

Invasive Plants Found in Oklahoma's Forests, 2010

Sonja N. Oswalt and Christopher M. Oswalt

Introduction

This science update provides an overview of nonnative invasive plants found in Oklahoma forests based on an annual inventory conducted by the Forest Inventory and Analysis (FIA) Program at the Southern Research Station (SRS) of the U.S. Department of Agriculture Forest Service in cooperation with the Oklahoma Forestry Services. These estimates and coverage maps will be updated periodically. For more information regarding past inventory reports for Oklahoma, inventory program information, field sampling methodology, and estimation procedures, please refer to the citations at the end of this report.

Foresters and ecologists have noted the spread of nonnative invasive species onto U.S. forest land for decades. Despite soaring costs and inestimable environmental impacts, nonnative invasive species continue to spread across managed and natural forests. This update describes current results from Oklahoma survey year 2010, and provides graphic

illustrations of where invasive plants are being observed in forests across the State of Oklahoma. Observations of nonnative invasive plants include only those plants on the southern FIA invasive plants "watch list" which in this case contains 33 plant species regionally recognized as problematic nonnative invasive plants.

Findings

Invasive plants were detected on 595 plots across the State, or 43 percent of all forested plots measured (fig. 1). The maximum number of the surveyed nonnative invasive species detected on an individual plot was five, which occurred on <1 percent (three plots) of forested plots (table 1). Approximately 57 percent of invaded plots contained only one invasive plant from the SRS FIA "watch list," while 85 percent of invaded plots contained only one or two invasive plants (table 1).

FOREST INVENTORY & ANALYSIS FACTSHEET



Japanese honeysuckle. (photo courtesy of Chris Evans, Bugwood.org)

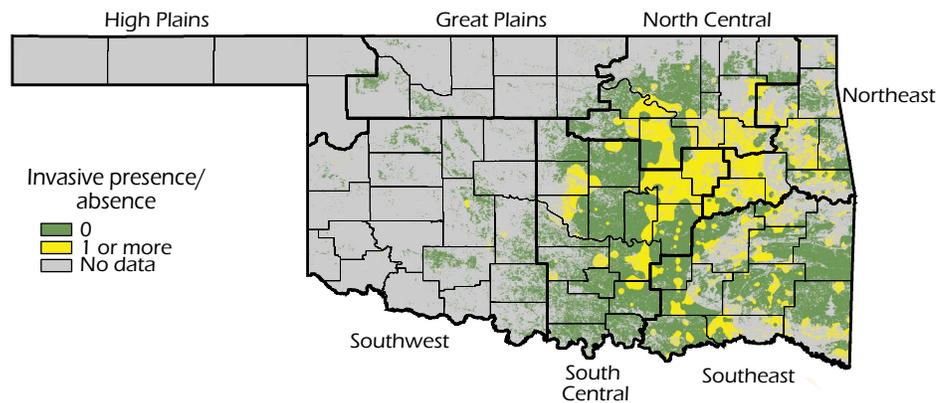


Figure 1—Presence/absence of invasive species on Oklahoma forest land, statewide, 2010.

Table 1—Invasive species on Oklahoma forest land—number of species detections and the number and percent of plots on which they occur, 2010

Number of unique species detected ^a	South-east	North-east	North Central	South Central	South-west	High Plains	Great Plains	Total of invaded plots	Invaded plots ^b
	number of plots							percent	
1	202	71	23	33	8	—	1	338	24
2	90	51	7	15	2	—	—	165	12
3	29	28	4	3	—	—	—	64	5
4	8	17	—	—	—	—	—	25	2
5	2	—	—	—	—	1	—	3	<1
Total invaded plots (all species)	331	167	34	51	10	1	1	595	
Percent of all sampled plots	42	58	52	42	11	14	5	43	
Total number of sampled plots	788	287	66	121	91	7	21	1,381	

— = no data for the cell.

^aUp to 4 unique species may be noted per subplot, for a total possibility of 16 unique species per complete plot.

^bPercent of survey plots with the listed number of unique species, out of 1,381.



Southern Research Station

e-Science Update SRS-102 August 2014



Very few plots contained more than two invasive plants from the SRS FIA “watch list.” Forests in the Northeast unit exhibited the highest frequency of invasion, with 58 percent of sampled plots containing at least one invasive plant. Forests in the plains (High Plains and Great Plains units), albeit very limited, were less likely to contain invasive forest plants, with <10 percent of plots containing at least one invasive plant across both units combined.

The concentration of nonnative invasive plants appears highest within the central portion of the forested eastern half of the State (fig. 1). While Japanese honeysuckle (*Lonicera japonica*) is the most common monitored invasive plant in all other southern States, nonnative roses (*Rosa* spp.) are observed more frequently than any other monitored invasive plant in Oklahoma (table 2). Factors such as land use, differences in overall species richness, site productivity, length of growing season, forest-type characteristics, or other environmental differences (e.g., soil, moisture, temperature, precipitation, elevation, aspect) can all contribute to differences in the presence of individual invasive plant species.

Nonnative roses, Chinese lespedeza (*Lespedeza cuneata*), and Japanese honeysuckle were all detected on at least 15 percent of all monitored forested plots (17, 16, and 15 percent, respectively). Nonnative roses were the most frequently detected nonnative species group in Oklahoma (table 2). This rapidly invading shrub was found on 17 percent of all forested plots surveyed, and 39 percent of all plots containing an invasive species.

On average, nonnative roses covered only 4 percent of forested subplots where the group was observed. Chinese lespedeza and Japanese honeysuckle foliage covered 10 percent and 14 percent of the subplots on which they were found. The Chinese/European privet (*Ligustrum sinense*/*L. vulgare*), as a group, was the fourth most frequently detected species/group, and was noted on 10 percent of measured plots, with an average percent cover of approximately 7 percent on subplots where it was detected. Shrubby lespedeza (*Lespedeza bicolor*) and tall fescue (*Lolium arundinaceum*) were the only other invasive plants from the SRS FIA “watch list” found on at least 3 percent of sampled plots (Note: the USDA PLANTS database and the North American Plant Atlas of the Biota of North America Program indicate very limited distribution of *L. bicolor* in Oklahoma). Thirteen other species were found on <2 percent of sampled plots each (table 2).

Invasive shrubs, primarily nonnative roses, were the most frequently detected invasive plant life form (table 3) and were found on 28 percent of all forested plots. Invasive forbs were found on 21 percent of all forested plots, while invasive vines were found on 15 percent, invasive grasses were found on 4 percent, and invasive trees were found on only 3 percent of all forested plots.

Invasive trees were noted primarily in eastern Oklahoma (fig. 2). An estimated 86 percent of all plots with invasive trees were located in the Southeast and Northeast units combined (table 3). Mimosa (*Albizia julibrissin*) was the most frequently detected invasive tree across the State and found on a significantly higher number of plots than any other invasive tree monitored (mimosa found on 25 plots, Tree-of-heaven (*Ailanthus altissima*) found on 9 plots, and paulownia (*Paulownia tomentosa*) and Chinaberry (*Melia azedarach*) found on only 1 plot each). Japanese honeysuckle was the most commonly detected vine (fig. 3) and was recorded on 16, 17, 18, 10, 22, and 14 percent of forested plots in the Southeast, Northeast, South Central, Southwest, High Plains, and Great Plains units, respectively. Nonnative roses, as a group, were clearly the most frequently detected shrubs (fig. 4) on Oklahoma forest land. However, Chinese and European privet, as a group, occupied more plots in the Southwest unit (only three plots versus two plots occupied by nonnative roses).

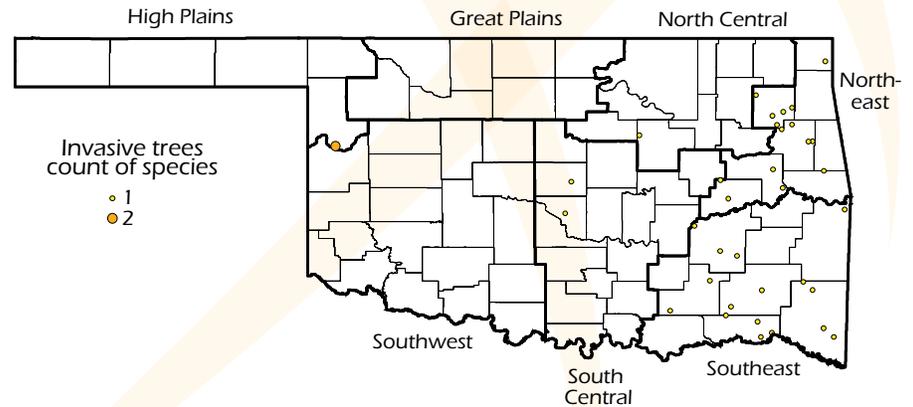


Figure 2—Number of invasive trees on plots, Oklahoma, 2010.

Table 2—Invasive species detected on Oklahoma forest land with frequency of plot detections and mean percent subplot cover, 2010

Common name	Scientific name	Plot detections	Mean percent subplot cover
Nonnative roses	<i>Rosa</i> spp.	234	4
Chinese lespedeza	<i>Lespedeza cuneata</i>	217	10
Japanese honeysuckle	<i>Lonicera japonica</i>	204	14
Chinese/European privet	<i>Ligustrum sinense</i> / <i>L. vulgare</i>	133	7
Shrubby lespedeza	<i>Lespedeza bicolor</i>	69	5
Tall fescue	<i>Lolium arundinaceum</i>	44	8
Silktree, Mimosa	<i>Albizia julibrissin</i>	25	5
Tree-of-heaven	<i>Ailanthus altissima</i>	9	10
Japanese/glossy privet	<i>Ligustrum japonicum</i> / <i>L. lucidum</i>	9	7
Nepalese browntop	<i>Microstegium vimineum</i>	9	30
Bush honeysuckles	<i>Lonicera</i> spp.	7	12
Tropical soda apple	<i>Solanum viarum</i>	5	1
Nonnative climbing yams-air yam/Chinese yam	<i>Dioscorea bulbifera</i> / <i>D. oppositifolia</i>	3	2
Wintercreeper	<i>Euonymus fortunei</i>	2	3
Princesstree, Royal paulownia	<i>Paulownia tomentosa</i>	1	30
Chinaberry	<i>Melia azedarach</i>	1	<1
Winged euonymus	<i>Euonymus alata</i>	1	5
Kudzu	<i>Pueraria Montana</i> var. <i>lobata</i>	1	18
Giant reed	<i>Arundo donax</i>	1	25

Table 3—Invasive species detected on Oklahoma forest land by FIA unit and invasive plant life form, 2010

Life form	South-east	North-east	North Central	South Central	South-west	High Plains	Great Plains	Total
Trees	16	15	1	2	0	2	0	36
Shrubs	205	107	25	40	5	1	1	384
Vines	128	54	12	12	2	2	0	210
Grasses	17	34		2	1	0	0	54
Forbs	145	115	11	16	4	0	0	291

While invasive grasses (fig. 5) were not observed on forest lands within the State with the same frequency as other life forms, tall fescue was observed, primarily in the east, with enough frequency to warrant attention. Tall fescue was observed on 12 percent of sampled plots in the Northeast unit. Invasive forbs (fig. 6), particularly Chinese lespedeza and shrubby lespedeza, are sometimes found occupying the same plot.

Conclusions

Invasive species are common on forested plots across the State of Oklahoma. The prevalence of invasive plants on Oklahoma forest land illustrates the need for public education regarding the ecological and economic costs of invasive plants, and the need for concentrated control and management efforts for invasive plants.

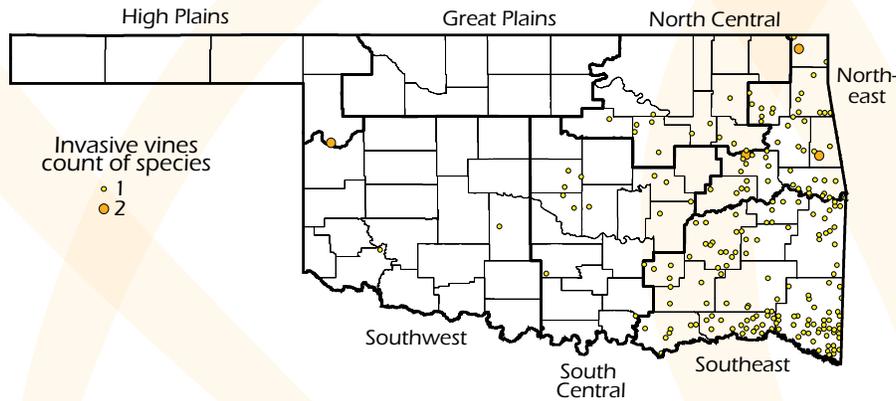


Figure 3—Number of invasive vines on plots, Oklahoma, 2010.

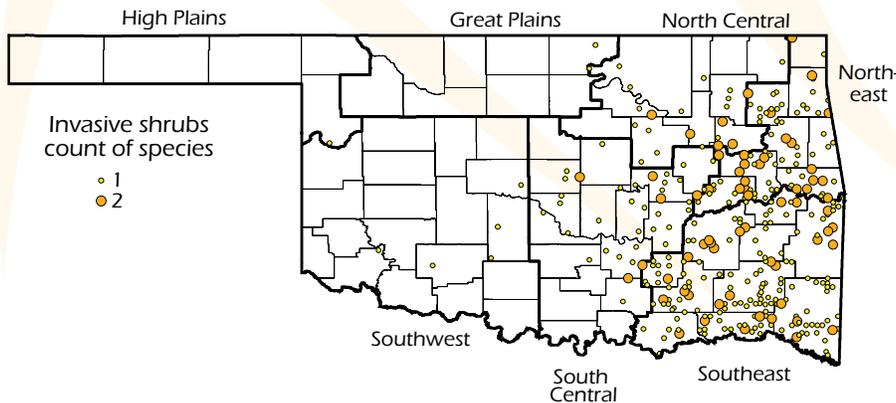


Figure 4—Number of invasive shrubs on plots, Oklahoma, 2010.

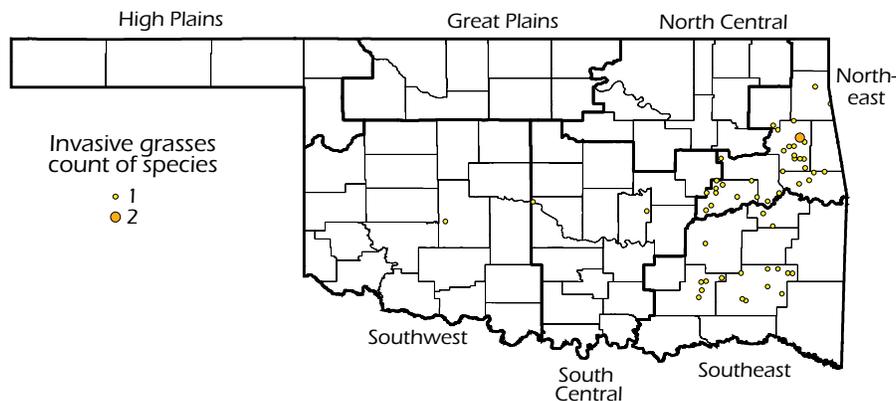


Figure 5—Number of invasive grasses on plots, Oklahoma, 2010.

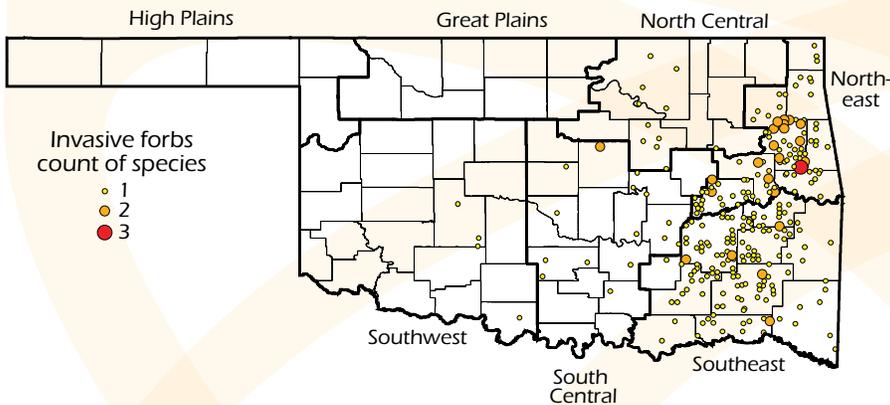


Figure 6—Number of invasive forbs on plots, Oklahoma, 2010.

FIA Program Information

Bechtold, W.A.; Patterson, P.L., eds. 2005. The enhanced forest inventory and analysis program: national sampling design and estimation procedures. Gen. Tech. Rep. SRS-80. Asheville, NC: U.S. Department of Agriculture Forest Service, Southern Research Station. 85 p.

Smith, W.B. 2002. Forest inventory and analysis: a national inventory and monitoring program. *Environmental Pollution*. 116: 233–242.

U.S. Department of Agriculture Forest Service. 2005. Forest inventory and analysis national core field guide. Field data collection procedures for phase 2 plots. Version 3.0. Vol. 1. Arlington, VA: U.S. Department of Agriculture Forest Service, Forest Inventory and Analysis Program. <http://fia.fs.fed.us/library/field-guides-methods-proc/>. [Date accessed unknown].



How do you rate this publication?
Scan this code to submit your feedback or
go to www.srs.fs.usda.gov/pubeval

You may request additional copies of this
publication by email at pubrequest@fs.fed.us
Please limit requests to two per individual.

Additional Oklahoma Information

Cooper, J.A. 2013. Oklahoma, 2011—forest inventory and analysis factsheet. e-Science Update SRS-066. Asheville, NC: U.S. Department of Agriculture Forest Service, Southern Research Station. 5 p.

Harper, R.A.; Johnson, T.G. 2012. Forest resources of East Oklahoma, 2008. Resour. Bull. SRS-187. Asheville, NC: U.S. Department of Agriculture Forest Service, Southern Research Station. 112 p.

Miller, J.H.; Chambliss, E.B.; Loewenstein, N.J. 2010. A field guide for the identification of invasive plants in southern forests. Gen. Tech. Rep. SRS-119. Asheville, NC: U.S. Department of Agriculture Forest Service, Southern Research Station. 126 p. <http://www.srs.fs.usda.gov/pubs/35292> and <http://wiki.bugwood.org/Archive:IPSF>.

Miller, J.H.; Manning, S.; Enloe, S.F. 2010. A management guide for invasive plants in southern forests. Gen. Tech. Rep. SRS-131. Asheville, NC: U.S. Department of Agriculture Forest Service, Southern Research Station. 120 p. <http://www.srs.fs.usda.gov/pubs/36915> and <http://wiki.bugwood.org/Invplantmgmt>.

How to Cite this Publication

Oswalt, Sonja N.; Oswalt, Christopher M. 2014. Invasive plants found in Oklahoma's forests, 2010—forest inventory and analysis factsheet. e-Science Update SRS-102. Asheville, NC: U.S. Department of Agriculture Forest Service, Southern Research Station. 4 p.

Tree-of-heaven (*Ailanthus altissima*). (photo by David J. Moorhead, University of Georgia, Bugwood.org)

Contact Information

Sonja Oswalt, Forester
Forest Inventory and Analysis
Southern Research Station, USDA Forest Service
4700 Old Kingston Pike
Knoxville, TN 37919
Phone: 865-862-2058 / Fax: 865-862-0262
Email: soswalt@fs.fed.us
Southern FIA: <http://srsfia2.fs.fed.us>
National FIA: <http://fia.fs.fed.us>

Christopher Oswalt, Research Forester
Forest Inventory and Analysis
Southern Research Station, USDA Forest Service
4700 Old Kingston Pike
Knoxville, TN 37919
Phone: 865-862-2068 / Fax: 865-862-0262
Email: coswalt@fs.fed.us
Southern FIA: <http://srsfia2.fs.fed.us>
National FIA: <http://fia.fs.fed.us>



The Forest Service, U.S. Department of Agriculture (USDA), is dedicated to the principle of multiple use management of the Nation's forest resources for sustained yields of wood, water, forage, wildlife, and recreation. Through forestry research, cooperation with the States and private forest owners, and management of the National Forests and National Grasslands, it strives—as directed by Congress—to provide increasingly greater service to a growing Nation.

The USDA prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD).

To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, SW, Washington, DC 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.