens Murray, Dade, and Walker.



The GFC provided assistance to the predator beetle rearing labs at Clemson University, University of Georgia, North Georgia College and State University and Young Harris College. Activities include foliage collection, scouting and preparing beetle release locations, and releasing predators. GFC played a critical role in the logistics of delivering foliage to the labs and getting predators to the forest as the location of these activities moves greater distances from the labs. GFC scouted for suitable foliage collection sites and infested branches were delivered as needed from December through early June

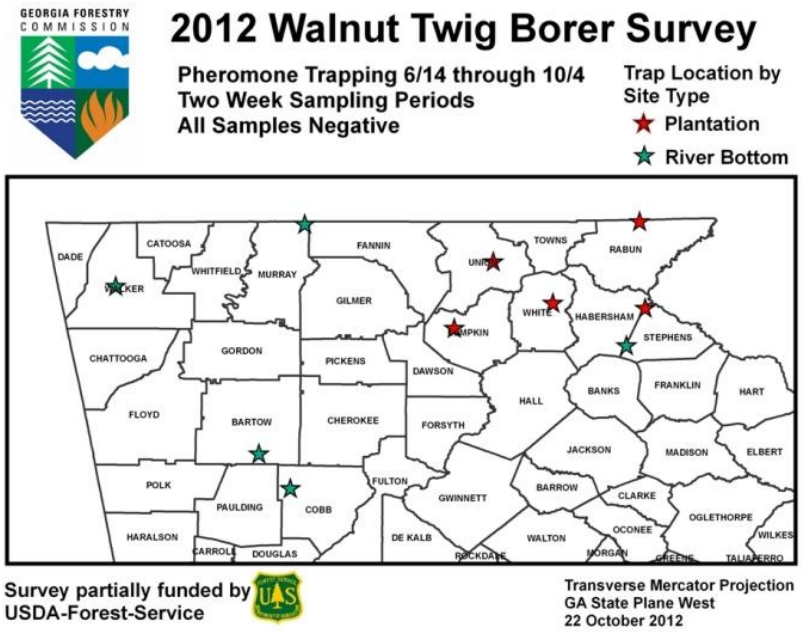
GFC assisted the USDA Forest Service in scouting and mapping a new Hemlock Conservation Area needed to fill a gap in the geographic distribution of these areas. GFC assisted in scouting and flagging some of the 2012 predator release areas on the Chattahoochee National Forest, scouting 18 areas and releasing predators in 12 of those areas.

The GFC continued to serve in an advisory capacity working with the Georgia Department of Natural Resources (DNR) to help survey and protect hemlocks on state lands. Much work was done on the Wildcat Tract of the Dawson Forest to develop a long range plan for the hemlocks on this property. A mix of chemical and biological control recommendations were offered. A partnership was developed with the Mountain Stewards, a non-profit group active in the area, and local volunteers to chemically treat thousands of trees according to the plan that was produced. Seven predator release areas were scouted on state lands with predators released in two of those areas. The GFC also began scouting predator release areas on US Army Corp of Engineers lands on Carters Lake.

The GFC assisted numerous cities, communities, homeowner associations and individuals regarding HWA. Kioritz injectors are available at GFC offices in Habersham, Union, Lumpkin, Gilmer, Fannin, Murray, and Pickens Counties. One injector was also placed in Rabun County at the UGA Cooperative Extension Office. Most counties reported frequent use of the tool with some counties having a waiting list. All Kioritz soil injectors were rebuilt and repaired in 2012, with internal parts being rebuilt and calibration tests conducted to insure proper metering of chemicals. An additional injector will be available for use in Northwest Georgia in 2013; this resource will be located in Walker County. At least 10 presentations were made to the public on HWA. GFC continued to work with UGA researchers and others to gather the most up to date information on HWA. GFC public website postings were added and updated in an effort to relay this information. http://www.gatrees.org/forest-management/forest-health/hemlock-woolly-adelgid/

Walnut Twig Borer / Thousand Canker Disease

The Georgia Forest Health Staff is concerned about the rapid spread of the walnut twig borer and the associated thousand cankers disease from its recent introduction near Knoxville, Tennessee. Ten locations were chosen across north Georgia to deploy pheromone traps to detect the presence of walnut twig borer. The sites were either black walnut plantations or bottomland forests with a large component of black walnut. Four sites were in the Chattahoochee National Forest, four were on state property, one was in a county park, and one on private property. The initial survey began in mid-June and lasted through four 2 week periods. The samples were collected every two week and sent to Dr. Rick Hoebeke, Collection Manager, Museum of Natural History, University of Georgia, for identification.



Additional information was forthcoming in late summer identifying mid-August to late September as the peak flight season for the walnut twig borer. The forest health staff collected three additional two week samples during the peak flight season.

Results of the first 8 weeks (four 2 week periods) of sampling were negative. Results of the later six weeks (three 2 week periods) are still pending.

Laurel Wilt Disease

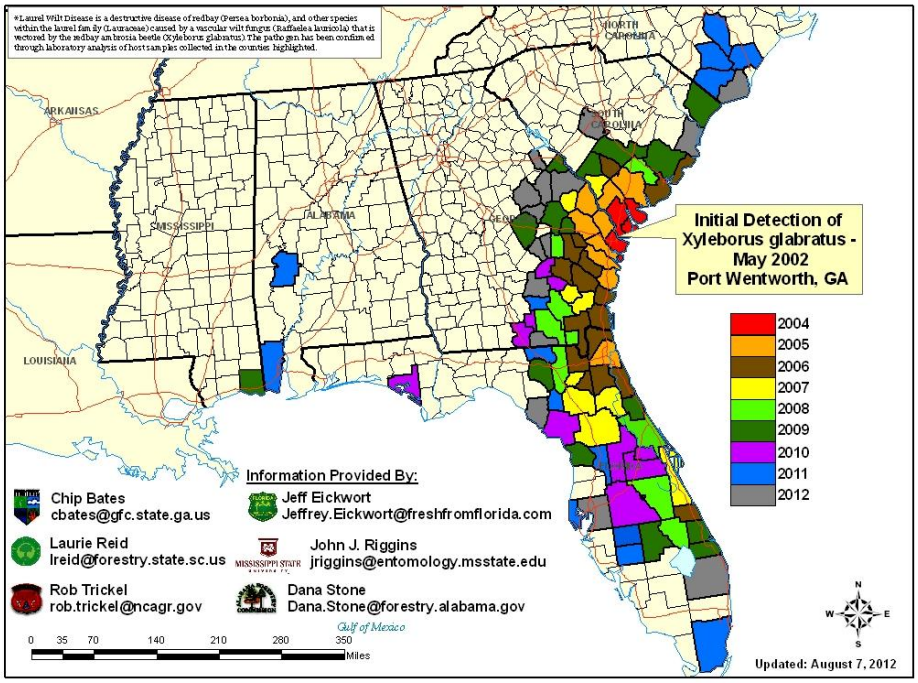
Laurel wilt is a disease of plants in the Lauraceae family in the United States caused by the fungus *Raffaelea lauricola* that is vectored by *Xyleborus glabratus*, the redbay ambrosia beetle (RAB), both of which originated in Asia. Since laurel wilt disease (LWD) was first recognized near Savannah in 2002, it has spread rapidly through the abundant redbay trees (*Persea borbonia)* in the maritime and coastal plain forests of Georgia, north through South Carolina into southeastern North Carolina, and south nearly to the southern tip of the Florida peninsula. The disease has also killed numerous sassafras trees, *Sassafras albidum,* as it spread inland. Other plants in the laurel family known to be susceptible to varying degrees include: camphor (*Cinnamomum camphora*), avocado (*Persea americana*), pondspice (*Litsea aestivalis*), and pondberry (*Lindera melissifolia*). In recent years, LWD has been confirmed in several distant locations to the west including: Jackson County Mississippi (2009) in the Pascagoula River drainage, Bay County in the Florida Panhandle (2010), Mobile County, Alabama (2011), and Marengo County, Alabama (2011) where it was killing sassafras in the absence of redbay. The 2011 discovery of LWD in Dade County, Florida poses a serious threat to the avocado industry in South Florida.

The advance of LWD in Georgia has been documented through contacts with landowners, directed road surveys, and assessments of monitoring plots by Georgia Forestry Commission (GFC) Forest Health personnel. The presence of LWD in previously uninfected counties has been confirmed by submitting

wood samples from symptomatic trees to Steve Fraedrich, USDA Forest Service, Athens, GA, for laboratory culture and identification of the pathogen, *Raffaelea lauricola*. LWD was confirmed in one new county in 2011 and nine new counties through September 2012, five of which were from sassafras trees in areas where redbay is scarce or absent.

As of October 2012, the disease front in Georgia extends about 120 miles to the northwest, 80 miles to the west, and 155 miles to the southwest from where it was originally discovered near Savannah and includes 39 counties, where approximately seven (7) million acres of forest have been subjected to the disease. The rate of spread has varied along the advancing disease front in Georgia from over 17 miles/year in the southern coastal plain, where redbay trees are well distributed, to less than 9 miles/year to the west in the upper coastal plain where host plants is widely scattered. The rate of spread in Georgia appears to have slowed in areas with sparse host. Many new disease infections along the northwestern advancing front have occurred in sassafras trees, indicating that LWD can infect sassafras in the absence of redbay and may spread beyond previously predicted limits. At least five isolated disease incidents well beyond the previously known distribution of LWD have been documented in Georgia, which likely resulted from human-assisted dispersal of the RAB vector via movement of infested wood.

Distribution of Counties with Laurel Wilt Disease* by year of Initial Detection



An Environmental Monitoring project supported by the USDA Forest Service was initiated in 2009 by the Georgia Forestry Commission to document the spread of laurel wilt in Georgia and further our understanding of the disease process in both redbay and sassafras. Standardized permanent plots were established in redbay and sassafras habitats behind, at, and beyond of the advancing disease front to document the LW disease progress, vegetation changes, and survival of host regeneration in southeast Georgia. Sixteen redbay and eight sassafras plots were established in the winter/spring of 2009 and each plot has been reassessed six times through early spring 2012.

Redbay trees with symptoms of LWD die rapidly and are colonized by ambrosia beetles within a several months. Nearly all redbay trees greater one inch DBH are killed by laurel wilt and the disease process from the first symptomatic trees to inactivity in an area usually ranges from about 3 to 4 ½ years. Disease progression is most rapid in areas with high volumes of redbay, and it is slower in the presence of smaller, more scattered host trees. In most areas, redbay sprouts and regeneration are abundant after the disease runs its course; however the redbay ambrosia beetle and *R. lauricola* remain active at low levels many years after the initial epidemic has passed.

Laurel wilt infects sassafras in a rather haphazard fashion, sometimes killing scattered individual trees; other times killing entire thickets, while other groups of sassafras trees in the area are left unaffected. The largest sassafras trees tend to be killed first and disease spread is sometimes rapid in dense thickets,

apparently through interconnected lateral roots, yet some small trees usually remain alive. Ambrosia beetle attacks are most evident at the bases of sassafras trees killed by LWD. Redbay ambrosia beetles are capable of spreading laurel wilt disease in sassafras in the absence of redbay and substantial brood can be produced in larger sassafras trees.

A progress report detailing the GFC Laurel Wilt Evaluation Monitoring project was completed in 2011, entitled "Evaluation of Laurel Wilt Disease in Georgia: Progression in Redbay and Sassafras – 2008-2010." A poster presentation, "Progression of Laurel Wilt in Georgia, 2009-2011" was prepared for the 2012 Forest Health Monitoring Working Group Meeting and is posted on the National Forest Health Monitoring website. Also, a document summarizing this project with the same title as the poster is "in press" for publication in the 2012 Forest Health Monitoring National Technical Report. Final assessments of the permanent plots established for this project will be conducted in fall/winter 2012 and a final report will be prepared to further document the wealth of information generated by this project.

The Georgia Forestry Commission will continue working with the USDA Forest Service, the University of Georgia, and other partners to document the spread, study the biology, and support cost-effective methods for slowing the spread of this destructive nonnative invasive insect and disease. Long distance spread of LWD continues to occur, emphasizing a need for more effective education and other measures aimed at limiting the movement of host material harboring RAB.

More information on LWD can be found at: http://www.gatrees.org/forest-management/forest-health/laurel-wilt-disease/ This Georgia Forestry Commission web page provides a summary of this disease, as well as links to a distribution map, progress reports, a poster presentation, and the USDA Forest Service Laurel Wilt website http://www.fs.fed.us/r8/foresthealth/laurelwilt/index.shtml

Sudden Oak Death Syndrome

The sudden oak death early detection program continues with 10 watersheds chosen in north Georgia to monitor for the presence of the pathogen (*Phytopthora ramorum)* blamed for west coast tree mortality. Stream baiting targeted watersheds including Georgia's past positive nursery sites and watersheds with abundant new residential development in the metro Atlanta area with the belief that many of these plants were sold and planted locally and could be causing further *P. ramorum* infections in the landscape undetected. One of these sites detected a new positive for *P. ramorum* in 2012.

In addition, stream-baiting continued around a nursery that had positive plants and soil in 2008. Multiple positive stream baits were found at this location. A cooperative effort has been formed between Georgia Forestry Commission, USDA Forest Service, Georgia Department of Agriculture, Animal and Plant Health Inspection Service, and Clemson University to conduct a vegetation survey along the streams in this area. Stream baiting will continue at this site.

In 2012 an additional positive watershed was detected by an early detection stream-bait. Additional stream baits are deployed to try and narrow the search for the source, and a vegetation survey was conducted along both positive watershed streams to attempt to locate any native vegetation that is infected with *P. ramorum.*

GFC has also been assisting the USDA Forest Service in gathering data comparing pouch stream-bait data with BOBs(bottle of baits) to determine the usefulness of the BOB method.

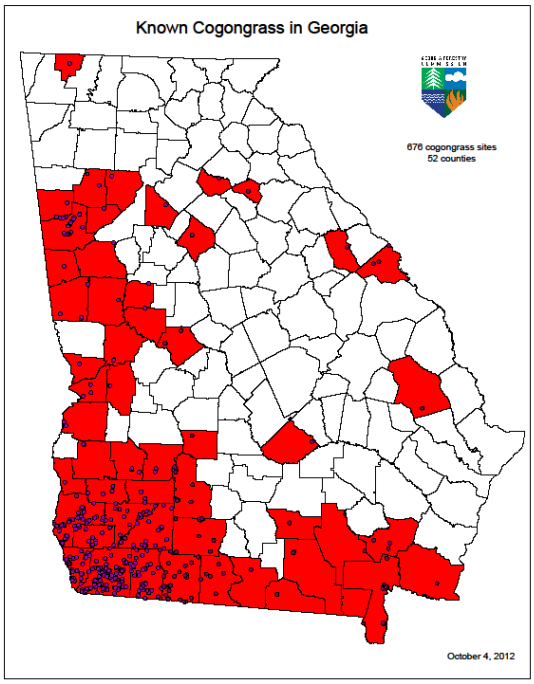
Invasive Weeds

Cogongrass

Although many invasive plants cause problems within Georgia, most of our efforts have focused on Cogongrass and Chinese privet. Our "Cogongrass Task Force" continues its mission in Georgia to address the threat this plant has toward our environment. Training has been given to resource professionals throughout the state, and the educational campaign continues to help landowners identify the plant. Once landowners find suspect plants, they then notify the GFC to verify the identification, and if confirmed is treated by the GFC (at no charge to landowners). All known cogongrass infested sites are being treated by either the Georgia Forestry Commission, or in a few cases the landowners.

The GFC spearheaded an effort to bring all concerned groups and agencies under this umbrella to detect cogongrass. A total of 23 state, federal and private partners signed an agreement to establish the entire state of Georgia as a Cooperative Weed Management Area for cogongrass in May 2008. These partners were contacted last winter (February) to remind them of the flowering and seeding period that makes it recognizable. Literature was mass printed and given to all partners who expressed interest. The combined effort of this group should have far reaching impacts to help educate the public about cogongrass as well as help locate all infested sites. All information regarding this non-native invasive weed has been assembled at this web site: http://www.cogongrass.org/

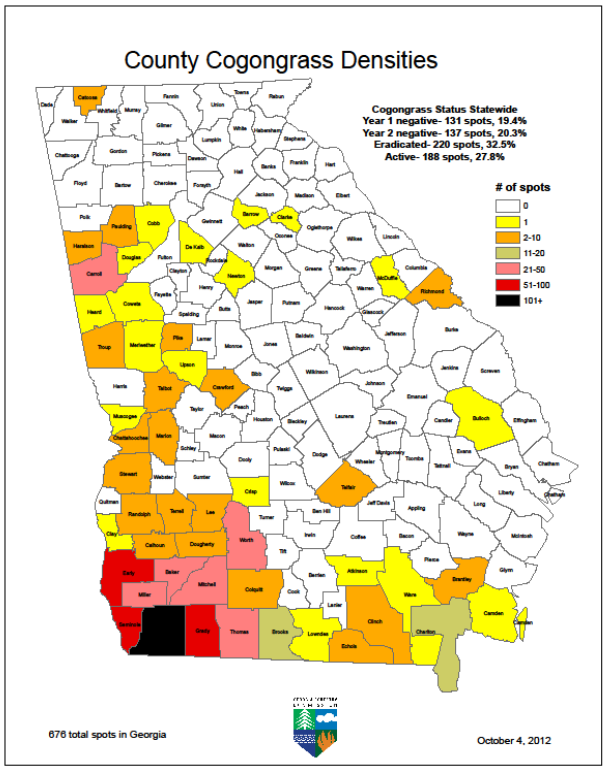
The education efforts of the Georgia Forestry Commission have paid dividends and initial cogongrass reports are being filed from private landowners, industry foresters, and some logging operations. Statewide, forest health training was provided to foresters, resource managers, loggers, public works departments (state and county), nurserymen, regulatory agencies, landowners and at field days on 82 occasions with 3,931 attendees being touched. These sessions involved forest health key topics and cogongrass was included as a fundamental part of these training seminars.



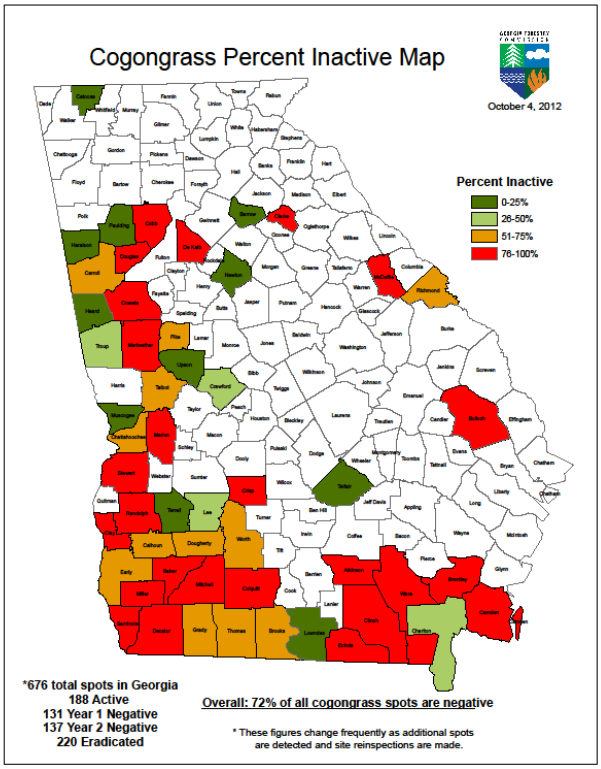
There have been 75 new cogongrass infestation sites reported and treated by the GFC during this fiscal year. This is the first year the number of new detections has decreased since the GFC began its leadership role in cogongrass detection and eradication. The GFC continues to treat all new sites with herbicide, normally Imazapyr and Glyphosate, at no cost to landowners. This assistance is only possible through an ongoing grant provided by the USDA Forest Service. This non-native invasive weed has now been found in **52** Georgia Counties, involving **676** sites. In Georgia, **185 acres** of cogongrass have been treated with all known sites being sprayed at least once. Most of the infestations in Georgia are between **1/10 - 1/4** acre in size and are not visible from an aerial detection survey. Ground survey and field reconnaissance are the only reliable means of detection. During the post treatment inspection process, approximately **72%** of all known sites are being shown as negative for cogongrass. Three consecutive years of negative evaluation is required for a cogongrass site to be deemed as eradicated. There are 131 sites in Georgia that have shown one year of negative post inspection, 137 sites that have shown two years of negative post inspection and **220 sites** have been declared eradicated. Herbicide results have been positive with the majority of all sites now being controlled within two growing seasons based on the current herbicide mixture and rates. These mixes and rates are published in a paper produced by the forest

health staff and The USDA Forest Service. These recommendations are posted on the Georgia Forestry Commission's public web site: ***Cogongrass Eradication Strategies*** http://www.gatrees.org/forest-management/forest-health/cogongrass/GFCCogongrassEradicationStrategiesrevMarch2010.pdf

In an effort to increase public awareness and education, Mark McClure, Forest Health Specialist, Southwest Georgia continues to write an information newsletter, semi-annually, on the GFC Homepage and is e-mailed to landowners and partners across the Southeast. This newsletter contains reminders for landowners to be vigilant for new infestations of cogongrass, gives pictures for identification purposes, and provides an update on the current status of cogongrass infestations in Georgia. This newsletter is published on the GFC Homepage at:
Cogongrass in Georgia: Spring 2012 Update
http://www.gatrees.org/forest-management/forest-health/cogongrass/CogongrassinGeorgia-Spring2012Update.pdf



Mark also produced a county density map to better depict local infestations and more accurately shows the spread of cogongrass in Georgia. This map is published on the GFC Homepage and can be found at: ***County Density Map*** http://www.gatrees.org/forest-management/forest-health/cogongrass/CogongrassCountyDensityMap-1004412.pdf



An additional map was created in 2011 to show the percentage of **inactive** cogongrass sites in each Georgia County. http://www.gatrees.org/forest-management/forest-health/cogongrass/CogongrassPercentInactiveMap-100412.pdf

The cogongrass banner stands created by the Forest Health Staff has been utilized at numerous public events and workshops. In addition, a cogongrass poster created in 2011 was distributed and displayed in state and federal government offices along with local stores in the community.

Dirty Dozen List of Invasive Weeds

The use of the top twelve **"Dirty Dozen List"** has proven a valuable tool in the fight against invasive weeds in Georgia. This list uses Forest Inventory and Analysis (FIA) data providing a defendable ranking of invasive plants. During the spring of 2012, the FIA inventory was conducted giving the forest health staff an opportunity to contribute input on the nonnative invasive plants surveyed for in Georgia. This "Targeted Watch list" included species on the original "Dirty Dozen List" but it also was developed using the standard Invasive Plant Definition adopted in 2011.

"Any plant or animal that has normally been introduced and aggressively competes with, and displace, local native communities; normally having no natural enemies to limit reproduction and spread."

The final "Targeted Watch list" consists of twenty-five nonnative invasive plant species that are proven to meet the definition above; aggressively competing with and displacing native communities. This is not to say that the standard FIA nonnative invasive list was ignored, this input simply provided the FIA foresters a working knowledge of the needs of our Forest Health Program. From this 2012 FIA survey we are developing an updated 'Dirty Dozen List" to be released in 2013. (See Appendix for the original "Dirty Dozen List)

Across Georgia our efforts have focused on Chinese privet, Japanese climbing fern, Chinese tallowtree, Non-native olive, and Nonnative rose. This list is subject to change as we encounter new treats that are entering Georgia. The use of tools, such as FIA data, gives our Forest Health Team the ability to see trends in occurrence and growth, and the data helps us to predict our greatest enemies in the future. Cogongrass is considered to be our greatest threat as an invasive plant and we separate this Federal Noxious Weed out as our number one invasive weed challenge in Georgia.

In 2012, the GFC incorporated **The Invasive Plant Control Cost Share Program** assisting landowners in the control of targeted species listed as major competitors to our native forests. This Cost Share Program has provided assistance to landowners across Georgia and is being extended for a second year in 2012-13. See the details below.

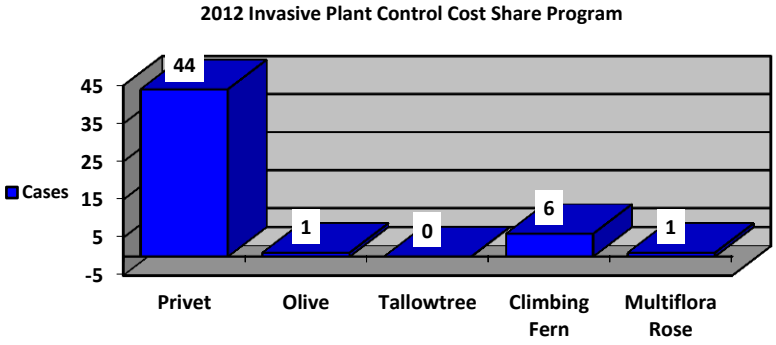
Invasive Plant Species Control Program

Addressing invasive species occurrence and control is a growing issue; The Forest Health staff is partnering with The USDA Forest Service, The University of Georgia, National Wild Turkey Federation, and other state, local, and federal agencies to educate the public of the harm nonnative invasive plants can cause in Georgia. Regional and local programs have been conducted during the past year and are being planned to bring relevant and current topics to the landowners of Georgia and our Federal and State partners.

In 2011, the GFC began the Invasive Species Control Cost Share Program assisting landowners in the control of nonnative species, and one hundred (100) landowners were awarded contracts to begin control of Chinese Privet and Japanese Climbing Fern on over 2,100 acres of private lands across Georgia. This initial round of contracts should be completed in the spring of 2012. Approximately one half of the original contracts have been completed and GFC foresters are contacting individual landowners to insure the remained on the contracts are accomplished

In 2012, the GFC continues the **Invasive Plant Control Cost Share Program** assisting landowners with control of targeted invasive species*. This Cost Share Program is assisting landowners in increasing the amount of healthy, productive forests across Georgia by eliminating nonnative, invasive plants. Invasive plants aggressively battle for growing space, out competing native vegetation including herbaceous and woody plants. If left unchecked, lands occupied by these plants become unproductive and native flora (and fauna) can be completely displaced. This program targets certain invasive plant species listed as a top concern by foresters in Georgia. Many practices can be used to minimize or eliminate invasive plants including the use of herbicides or a combination of mechanical and herbicide treatments. For 2012 fifty-two (52) landowners were awarded contracts to control Chinese Privet, Nonnative olive, Japanese Climbing Fern, and Multiflora rose on 2,250 acres of private lands across Georgia.

*Target Species	Cases	Acres
Non-native Privet	44	2,120
Non-native Olive	1	87.5
Chinese Tallowtree	0	0
Japanese Climbing Fern	6	37.5
Multiflora Rosa	1	5
Total	52	2,250



Technical assistance is provided to landowners by GFC foresters for evaluation of sites, and determining the steps landowner should take to expect successful results (brief management plan). The forester will inspect the area at the completion of the practice to determine if the management plan was successfully implemented, and authorize release of cost share funds at that time.

Chinese privet

This is the most widespread and harmful non-native invasive plant to Georgia's forests. The New Forest Inventory and Analysis surveys for 2012 indicates a significant increase in acreage infested with Chinese Privet; preliminary figures show over 500,000 acres infested.

In 2012 almost 95% of the requests for assistance under the Invasive Plant Cost Share Program were for privet control. This nonnative invasive plant continues to be a major competitor in wetlands and is still the number one invasive plant in Georgia in terms of acres affected.

The control of Chinese Privet has proven simple using a foliar application of Glyphosate (4 -7%) applied between October and January has shown to be cost efficient and very effective. Applications made, in the winter months, we expect to produce close to a 100% kill by April of the following year. A second application may be required in the following year to eliminate the small amount of regeneration. Normally one application is sufficient to achieve control.

After Glyphosate Treatment – March

The Invasive Plant Cost Share Program provides assist to landowners in controlling this targeted species and results have been documented across all of Georgia.

Trifoliate orange (Poncirus trifoliate)

Trifoliate orange

On January 13, 2011 the Forest Health Staff began field trials to test application methods, and herbicide rates for control of Trifoliate orange (*Poncirus trifoliata)* in central Georgia. The goal is to determine optimal application timing and rates for best control using proven application techniques and commercially available herbicides.

Multiple plots were established using cut stump, basal stem, thin line, and foliar applications at varying rates of Triclopyr, Glyphosate, and Imazapyr to determine the most economical and practical application methods for control of this thorn infested invasive.

The initial evaluation of our first field trials was made in June of 2011 and field observations indicated that the most promising techniques were made with low rates of Glyphosate in a foliar application applied during winter months. Surprisingly these rates and application times mimicked the timing and rates used for Chinese Privet Control. The application of Glyphosate (5 - 8%) with 1.5 ounces of Metsulfuron in one hundred gallons of mix, applied between October and February has proven to be extremely affective.

June 2011

Additional field trials were conducted during the winter of 2012. Three plots were treated on February 2, 2012 using backpack mist blowers and this dispersal method appears to be useful. Herbicides are dispersed using high volumes of air pressure to atomize the herbicide producing fine droplets giving better coverage, higher efficiency, and greater dispersal in difficult areas. Three new evaluation plots were established:

Plot #1 - 10% Garlon 4, 25% Basal Bark Oil plus water.

Plot #2 - 5% Garlon 4, 1% Milestone, 25% Basal Bark Oil plus water.

Plot #3 - 5% Accord XRT, 1% Dyne-a-pak plus water.

The initial evaluation of the second plots was conducted on May, 1, 2012. Using field observations the most promising application, again, was made with low rates of Glyphosate in a foliar application. Within three months of the initial application browning was observed in the cambium layer and dieback on smaller limbs.

February 2012

Japanese Climbing Fern

Japanese climbing fern is a perennial climbing fern that can reach lengths of 90 ft. (30 m). Vines are thin, wiry, green to orange to black and usually die back in the winter. The fronds (leaves of a fern) are opposite, compound, usually triangular in shape, 3-6 in. (8-15 cm) long, 2-3 in. (5-8 cm) wide and finely dissected. Fertile fronds bear sporangia that produce tiny, wind-dispersed spores. Plants are also spread by rhizomes. Japanese climbing fern often invades disturbed areas such as roadsides and ditches, but can also invade natural areas. It generally is scattered throughout the landscape, but can form dense mats that smother understory vegetation, shrubs and trees. Japanese climbing fern is native to eastern Asia and was first introduced into the United States during the 1930s for ornamental purposes.

Five years ago Japanese climbing fern was virtually unknown in Georgia. This plant is perceived as a potential threat to the health of Georgia's forests, and initial estimates show approximately 20,000 acres of Japanese Climbing Fern in Georgia. This doubles know infestations in Georgia from previous FIA surveys. Increased awareness of this plant has led to a dramatic increase in sightings and identification of this pest. To date Japanese climbing fern has been found as far north as Athens and Atlanta, Georgia.

Field trials show good results in the first year control using 5% Glyphosate and one and a half ounces (in one hundred gallons of solution) of Metsulfuron (Escort XP) sprayed the in late summer to early fall. First year evaluations show approximately 95 % control and very little sprouting in the test area. Sites with dense, multiple layers of Japanese climbing fern often required two treatments of glyphosate in the same growing season to eliminate all layers of fern.

Chinese Tallowtree

In 2012 Chinese tallowtree is native to China and Japan and was introduced to The United States in the late 1700's. This non-native invasive can establish in full shade on a wide range of soil types in the coastal region and South Georgia. Chinese tallowtree is becoming a serious forest health problem in bottomlands, old fields, coastal mashes, disturbed and undisturbed sites, and in urban settings.

Each tree has the potential to produce thousands of seeds annually and it is common to find trees in excess of twelve to fourteen inches in diameter in well established areas. Seeds are dispersed primarily by birds; and flooding in riparian areas can disperse seeds for miles. These seeds mature in late summer to fall ready to germinate the following spring.

Historically, Chinese tallowtree has been controlled using labor intensive injection methods or basil stem application of herbicide. In the spring of 2010 a new chemical, "Clearcast" (Imazamox), was presented by BASF as an aerial or ground herbicide for application directly over hardwoods with the claim that tallowtree and only tallowtree would be killed. In an effort to increase our outreach and education efforts, a partnership was formed with BASF and SePRO to promote this new technology as an eradication option.

In October 2011, twenty one acres of slash pine were aerially treated using three rates of "Clearcast" to determine if the herbicide can be safely applied over slash pine. Our objective was to apply thirty-two, sixty-four, and seventy-two ounces of "Clearcast" per acre, applied aerially, to evaluate the percent kill on Chinese tallowtree and any collateral damage to the hardwood and pine.

Nine (9) acres of 16 years old slash pine were treated with 64 oz. /ac. of Clearcast while an additional 9 acres of 18 year old slash pine were treated with a rate of 72 oz. /ac. Three (3) acres of 8 year old slash were treated at a rate of 32oz/ac rate. This field trial was conducted west of Hahira, Georgia in Lowndes County. All sites were examined 7 and 12 months after herbicide application. Clearcast results were very good with the 64-72oz. /ac rate while the 32oz. /ac rate had very good suppression but epicormic sprouting occurring on most stems twelve months after herbicide application. There was no collateral damage to water oak, red maple, blackgum, or wax myrtle species. There was slight damage to the terminals of sweetgum. Furthermore, there was no visible damage to the slash pine at any of the applied rates.

In addition to the aerial treatment with Clearcast, hack-n-squirt treatments with 50% Accord XRT II (glyphosate), and 5% Arsenal AC (Imazapyr) were made. Furthermore, a 1% Clearcast treatment was made to a small area using a mist blower. Both hack-n-squirt treatments were effective. However, the 5%

Tallowtree Prior to Treatment

Tallowtree One Year Post Treatment

Arsenal AC treatment showed overall best results. The 1% Clearcast application with a mist blower showed suppression but not control. Further mist blower treatments with higher percentage rates of Clearcast need to be examined to determine an effective application rate.

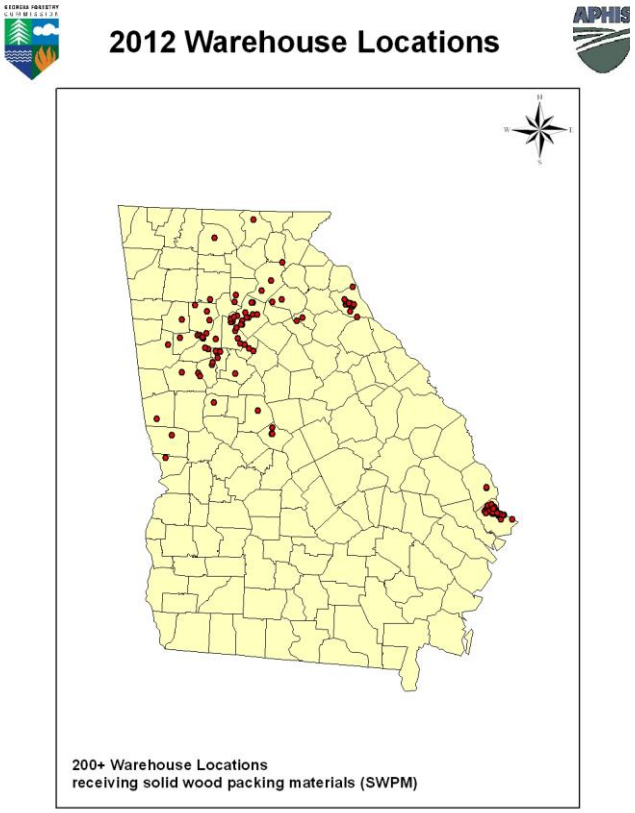
In an effort to promote alternative methods for control of Chinese Tallowtree, a collaborative partnership was established with The Jekyll Island Authority to evaluate Tallowtree infestations and control techniques. Two evaluation sites were established near residential communities and written recommendations have been provided to the Jekyll Island Authority on various techniques using chemical control. The Hack and Squirt and cut stump methods are being demonstrated using Garlon, and landowners on the island are encourage to visit the sites to see the results first hand.

The goal is to promote known, safe, control techniques and demonstrate herbicides as a viable alternative without collateral damage. Residence are discouraged from planting tallowtree in their yard and are informed of the invasive potential of this invasive species.

Early Detection Rapid Response

In 2012, The Georgia Forestry Commission hired one new temporary day labor employee to perform early detection insect trapping around facilities accepting international cargo with solid wood packing material (**SWPM**).

Thirty-six (36) Early Detection Rapid Response (EDRR) and (36) Cooperative Agriculture Pest Survey program (CAPS) traps were deployed in the Athens and Savannah Ports area for the detection of non-native exotic bark and ambrosia beetles. The traps were inspected on a two week schedule for twelve weeks with trapping ending in July 2012. Specimens collected were cleaned, sorted, labeled and sent to Dr. Rick Hoebeke, Collection Manager, Museum of Natural History, University of Georgia, for screening and identification.



In 2010 a new United States record for *Xyleborinus artestriatus* occurred when the insect was found in a trap near a warehouse in Port Wentworth, Georgia. In 2011 trapping at this same warehouse resulted in the capture of forty-eight *Xyleborinus artestriatus*, but none were caught at traps set a few miles from the initial catch site. In 2012, The forest health staff continues to catch *X. artestriatus* at the original warehouse, but 4 additional warehouses located up to 2.5 miles from the initial catch area are now showing positive results for X. artestriatus which would suggest that this new exotic ambrosia beetle is established in coastal Georgia and is producing breeding populations. To date no damage has been documented on native vegetation in the area, and the preferred native plants have not been determined. *X. artestriatus* have been caught this year in traps baited with ethanol, ethanol/alpha-pinene, and Ips lures. From CAPS data entries additional states have been successful in trapping X. artestriatus. Thirteen positive catches have been made for Texas and one in South Carolina.

In addition, 16 Sirex wood wasp traps, 20 emerald ash borer traps and 25 gypsy moth traps were placed in the, Elberton and Savannah areas. These traps have yielded no positive pests to date.

In 2012, Reggie Morgan was hired to conduct early detection insect trapping around facilities accepting international cargo. A contact in a warehouse in Elberton, Georgia collected insects from a container that was opened at the facility. A "Swarm" of live "Wasp" was present in the container, and many of these insects escaped to the adjacent wooded area. The insects that were captured alive were submitted to Dr. Rick Hoebeke, Collection Manager, Museum of Natural History, University of Georgia who initially identified them as a male and female **Tremex woodwasp** *(Tremex fuscicornis)*. This initial identification was confirmed by the USDA-ARS Systematic Entomology Laboratory (SEL), a new introduction into the United States. The **Tremex Woodwasp** *Tremex fuscicornis* is an insect pest of broadleaf trees. This species occurs in Europe and Asia and prefers stressed trees that are dead or dying in its native range. In Chile, where it has been introduced, it has caused severe damage to healthy trees of importance in agriculture, arboriculture and forestry. Boring by larvae causes severe degradation of wood; in many cases attacks are so heavy to render the wood useless.

Recorded hosts are Beech, *Fagus* sp., *Fagus sylvatica*; Poplars, *Populus* sp., *Populus tremula, Populus nigra, Populus nigra* Italica (=*Populus pyramidalis* = *Populus italica*); elm, *Ulmus* sp.,*Ulmus propinqua, Ulmus japonica*; alder, *Alnus* sp., *Alnus japonica, Alnus japonica* var. *arguta*; wingnut, *Pterocarya stenoptera*; Persian walnut, *Juglans regia*; birch, *Betula sp.*; maple, *Acer negundo, Acer platanoides*, black locust, *Robinia pseudoacacia*; willow, *Salix sp.*; oak, *Quercus sp.*; hackberry, *Celtis sinensis*; *Zelkova* sp., Zelkova serrata; *Prunus* sp., *Prunus yedoensis*; hornbeam, *Carpinus betulus* (Smith 1978).

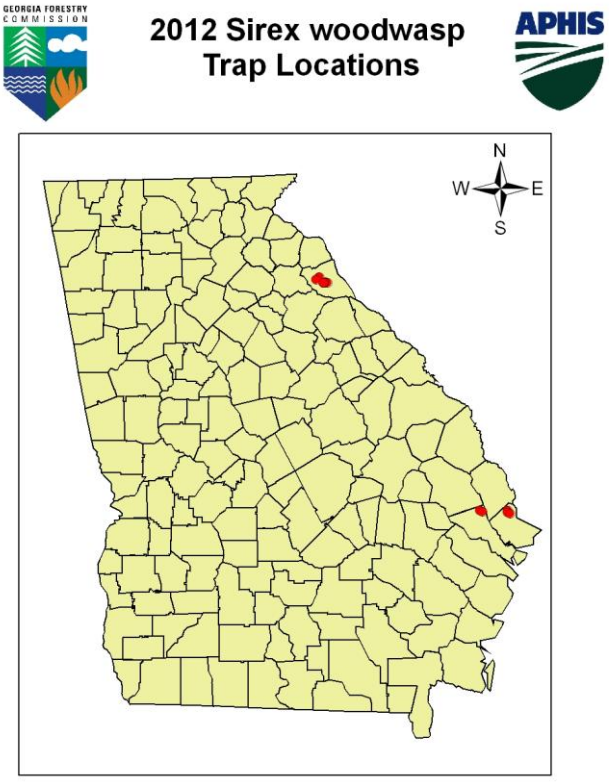
Once a positive identification was made, six (6) early detection baited funnel traps were located around the warehouse where the Tremex woodwasp was found, but to date no Tremex woodwasp have been captured. In 2013, a series of delimit traps will be established around, and inside, the warehouse site in Elberton, Elbert County, Georgia to attempt and detect any populations that may have established in the area.

Additional Surveys Supported by Georgia Forestry Commission

Sirex Woodwasp

Huge losses of both loblolly and slash pine have occurred on other continents due the Sirex Woodwasp *Sirex noctillio*, and it remains as a high concern pest that has yet to be detected in Georgia (or the southeastern U.S). The sirex woodwasp poses a threat to all of Georgia's southern yellow pines and warrants monitoring through our early detection rapid response protocols.

A series of Lindgren funnel insect traps (baited with alpha-pinene lures for sirex woodwasp) were deployed at high risk warehouses receiving solid wood packing materials near Savannah and Elberton Georgia. Sixteen traps were located in pine stands near warehouses from June through October to detect any *Sirex noctilio* inadvertently moved into these locations in cargo. These traps are checked every 2 weeks and any suspect nonnative insects are initially screened for identification by the forest health staff. No *Sirex noctilio* have been caught in our traps to date.



16 Sirex woodwasp traps

American Recovery and Reinvestment Act of 2009
Cogongrass and Invasive Species Eradication 09-DG-11084419-040

Introduction
Cogongrass, *Imperata cylindrica* (L.), is considered the seventh worst weed in the world, and has taken over vast ecosystems in Alabama, Mississippi, and Florida. This noxious weed has been present in these states for almost one hundred years.

Cogongrass greatly increases the risk of damaging wildfire in the forest – especially during the dormant season. Firefighter risk is of great concern.

In 2004, the Georgia Forestry Commission (GFC) organized a Cogongrass task force, and invited multiple partners to discuss the issue. The task force created strategies for detection, education, and suppression treatments. The purpose of this project was to expand the current efforts by working through the Cogongrass taskforce.

As of June 1, 2009, Cogongrass was only known to occur in twenty nine Georgia counties. Therefore, it is believed that eradication is a viable option in Georgia.

The GFC professionals identified other invasive plant species as threats to forests within Georgia and these include: non-native privet species, Japanese climbing fern, Chinese tallowtree, non-native olive species, and multiflora rose. A survey and treatments were planned on state-owned lands (GFC, University of Georgia, and Georgia State Parks), as well as privately-owned forests. Also, a public outreach and educational campaign for invasive plants in Georgia was planned.

The funds from the grant were to be used to hire temporary workers and contractors. The grant funds would be used to create jobs throughout the state.

Project Objectives **Award amount: $1,795,000.00**
The goal of this grant was the detection and eradication of all known Cogongrass infestations in Georgia. The program was also focused on the detection and eradication of the other target invasive species on state and private land. The educational and outreach program focused on developing prescriptions and disseminating the information to the public. The original funding matrix is included in **Exhibit A**.

Private Landowner treatments **Allocation: $850,000**
The GFC advertised a private landowner incentive program to control the target invasive species in the stimulus grant. The guidelines of the program are attached in **Exhibit B**. Applications were received from all of the GFC Districts in the state. GFC foresters visited these sites to see if the site contained one or more of the target invasive species. The GFC forester mapped the area with the invasive species, and reported if the site qualified for the program. The GFC foresters verified 488 applications for 9,042 acres that totaled $3.6 million in requests, which qualified for the program.

The funds were distributed by a random selection drawing to 100 qualified landowners. The selected landowners were notified with a letter that contained a map of the area to be treated, the prescription to use, and a deadline to complete the treatments. The GFC forester also assisted the landowner to find a contractor to perform the treatments, and each contract required two treatments.
Once the treatments were completed, the GFC forester visited the site to see if the management plan was implemented successfully. At this point, the GFC forester authorized the release of the incentive payment.

The funds allocated for the private landowner incentive program treated 4,794 acres for invasive species. A location map for the private landowner contracts is included in **Exhibit C**.

Georgia Department of Natural Resources **Allocation: $250,000**

The Georgia Department of Natural Resources - **State Parks and Historic Sites** (GA DNR) was awarded a contract to treat the target invasive species on state park lands. The grant contract funds were used to hire contractors to perform herbicide and mechanical treatments over a two year period. Funds were also utilized to purchase herbicides and gear to be utilized by park staff and volunteers for continued treatments after grant expiration.

In 2011, GA DNR was awarded a second contract for $67,000 to continue to treat invasive species on state park sites.

In 2012, GA DNR – **Wildlife Resources Division, Game Management Section** was awarded a third contract to treat tallowtree on Ossabaw Island. The funds from these contracts were used to hire contractors to perform the herbicide treatments.

Since 2009, approximately 820 acres have been treated on 25 Georgia State Parks and Historic Sites for invasive species. A location map for the treatment areas on public lands is attached in **Exhibit D**.

University of Georgia **Allocation: $235,000**

The University of Georgia (UGA) was awarded a contract to devise and develop education and training programs for invasive species with focus on the six priority species. The project also funded a survey and treatment of invasive species on lands owned by UGA.

The education and outreach project provided funding to develop the website invasive.org, create fact sheets on the target invasive species, develop an information poster, and create a marketing plan to educate the public on the threats of invasive species. Also, the funds from the grant were used to support travel to present the invasive program at county extension meetings, invasive workshops and other educational meetings across the state.

The invasive plant survey of UGA lands project funded contract labor to survey UGA property for invasive species, and to hire contractors to perform herbicide treatments on the affected areas. Approximately 2,576 acres were surveyed, and herbicide treatments were performed on 25 acres on two properties: UGA's Whitehall Forest and Thompson Mill Forest. The location of these areas is included on the public lands map in **Exhibit D**.

Planning **Allocation: $460,000**

The planning portion of the grant was used to fund the salaries of the six foresters hired to survey the private landowner applications, and for the program manager hired to supervise the public and private portions of the grant.

Six foresters and I, the program manager, were hired in 2009 to implement the grant. The foresters were located throughout the state, and were assigned the work in their District. These foresters focused on the private lands portion of the grant. As the program manager, I was responsible for managing all grant activities on public and private lands, as well as budgeting and reporting requirements.

Grant Modifications

The original grant period was to expire on February 29, 2011. However, due to difficulties with weather conditions and challenges with acquiring skilled herbicide applicator contractors, it became apparent that the private land contracts would not be completed by the end of the grant period. Therefore, the grant period was extended until August 31, 2012, in order to allow adequate time to finish all grant projects.

Impacts
The ARRA Cogongrass and Invasive Species Grant provided temporary jobs, technical training, and valuable experience to forestry professionals within the Georgia Forestry Commission. Some of the ARRA foresters hired were recent graduates, and this grant provided much of their first professional experience. Other professionals had been affected by the slow economic times, and were seeking work within their profession.

The total number of jobs created by this grant (as of August 31, 2012) is 82.80 FTEs. FTE (Full Time Equivalent) is calculated by taking the total paid hours during a quarter and dividing by the hours that a full time worker would accumulate during a quarter. Of those, 34.52 were the result of direct employment of the grant staff, and 48.28 resulted from contract work on the grant projects. A table summarizing the FTEs for each quarter is attached in **Exhibit E**.

Over 95% of the private landowner contracts had non-native privet as the primary invasive to control. All of the state parks, except one, focused on control of non-native privet. Privet commonly forms dense thickets in fields or in the understory of forests, and is one of the most widespread and problematic invasive plants in the Southeast. It shades and out-competes many species and, once established, is very difficult to remove.

While the sites containing privet were treated, the areas were also surveyed for other dangerous invasive plants. The grant projects facilitated the Cogongrass Task Force's goal of detecting and eradicating all cogongrass in Georgia: It allowed trained professionals access to private and otherwise inaccessible areas for survey.

If left uncontrolled, invasive species can limit land use, cause economic loss, threaten the state's biodiversity, and become a financial burden to control. The grant funds were used to survey and treat approximately 8,200 acres for invasive species. Professionals and landowners around the state were trained on the dangers of invasive species, and taught effective techniques to control them.

The grant projects introduced people that had not worked together before. Georgia forestry Commission employees were introduced to representatives from the U.S. Forest Service. GFC professionals were introduced to employees from the Georgia Department of Natural Resources and The University of Georgia. New contacts were made between contractors, foresters, laborers, and landowners. The projects of this grant educated these individuals on the threats of invasive species. In conducting the work, the individuals were actively learning proper control techniques. The Cogongrass and Invasive Species Eradication Grant effectively controlled the target invasive species and focused the public's attention on the dangers they present.

American Recovery and Reinvestment Act (ARRA) Exhibits: (See Appendix)

Exhibit A. Original funding matrix

Exhibit B Guidelines of the program

Exhibit C Location map for the private landowner contracts

Exhibit D. Location map for the treatment areas on public lands

Exhibit E. Table summarizing the Full Time Equivalents (FTEs) for each quarter

Animal Plant Health Inspection Service (APHIS) Funded

Emerald Ash Borer (USDA-Aphis Funded) 11-8213-0651-CA

The Emerald Ash Borer (EAB) has devastated ash trees in the northeast and mid-west and could have the same impact in Georgia. EAB was introduced in Detroit, Michigan in 2002 and has since spread as far south as Monroe County, Tennessee; placing emerald ash borer within 35 miles of the Georgia border. Many infestations are started by human assisted spread through the movement of ash logs and firewood from infested areas. Early detection of this new invasive insect is critical to the protection of the forests of Georgia.

Annually, EAB traps are deployed across Georgia in an attempt to detect new introductions present in Georgia. Between April and September triangular, purple, sticky traps (baited with a manuka oil lure and a Hexenol lures) were deployed across Georgia and inspected monthly for suspect EAB. Under the leadership of the Georgia Forestry Commission (GFC), 158 total traps were deployed by GFC personnel, UGA Warnell School of Forestry and Natural Resources, Georgia Department of Agriculture, and Trees Atlanta. Additionally, Delta-21 Resources, Inc. contracted with APHIS and set approximately 600 traps. No Emerald Ash Borers were detected in Georgia in 2012.

With positive catches in Monroe County, Tennessee in 2012, it will be imperative to trap for Emerald Ash Borer in north Georgia in 2013.

Forest / Wood lot / Camp/Park	108 Traps
Urban /Commercial	20 Trap
Urban Residential	8 Trap
Rural Commercial	16 Traps
Other	6 Traps
Total	**158 Traps – State Wide***

*This includes traps deployed by the Georgia Department of Agriculture, Trees Atlanta and the University of Georgia. Does not include the traps set by Delta-21 Resources, Inc.

Gypsy Moth (USDA-Aphis Funded) 12-8213-0032-CA

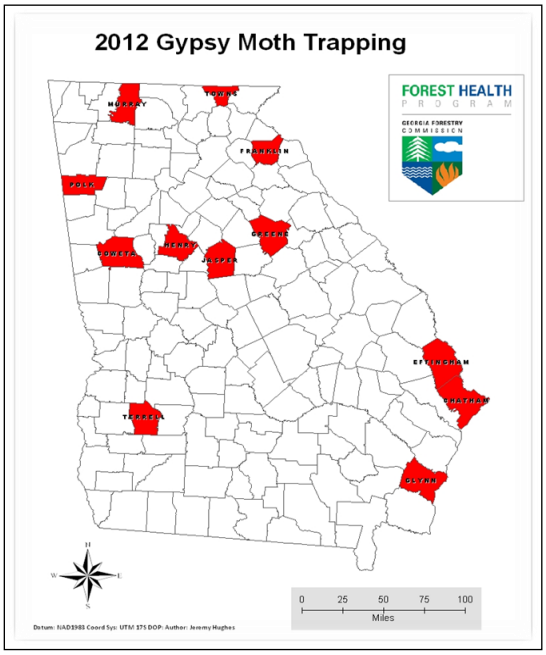
The Gypsy Moth is a serious forest pest capable of causing severe damage to hardwood trees, especially oaks. This damage is inflicted as the gypsy moth larvae defoliate entire stands of trees. In cooperation with the USDA- Animal Plant Health Inspection Service (APHIS), the Georgia Forestry Commission (GFC) deploys traps yearly to detect the presence of Gypsy Moth. There are no known infestations currently in Georgia, although the threat is always present.

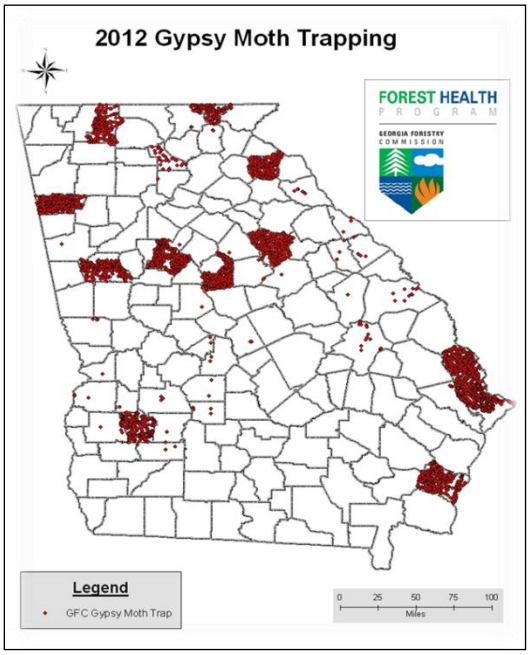
Georgia has had outbreaks in the 1990's in White, Fannin and Rockdale Counties. These spots were eradicated by state and federal forestry officials. It is likely that they were started by individuals moving cargo with egg masses attached to it from infested areas.

The following accomplishments summarize the work done by the Georgia Forestry Commission under Cooperative Agreement 12-8213-0032-CA. A total of 2944 traps were placed in 12 + counties. Traps were placed by trained GFC personnel and counties were selected based on a higher likelihood of introduction. No delimiting trapping was conducted in 2012.

Accomplishments:

- GFC personnel deployed traps across the state in 12+ counties in 2012.
- The following counties were trapped: Murray, Towns, Polk, Franklin, Coweta, Henry, Jasper, Greene, Terrell, Effingham, Chatham, and Glynn counties.
- A total of 2806 traps were placed in these counties by GFC Rangers, Technicians and Foresters. The Forest Health Staff of the GFC placed an additional 138 traps around high risk areas in their work areas. Eight positive catches were made in Chatham and Glynn counties. One moth caught in Murray County is still pending identification.
- No Delimit trapping was conducted this year.
- A grand total of **2944** traps were deployed in Georgia in 2012.



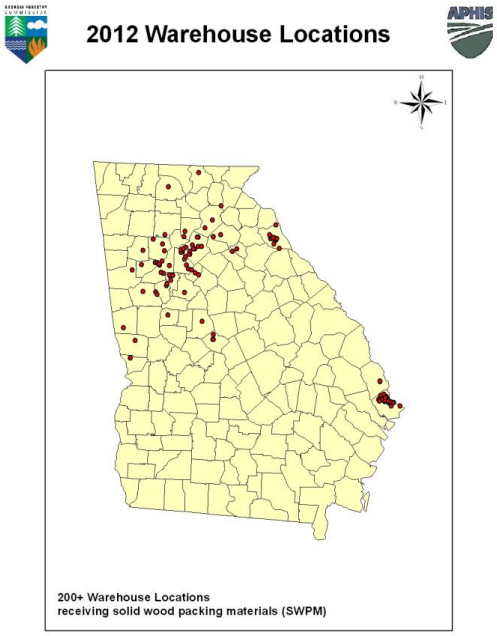


Exotic Wood Boring and Bark Beetle Survey (USDA-Aphis Funded) 12-8213-0457-CA

In 2012 the Exotic Wood Boring and Bark Beetle Survey was conducted by The Georgia Forestry Commission and one new temporary day labor employee hired to visit and inspect companies accepting international cargo with solid wood packing material (**SWPM**). Reggie Morgan was hired in March of 2012 and his demeanor, personality, and experience have proven to be a true asset to these warehouse inspections. He approaches each warehouse with the attitude that we are there to educate their employees and to act as partners in preventing new nonnative invasive insects from entering the country.

The Facility Risk Assessment Scale System (FRASS) developed in 2010 to evaluate and rate facilities for potential risk for exotic pest introductions; has proven to be a great asset in warehouse surveys and is still being used in 2012. Each facility is given a rating based on the type packing material received, moisture content, and continent of origin of the SWPM it handled. Facilities scoring 0-5 points are rated as low risk or "cold" for pests; 6-9 points indicate a moderate or "warm" risk; and a score above 9 points indicates a high or "hot" risk for pests. A facility with a cold rating requires fewer site visits, as they are on the lower risk scale for new introductions, where a high risk site may receive multiple site visits during our survey rotation. (**Refer to The Facility Risk Assessment Scale (FRASS) in the Appendix**).

Fifty-two (52) new facilities were found as potential risks in 2012 with over two-hundred (200) total facilities identified as potential risks for exotic pest introductions staewide. Over 250 site visits were made to these facilities this year for warehouse inspection and trapping of nonnative bark and ambrosia beetles; thirty-six (36) traps were established and monitored between March 16 and October 31, 2012. An additional twenty (20) emerald ash borer (EAB), twenty-five (25) gypsy moth (GM) and sixteen (16) Sirex woodwasp traps were deployed at multiple locations in the Elberton and Savannah area. An estimate of the number of trees located at each facility was determined as well as their health. No declining or dying trees were noted during the 2012 survey. It was also noted how long each warehouse existed at a location. An older warehouse has more potential for a pest introduction than a facility that had operated for a short period of time.



Reggie Morgan was hired to conduct trapping and warehouse surveys in 2012, but he also began an education program with the warehouse contacts to explaining the Exotic Bark Beetle Program, provide educational brochures and literature to warehouse workers, and provide literature produced by Mark Raines (Forest Health Specialist) to show warehouse workers color photographs of nonnative insects that might be found in SWPM coming into their facilities. Each contact person was asked to protect and preserve any suspect insects found in their warehouses and to call The Georgia Forestry Commission Forest Health Staff when suspect insects are found. This education program paid dividends when Reggie received a call from a warehouse in Elberton, Georgia telling him they had collected live insects from a container they opened. These insects were collected and submitted to Dr. Rick Hoebeke, Collection Manager, Museum of Natural History, University of Georgia, who initially identified them as a male and female **Tremex woodwasp** *Tremex fuscicornis* which was later confirmed by the USDA-ARS Systematic Entomology Laboratory (SEL), a new introduction into the United States. The **Tremex Woodwasp** *Tremex fuscicornis* is an insect pest of broadleaf trees. This species occurs in Europe and Asia and prefers stressed trees that are dead or dying in its native range. In Chile, where it has been introduced, it has caused severe damage to healthy trees of importance in agriculture, arboriculture and forestry. Boring by larvae causes severe degradation of wood; in many cases attacks are so heavy to render the wood useless.

Recorded hosts are Beech, *Fagus* sp., *Fagus sylvatica*; Poplars, *Populus* sp., *Populus tremula, Populus nigra, Populus nigra* Italica (=*Populus pyramidalis* = *Populus italica*); elm, *Ulmus* sp.,*Ulmus propinqua, Ulmus japonica*; alder, *Alnus* sp., *Alnus japonica, Alnus japonica* var. *arguta*; wingnut, *Pterocarya stenoptera*; Persian walnut, *Juglans regia*; birch, *Betula sp.*; maple, *Acer negundo, Acer platanoides*, black locust, *Robinia pseudoacacia*; willow, *Salix sp.*; oak, *Quercus sp.*; hackberry, *Celtis sinensis*; *Zelkova* sp., Zelkova serrata; *Prunus* sp., *Prunus yedoensis*; hornbeam, *Carpinus betulus* (Smith 1978).

Once positive identification was made, six (6) baited funnel traps were located around the warehouse where the T. *fuscicornis* was found, but to date no Tremex woodwasp have been captured. In 2013, a series of delimit traps will be established around, and inside, the warehouse site in Elberton, Elbert County, Georgia to attempt and detect any populations that may have established in the area.

In an effort to increase awareness of nonnative insects, a four page color brochure is being developed to provide a visual representation of the pests targeted in our annual surveys. This brochure will depict some common nonnative insects found in SWPM, and the more exotic insects that we expect to see in the near future. This material will be left with warehouse contacts to be posted in break rooms, work areas, lunch areas, and loading docks for the warehouse workers to see.

During the summer of 2012, the forest health staff conducted a warehouse inspection tour with Animal Plant Health Inspection Service (APHIS). Dr. Bill Kauffman, State Plant Health Director, Georgia was provided the opportunity to see firsthand the inspection process in coastal Georgia. We were able to demonstrate the usefulness of these surveys and to show how these inspections play a vital role in protection our natural resources in Georgia.

Appendix:

Appendix A
"Dirty Dozen" Nonnative Invasive Species

Top 12 Species* and FIA occurrence data:

Rank	Species or Genera	Acres
1	Non-native Privet	347,346
2	non-native Lespedeza	58,391
3	kudzu	26,669
4	Chinaberry	23,057
5	Japanese Climbing Fern	9,225
6	Tallowtree	7,204
7	non-native Roses	5,799
8	non-native Olives	5,158
9	chinese/japanese wisteria	5,045
10	napalese browntop	4,061
11	Mimosa	3,567
12	Cogongrass	200
		495,722

- Top 11 species removing honeysuckle and fescue
- Cogongrass is GFC estimate

Appendix B
The Facility Risk Assessment Scale (FRASS)

FOREST HEALTH PROGRAM

FACILITY RISK ASSESSMENT SCALE SYSTEM (FRASS)

(FACILITY RISK ASSESSMENT SCALE SYSTEM (FRASS) - CRITERIA

Pallet/SWPM Type (Scale Points)

Pallet/SWPM Type	Points
Metal (M)	0
Plastic (P)	0
Foreign Composite (FC)	0
Domestic (D)	0
Composite/Laminate Crate (CC)	0
Cardboard (CB)	0
Laminate Runners (LR)	0
Wooden Racks (WR)	1
Wooden Granite Slab Frames (WGSF)	1
Lumber (Lmbr)	1
Foreign Non-Composite (FNC)	1
Crate (C)	1
Solid Crates (SC)	1
Runners (R)	2
Coil Pallet (CP	4

Moisture Content of Pallet/SWPM Wood (Scale Points)

Moisture Content	Points
0-9%	0
10-20%	1
21-30%	2
31-40%	3

Continent of Origin

Continent	Points
Asia	3
Africa	3
Australia	1
Europe	1
South America	1

FRASS SCALE

0-5 Cold Low Risk	6-9 Warm Moderate Risk	>9 Hot High Risk

An Equal Opportunity Employer and Service Provider

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ARRA Appendix:

ARRA Exhibits: (Please See Appendix at the end of this report)
Exhibit A. Original funding matrix

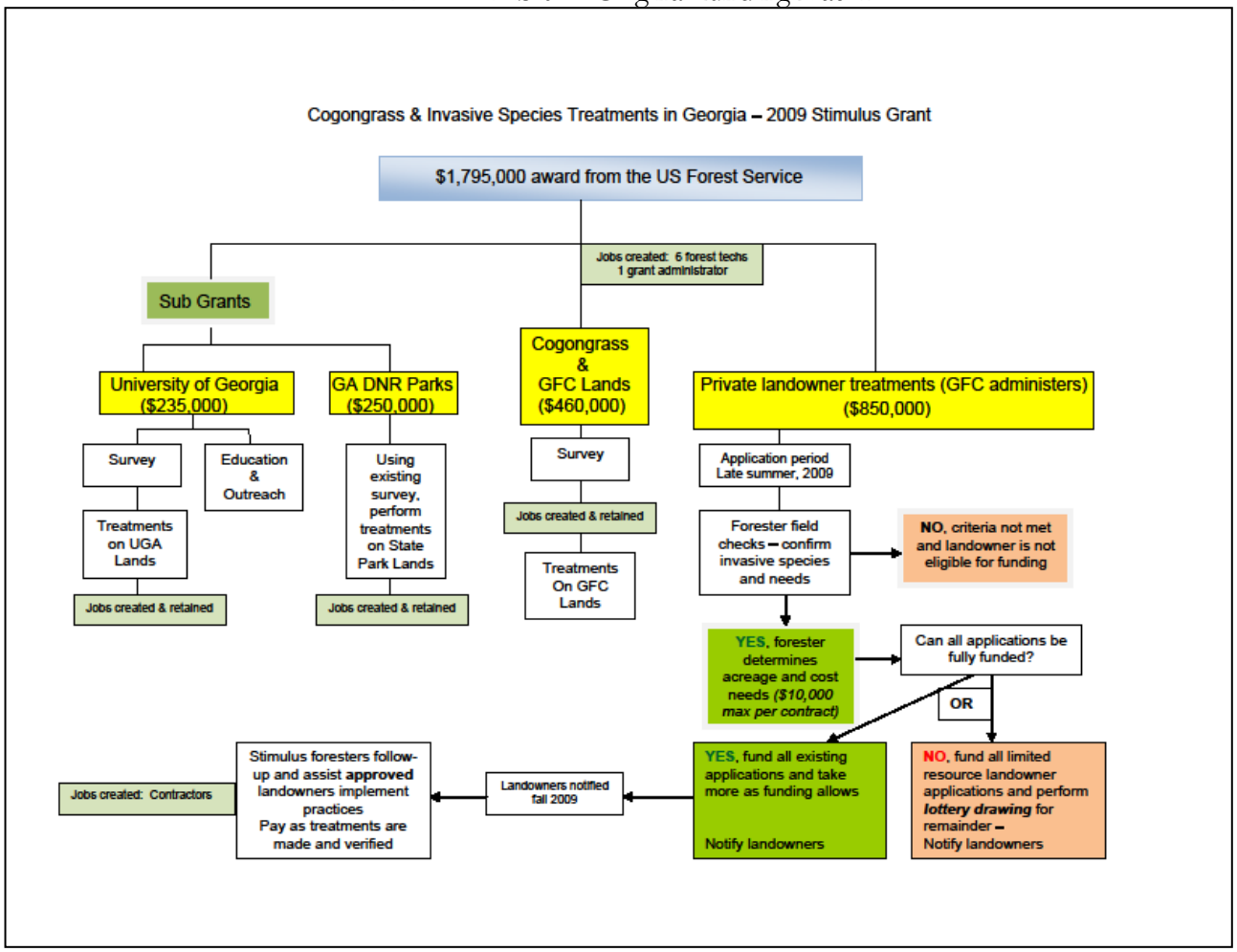
Exhibit B Guidelines of the program

Exhibit C Location map for the private landowner contracts

Exhibit D. Location map for the treatment areas on public lands

Exhibit E. Table summarizing the Full Time Equivalents (FTEs) for each quarter

ARRA Exhibit A. Original funding matrix



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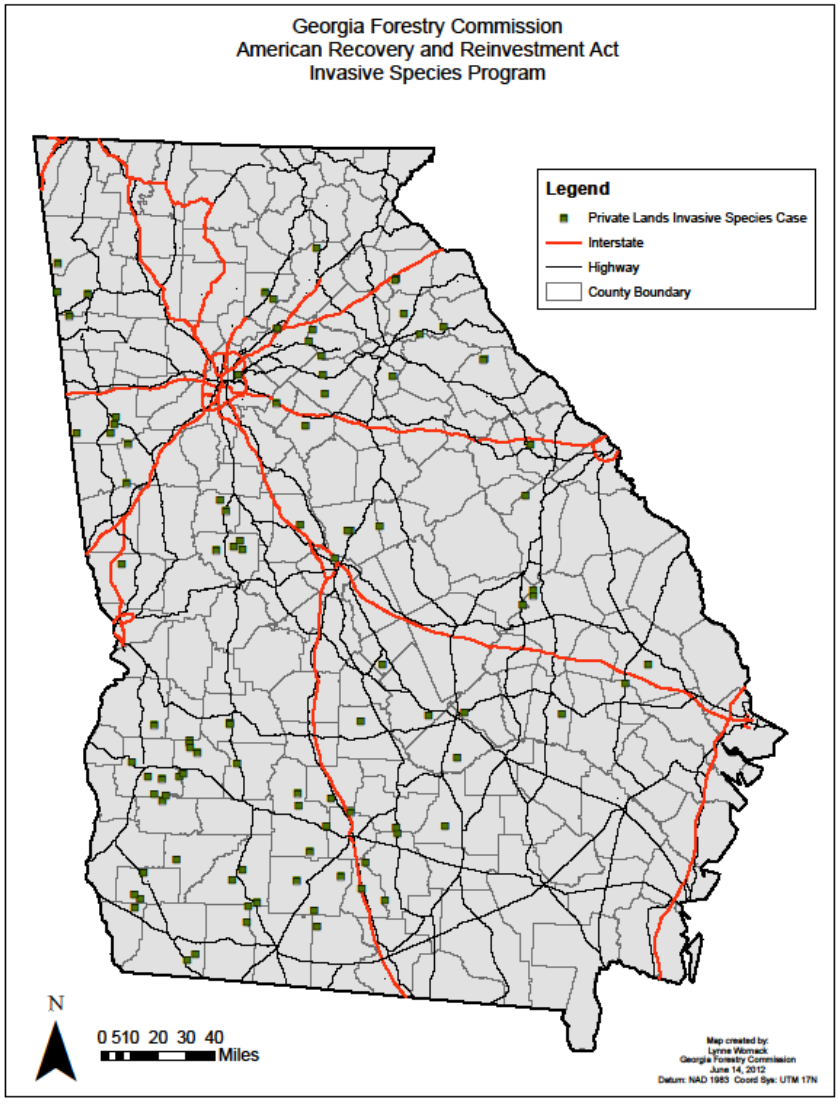
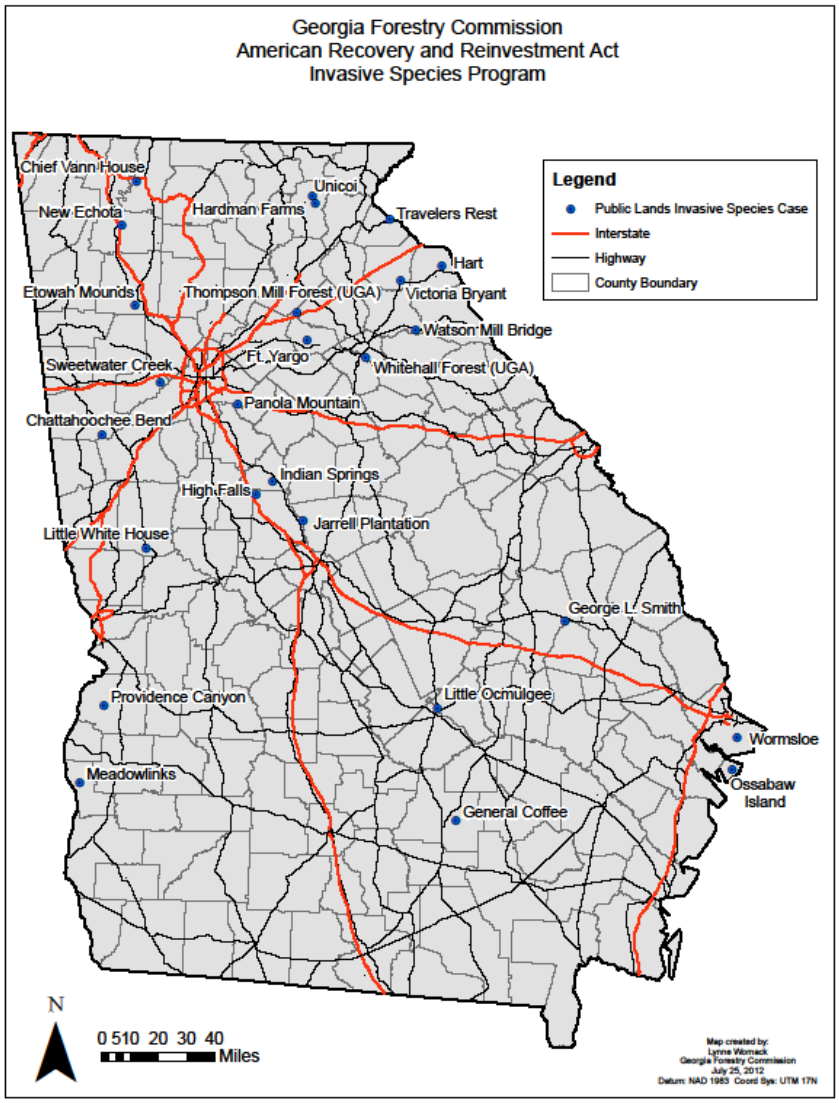
ARRA Exhibit B Guidelines of the program

http://www.gatrees.org/forest-management/recovery/landowner/InvasivePlantControlIncentiveProgramGuidelinesARRAGFC1009.pdf

ARRA Exhibit C Location map for the private landowner contracts



ARRA Exhibit D. Location map for the treatment areas on public lands



ARRA Exhibit E. Table summarizing the Full Time Equivalents (FTEs) for each quarter

State Quarter	TOTAL ARRA Agency PAID HRS	TOTAL ARRA Field PAID HRS	TOTAL HOURS	Hours in Period	B/C=FTE
SUMMARY TOTAL OF 1G239 BY QTR					
Quarter 1, 2010	88.00	0.00	88.00	88.00	1.00
Quarter 2, 2010	2,865.25	538.00	3,403.25	520.00	6.54
Quarter 3, 2010	2,492.45	2,379.25	4,871.70	520.00	9.37
Quarter 4, 2010	2,699.00	5,502.95	8,201.95	520.00	15.77
Quarter 1, 2011	2,377.50	2,693.00	5,070.50	520.00	9.75
Quarter 2, 2011	2,229.50	2,986.22	5,215.72	520.00	10.03
Quarter 3, 2011	1,963.50	2,236.10	4,199.60	520.00	8.08
Quarter 4, 2011	46.00	2,453.45	2,499.45	520.00	4.81
Quarter 1, 2012	0.00	1,777.00	1,777.00	520.00	3.42
Quarter 2, 2012	0.00	686.50	686.50	520.00	1.32
Quarter 3, 2012	0.00	1,186.00	1,186.00	520.00	2.28
Quarter 4, 2012	2,020.50	1,739.00	3,759.50	520.00	7.23
Quarter 1, 2013	1,170.00	929.20	2,099.20	360.00	5.83
TOTAL	**17,951.70**	**25,106.67**	**43,058.37**	**520.00**	**82.80**