

Current condition and extent of major invasive species in the southern forest lands

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Introduction

Over 215 million forested acres, nearly 30% of the total in the United States, are located in the South. Southern forests are characterized by diverse and rich species and genetic resources and high productivity. As elsewhere in the country, southern forests are experiencing increasing invasion, spread and establishment of non-native invasive species, the single most daunting threat to southern forests compared to all others combined because they displace native species, change the fundamental forest structure and functionality (OTA 1993, NISC 2001).

Currently about 650 non-native plant species are found in the southern forests (Evans et al. 2006). Eighteen species from the southern FIA database were included in the study, which may pose potentially severe threats to southern forests because of their rapid spread rate, population size and/or negative impact on forest ecosystem integrity and health and native species diversity. This self-support project visually displays current condition and extent of eighteen selected species in southern forests through the risk maps generated based on FIA plots.

Data and Methods

Over nineteen thousands of FIA plots measured from year 2002 through 2007 in twelve southeast states (Arkansas, Alabama, Georgia, south Carolina, North Carolina, Virginia, Tennessee, Kentucky, Mississippi, Florida, Louisiana, Texas (eastern part)) were included in the study. All FIA plots were spatially referenced by their latitude and longitude and identified as either presence (1) with or absence (0) from a species. The risk of a species within a region or on a spatial location was computed as the proportion of the presence plots. Gaussian kernel density was used to estimate the risk of a species on a location with the standard deviation of the Gaussian kernel determined through a cross-validation process.

Table 1. Major non-native invasive species in the southern forest lands

Name	presence probability (%) in 2001-2007 FIA plots
Trees:	
Tallow tree (Scientific name?)	5.8
Tree of heaven (?)	3.7
Mimosa	3.0
Chinaberrytree	1.9
Princesstree	0.9
Shrubs:	
Chinese European privet	30.1
Japanese glossy privet	4.5
Bush honeysuckles	3.3
Autumn Olive	1.4
Vines:	
Japanese honeysuckles	76.9
Japanese climbing fern	6.5
Kudzu	1.4
Grasses:	
Nepalese browntop	6.2
Tall fescue	5.7
Cogongrass	0.4
Forbs:	
Chinese lespedeza	7.3

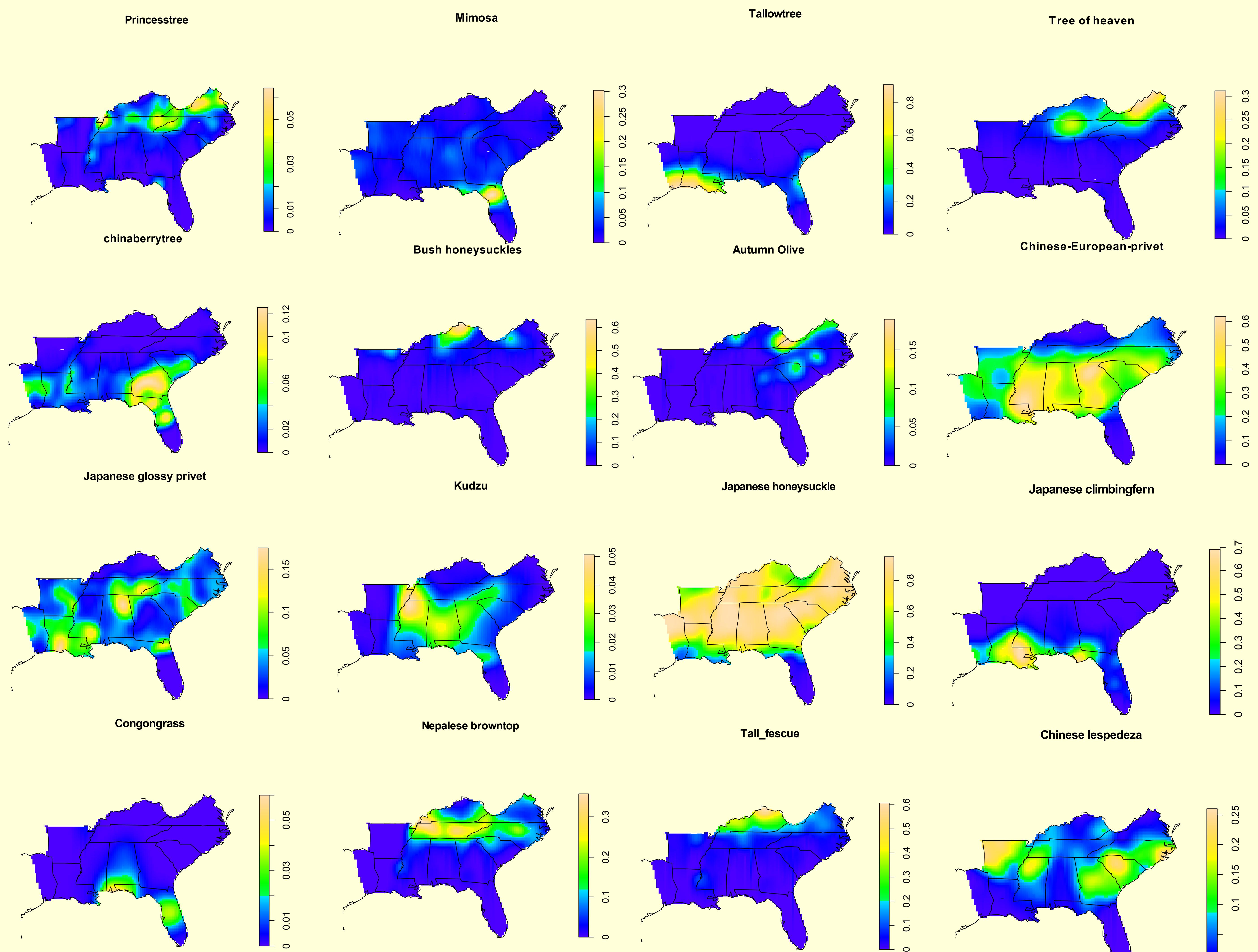


Figure 1. Risk (0-1) maps showing current condition and extent of major nonnative invasive species in the southern forest lands.

Retention of current and potential cavity trees in timber harvest

Based on the overall presence probability (Table 1) and risk maps (Figure 1) sixteen selected invasive species were coarsely classified into four groups: 1) regionally prevalent species (overall presence probability > 30% and species widely distribute over the southern region), which include Japanese honeysuckle and Chinese-European privet; 2) locally prevalent species (Species concentrate locally with one hotspot of risk>0.5, overall presence probability>3%,but ≤10%), which include Tallow tree, Bush honeysuckles, Mimosa, Japanese climbing fern and Tall fescue; 3) regionally spreading species (Species have more than hot spots of risk>0.1,but ≤0.5,overall presence probability >3%,but ≤10%), which include Chinese lespedeza, Nepalese browntop, Tree of heaven and Japanese glossy privet; 4) regionally introducing species (Species have more than hot spots of risk ≤ 0.1,overall presence probability <3%), which include Kudzu, Congongrass, Chinaberrytree, Autumn olive, and Princesstree.

Our future work will be to identify and quantify geographical, ecological and socio-economic factors that affect the invasion, establishment/reproduction and spread of major invasive species in southern forests and develop hierarchical geospatial and socio-ecological models to monitor, predict and map the extent, spread rate and condition of invasive species in finer scales. We welcome any kinds of opportunities, support, input and collaboration from those who are interested in the topic of invasive species (email Joseph Fan at zfan@cfr.msstate.edu or call 662-325-5809 or contact the coauthors of this poster).

Cited papers:

- Evans, G.W., Moorehead, D.J., Bergeron, C.T., and Douce, G.K. 2006. Invasive plant responses to silvicultural practices in the South. The Bugwood Network, BW-200603. The University of Georgia.
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