

# Paradise Lost

## The Productivity and Richness of Alabama's Forests Overtaken by Hostile Invasion of Alien Plants

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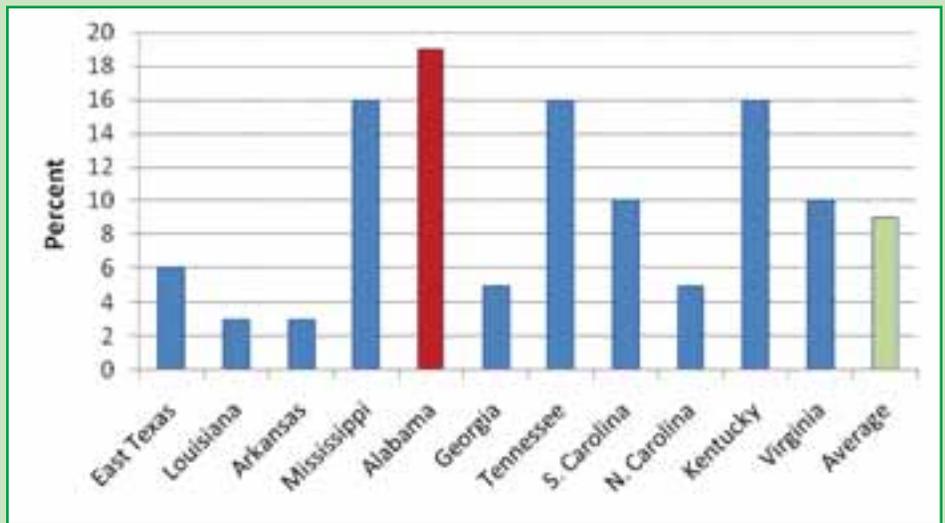
**K**udzu and Chinese privet along Alabama roadways are a familiar sight, and Japanese honeysuckle is so commonplace it has practically become a part of Southern culture. But are these and other invasive plants really having a negative impact on Alabama forests? Just how bad is the invasive plant problem in Alabama? What are the most effective ways to combat invasive plants?

A picture of the severity of the invasive plant problem throughout the Southeast is beginning to emerge from the USDA Forest Service Forest Inventory Analysis (FIA) data. The Forest Service, in partnership with state forestry agencies, began collecting FIA data in the 1930s from plots on all forest ownerships. Each state surveyed timber and growing stock every ten years – like the population census. In the 1990s, state forestry leaders realized that invasive plants were having an increasingly negative impact on forest use and productivity . . . and that more timely information was critically needed. They requested that the Southern Research Station's FIA start adding invasive plants and other forest health threats to their inventory and to also shorten the cycle of survey.

In 2001, FIA state and federal surveyors were trained to identify 40 invasive plants shown in *Nonnative Invasive Plants of Southern Forests*, a publication of the Forest Service. They began collecting data on the presence and cover of these species, along with the usual FIA timber and disturbance data. To shorten the cycle, one-fifth of all plots are now being surveyed on an annual basis (barring critical demands like wildfires), which mean that it takes about five years to complete a state. Alabama is now in its second cycle of FIA data collection. Data analysis from the first cycle is underway, and the results are disturbing.

It's hard to imagine, but the FIA data indicate that over 4 million acres of Alabama's 22.7 million acres of forest lands are covered by one or more invasive plant species. That is to say that 19%, or nearly one-fifth, of our forests are occupied and impacted in multiple ways by invasive plants. According to the current preliminary data summaries, more forest acres are infested in Alabama than in any other southern state. Tennessee, Mississippi, and Kentucky are not far behind, with 16% (two to three million acres) infested; while 5% of Georgia forests are

Figure 1. Nineteen percent of Alabama's forest land is occupied by invasive species, more than any other state in the South. (2001-2006 FIA data)



covered by invasive plants. The average across all southern states is 9% (Figure 1).

These summaries are preliminary because not all states have finished their first complete cycle and extensive data checks are still underway. Also, survey crews vary by states and even with continued training, the identification of invasive plants is new to them, so accuracy may vary. In Alabama alone, 15,500 subplots were surveyed – a heroic effort by the Alabama Forestry Commission associates in partnership with the Forest Service FIA. However, even with this number of plots, the sample is too small to give an accurate picture of species densities for individual counties or for invasive species that are widely scattered.

### Invasive Species of Concern

Beyond a doubt, Japanese honeysuckle (*Lonicera japonica*) is the most widespread and pervasive invasive plant in Southeastern forests (Figure 2). In Alabama alone, nearly three million acres of forest lands have this vine as part of the stand or on edges. Fortunately, it rarely forms exclusive infestations and then only temporarily. It is also an important year-round browse for white-tailed deer and eastern cottontails, and is also eaten by wild turkey, northern bobwhite, and song birds. Thus, this invasive has positive wildlife values unlike most of the other invasive plants. If it were not a preferred winter browse for white-tailed deer, we might very well be up to our ears in honeysuckle!

Chinese privet (*Ligustrum sinense*) and the closely related Japanese and glossy privets (*L. japonicum* and *L. lucidum*, respectively) occupy over one million acres of Alabama's forests (Figure 3). They both do provide fruit and cover for some song

birds and turkey, and limited browse for white-tail deer, but at the high cost of the loss of much of our bottomland hardwood and upland forests. Kudzu (*Pueraria montana*), which typically is confined to forest edges, can be found on over 60,000 acres of forest edges, openings, and along forest roads. This acreage does not include the countless acres of kudzu along highways, abandoned fields, and city lots and edges.

Cogongrass (*Imperata cylindrica*) is an extremely aggressive grass which has quickly become one of the most threatening invasive species in the state because it forms dense and exclusive infestations that are very difficult to control (Figure 4). It has consumed over 43,000 acres of our forest land and continues to spread rapidly - reducing forest productivity, destroying wildlife habitat, presenting a fire danger, and affecting rights-of-way. Based on preliminary data, it is estimated that the spread north from its introduction point near Mobile is at a rate of 2,000 acres a year. This is a conservative estimate of the actual rate of spread of this species, given that these acreage values do not include those along highway rights-of-way and pastures where cogongrass is often found. The cogongrass crisis can be studied in more detail by reading the Cogongrass Conference Proceedings, also known as "A Cogongrass Management Guide," and other articles at [www.cogongrass.org](http://www.cogongrass.org).

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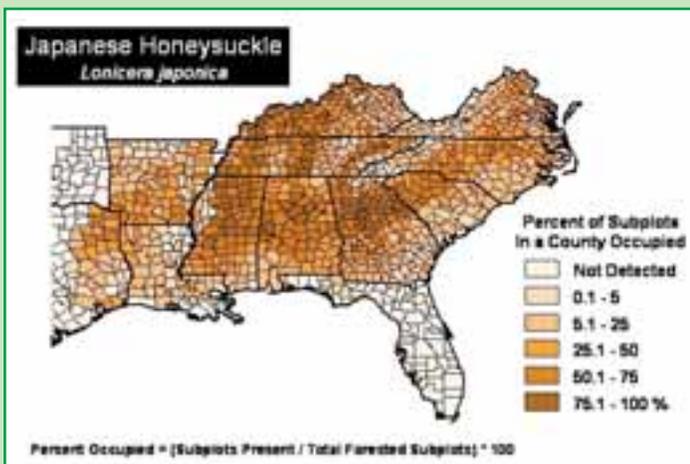


Figure 2. Japanese honeysuckle is the most widespread and pervasive invasive species in forests across Alabama and the Southeast. (2001-2006 FIA data)

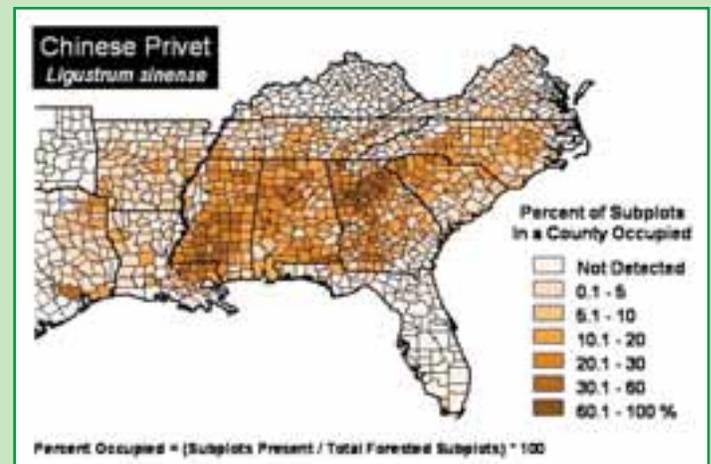


Figure 3. Chinese privet occupies nearly one million acres of Alabama forestland, occurring in every county of the state. (2001-2006 FIA data)

Japanese climbing fern (*Lygodium japonicum*), found on 43,000 acres of Alabama forestland, is another species spreading northward (Figure 5). This perennial fern vine, with distinctive frilly fronds, grows along stream banks and road sides, and often in open woods and pine plantations (Figure 6). An unfortunate result of Japanese climbing fern infestations in pine plantations is that the spores of this plant are often transported in pine straw to homeowners far and wide. Now Japanese climbing fern is becoming common in urban flower beds where the wind-blown spores can easily spread to nearby forests.

Other species of concern in Alabama forests are Chinese tallowtree (popcorn tree), bush honeysuckles, Japanese stiltgrass, Chinese and Japanese wisterias, Chinese and shrubby lespedezas, mimosa, and chinaberry (Table 1).

To view all of the FIA invasive species summaries, visit [srsfia2.fs.fed.us/data\\_center/index.shtml](http://srsfia2.fs.fed.us/data_center/index.shtml) and click on “Nonnative Invasive Plant data tool.”

### Impacts, Prevention, and Control of Invasive Species

This invasion of our forests is of concern because many non-native invasive plants can literally overrun native species, reducing numbers and biodiversity of native plants and the insects, birds and animals that depend on them. Infestations of many invaders can also change the way ecosystems work – altering fire regimes, water and nutrient cycles, soil characteristics, and the regeneration of forests and other natural areas. The economic costs resulting from the loss of forest productivity, wildlife habitat, recreational opportunities, and aesthetic appeal are difficult to estimate, but the final bottom line will certainly be large and the damage rapidly compounding. For example, a simple estimate of reforestation costs for the lands currently

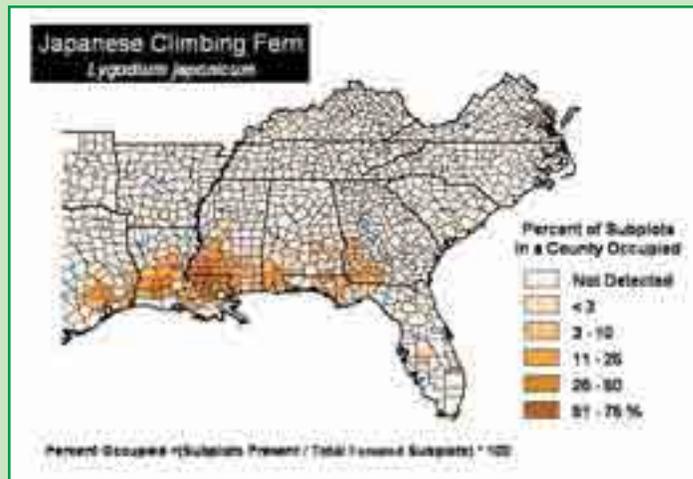


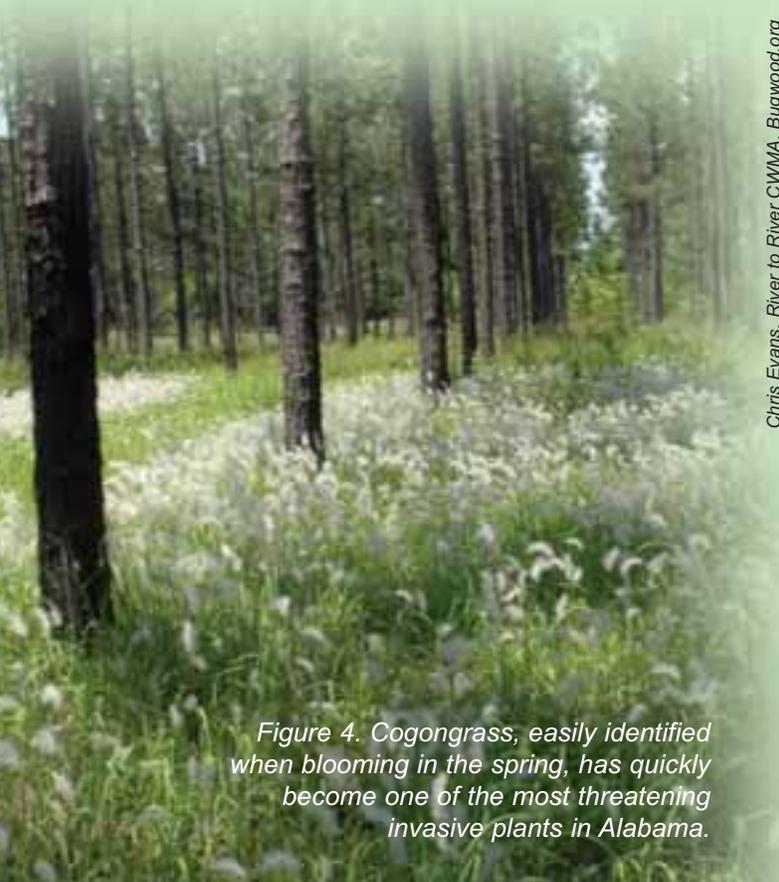
Figure 5. Spreading northward, Japanese climbing fern currently occupies an estimated 43,000 acres of Alabama forestland.

infested with tallowtree, privets, kudzu, wisterias, and cogon-grass – assuming a conservative \$250 per acre for control and planting – would be a staggering quarter of a billion dollars! Furthermore, this economic evaluation does not begin to consider the losses in wildlife habitat and recreational opportunities and other impacts on ecosystem services and the environment.

Given the high costs associated with invasive plants, the best long-term and cost-effective control strategy is to prevent the introduction and establishment of invasive plants in the first place. The initial step in this process is to learn which species are invasive and how to identify them. A list of invasive plants in Alabama can be found on the Alabama Invasive Plant Council webpage ([www.se-eppc.org/alabama](http://www.se-eppc.org/alabama)). The book developed for use by the FIA surveyors, *Nonnative Invasive Plants of Southern Forests*, is also free to the public and is an excellent resource for identification and control of invasive species. Order a copy at (828) 257-4830 or [pubrequest@fs.fed.us](mailto:pubrequest@fs.fed.us). The website [www.invasive.org](http://www.invasive.org) is another valuable resource, with photographs and links to a wealth of additional information.

Armed with knowledge of which species are invasive, strive to avoid the introduction and establishment of these species on your property. Invasive plants can be introduced in several ways. Many invasive species are escaped ornamentals, so be mindful of this when introducing plants to your yard and wildlife plantings. The more rapid invaders arrive by wind-blown seeds or spores. Some are widely scattered by bird- and animal-dispersed seeds. Many invasive plants also migrate along rights-of-way and stream margins. Arrival on infested clothing, equipment, and vehicles is also common. We will have to change our habits to be aware of seeds and roots that might lodge on our vehicles, equipment, dogs, and ourselves, and clean up before leaving infested areas. A number of invasive species continue to be planted by landowners and land managers, as some of these alien plants are still heavily relied upon for cattle forages, hay crops, wildlife plantings, and roadside stabilization. It is important that we begin to use and develop additional non-invasive alternatives for use in these situations.

The first line of defense against infestations is *constant surveillance* of rights-of-way, stream banks, internal roads and trails, and other disturbed areas for any new arrivals. With the



Chris Evans, River to River CWMA, Bugwood.org

Figure 4. Cogon grass, easily identified when blooming in the spring, has quickly become one of the most threatening invasive plants in Alabama.

<b>SPECIES (common name)</b>	<b>ALABAMA ACRES</b>
Japanese honeysuckle	2,922,547
Chinese privet	902,215
Glossy privet	144,094
Kudzu	61,295
Cogongrass	43,889
Japanese climbing fern	43,709
Mimosa (silktree)	34,945
Chinese tallowtree (popcorn tree)	22,505
Non-native roses	20,837
Japanese stiltgrass (Nepalese browntop)	15,482
Chinese and shrubby lespedezas	13,257
Chinese and Japanese wisterias	12,380

*Table 1. Summary data from the 2001-2006 Forest Inventory Analysis (FIA) reveals acres of Alabama forestland occupied by various invasive species.*

first sign of an unwelcome plant, effective control measures should be started, or spread is inevitable. Early detection and treatment on your forestlands will minimize the effort and cost that comes with treating well-established plants or full-blown infestations.

Most exotic invasive plants are perennials, having extensive tough roots and runners. This means that effective herbicide applications offer the best means of containment or eradication, because herbicides can kill roots and do so without exposing the soil to erosion.

To be successful, the most effective herbicide for the species should be used. It should be applied using a correct method, and applied during an optimum time period.

Read and thoroughly understand the herbicide label and its prohibitions before and during use. Many herbicides and some target plants require the addition of a non-ionic surfactant to the spray tank to be effective. Other important points are to always use clean water and mix your spray solution thoroughly before applying. If possible, forgo applications during periods of severe drought as herbicide effectiveness can be greatly reduced during these times. And, always wear the personal protective equipment prescribed on the label or in supplementary materials.

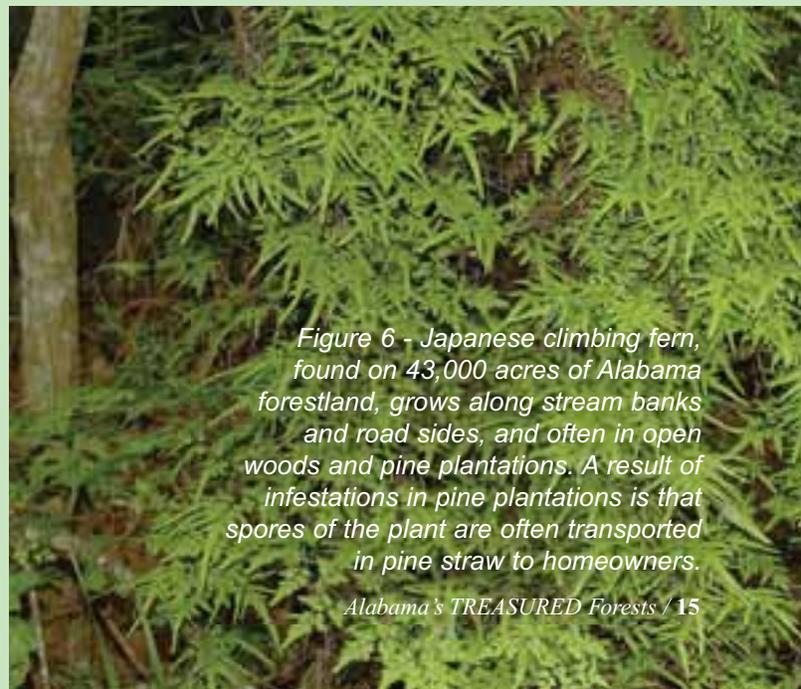
Mechanical treatments and prescribed burning can assist eradication measures, but are limited in effectiveness. Intensive grazing is one way to reduce the vigor of palatable alien plants like kudzu, but this rarely yields eradication and may spread seeds (now occurring with tropical soda apple). Prescribed burning does not control roots or runners and usually only kills the small shoots, providing only temporary above-ground control. Mechanical root raking and disking can actually spread or

aggravate a problem when dealing with plants having runners, by chopping these into re-sprouting segments. However, root raking, piling, and burning may be the only way to start controlling dense infestations of multiple woody invasive species. Small infestations may be handled by hand pulling, grubbing with a stout hoe, or by using the newly-introduced weed wrenches.

Although generally ineffective by themselves, both mechanical and burning treatments have a place in integrated pest management programs. Invasive shrubs and vines that are top-killed by burning will re-grow and can be more easily reached by herbicide foliar sprays, the most cost-effective way to use herbicides. It is critical, however, that herbicide applications following burning or disking be delayed to permit adequate re-sprouting of target plants for maximum herbicide uptake and effectiveness. Prescribed burning can also stimulate seed germination of troublesome plants, permitting effective herbicide control of germinants. Burning can be used to prepare the site for effective herbicide applications by clearing debris and revealing application hazards, such as old wells and pits. Additionally, mechanical and burning treatments can boost the effectiveness of herbicide treatments by killing herbicide-weakened plants. Disking and root raking can dislodge herbicide-damaged woody roots and large runners, leaving them to dry and rot.

When using mechanical and burning treatments, it is important to take steps to prevent erosion. For example, burning in late winter or during spring leaf-out minimizes the period of bare soil. It should also be recognized that because prescribed burning can expose soils, burning can actually facilitate establishment and spread of some invasive species like cogongrass and Japanese climbing fern.

An eradication program for infestations of troublesome plants usually takes several years, followed by years of surveillance to watch for re-growth or new invasions – a potentially daunting task. However, through a combination of prevention, regular monitoring, and persistent control efforts, you can protect your lands and the lands you manage from being choked out by alien plants. In this way, forest productivity, wildlife habitat, native plants, and Alabama’s natural heritage can be safeguarded from the threat of invasive plants and our children will not inherit a legacy of degraded lands and forests. 🌳



*Figure 6 - Japanese climbing fern, found on 43,000 acres of Alabama forestland, grows along stream banks and road sides, and often in open woods and pine plantations. A result of infestations in pine plantations is that spores of the plant are often transported in pine straw to homeowners.*