



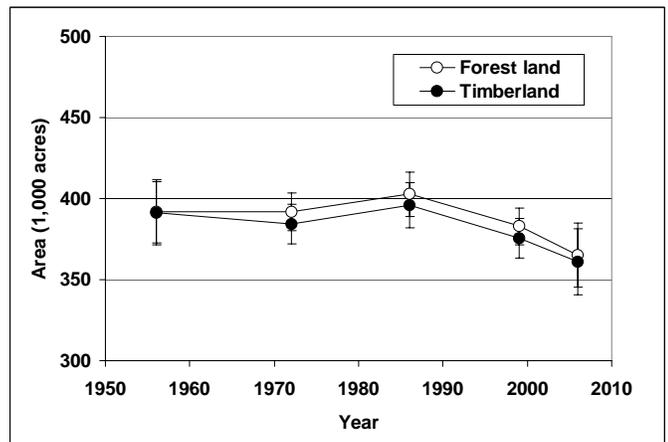
# Delaware's Forest Resources, 2006

Research Note NRS-27

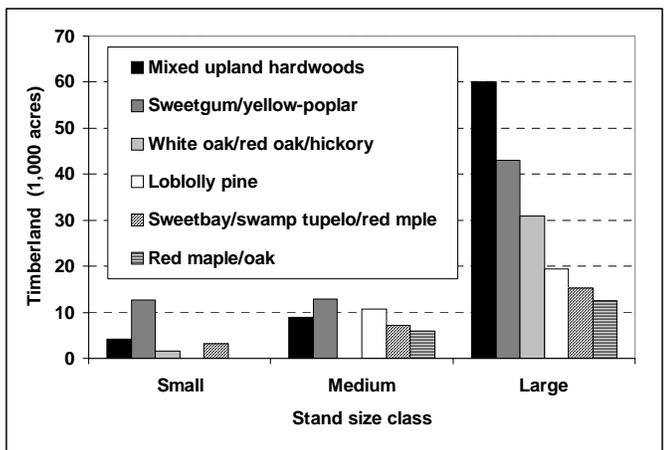
This publication provides an overview of forest resource attributes for this state based on an annual inventory conducted by the Forest Inventory and Analysis (FIA) program at the Northern Research Station of the U.S. Forest Service. These annual estimates, along with web-posted core tables, will be updated annually. For more information regarding past inventory reports for this state, inventory program information, and sampling/estimation procedures, please refer to the citations at the end of this report.

**Table 1. – Annual estimates and uncertainty**

	Estimate	Sampling error (%)
<b>Forest Land Estimates</b>		
Area (1,000 acres)	365.1	5.4
Number of live trees 1-inch diameter or larger (million trees)	235.3	10.5
Dry biomass of live trees 1-inch diameter or larger (1,000 tons)	25,673.6	7.1
Net volume in live trees (1,000,000 ft <sup>3</sup> )	798.4	7.9
Net volume of growing-stock trees (1,000,000 ft <sup>3</sup> )	781.4	8.0
Annual net growth of live trees (1,000 ft <sup>3</sup> /year)	27,379.8	13.8
Annual mortality of live trees (1,000 ft <sup>3</sup> /year)	4,098.4	28.0
Annual removals of live trees (1,000 ft <sup>3</sup> /year)	11,385.3	59.4
<b>Timberland Estimates</b>		
Area (1,000 acres)	360.9	5.6
Number of live trees 1-inch diameter or larger (million trees)	234.7	10.6
Biomass of live trees 1-inch diameter or larger (1,000 tons)	25,111.5	7.4
Net volume in live trees (1,000,000 ft <sup>3</sup> )	774.9	8.2
Net volume of growing-stock trees (1,000,000 ft <sup>3</sup> )	758.0	8.2
Annual net growth of growing-stock trees (1,000 ft <sup>3</sup> /year)	25,444.0	14.4
Annual mortality of growing-stock trees (1,000 ft <sup>3</sup> /year)	3,189.0	28.8
Annual removals of growing-stock trees (1,000 ft <sup>3</sup> /year)	10,347.0	60.3



**Figure 1. – Area of timberland and forest land by year.**



**Figure 2. – Area of timberland for top six forest types by stand size class.**



Table 2. – Top 10 species by statewide volume estimates

Rank	Species	Volume of live trees on timberland (1,000,000 ft <sup>3</sup> )	Sampling error (%)	Volume of sawtimber trees on timberland (1,000,000 bd ft)	Sampling error (%)
1	Red maple	195.4	14.9	626.6	19.7
2	Sweetgum	120.0	18.7	408.5	22.3
3	Loblolly pine	80.0	24.9	270.5	27.8
4	Yellow-poplar	66.2	46.6	306.6	54.5
5	White oak	47.1	23.0	171.7	26.7
6	Willow oak	45.1	44.7	213.8	47.5
7	Blackgum	34.1	21.0	89.7	30.1
8	Southern red oak	27.8	25.5	98.5	29.0
9	Scarlet oak	26.5	40.8	113.2	42.4
10	Virginia pine	16.3	43.6	57.0	52.2
	Other softwood species	2.9	97.9	9.8	108.9
	Other hardwood species	113.6	14.7	276.8	20.8
	All species	774.9	8.2	2,642.7	10.6

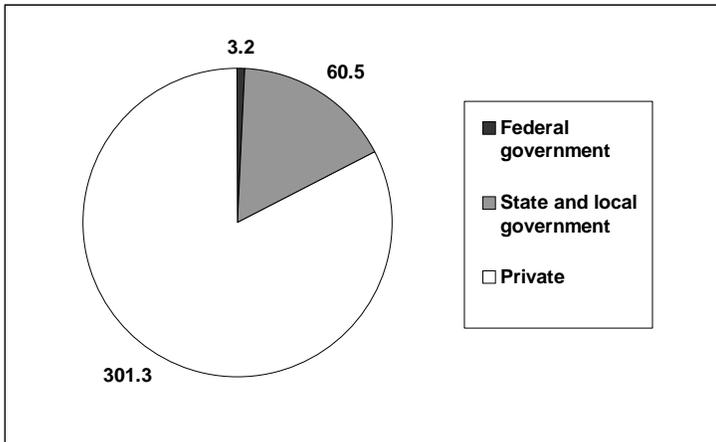


Figure 3. – Area of forest land (1,000 acres) by ownership group.

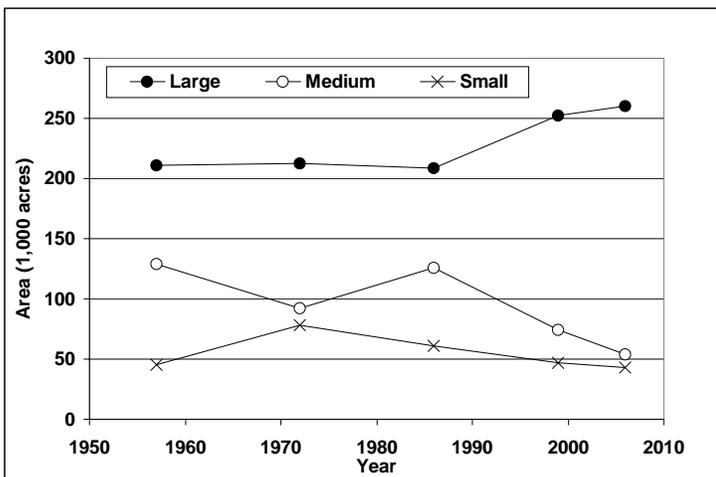


Figure 4. – Area of timberland by stand size class and year.



## Delaware Issue Update – Vegetation Diversity Data and Nonnative Species

As part of the Phase 3 forest health indicators, FIA collects vegetation diversity data on a subset of standard inventory plots. On these plots, FIA records the species of all vascular plants and estimates their percent cover. The data are used to generate species diversity indices and to provide information about the distribution of native and introduced species. In Delaware, FIA collected vegetation on 66 plots, and recorded 413 unique species. The most commonly observed species was red maple, which was present on 95 percent of the sampled plots.

Delaware is becoming more urbanized with a nearly 14 percent increase in the total urban land area from 1992 to 1997. One potential consequence of having forest land in close proximity to urban development is an increased presence of introduced and potentially invasive species. Sixty-six percent of the survey plots in Delaware had at least one introduced species. By far, the most common was Japanese honeysuckle, which was present on 37 vegetation plots (Fig. 5). This species, along with the second most common introduced species, multiflora rose, is listed among the most troublesome invasive species in the state of Delaware.

The distribution of vegetation plots, their species richness and the proportion of introduced species found on them is shown in Figure 6. This type of analysis of the relationships among variables such as species richness and composition, and anthropogenic factors (e.g., urban interface, road density and fragmentation information), can help us understand the effects that humans might have on the State's forests. The relationship between percent introduced species and housing and population density data in Delaware suggest that where there are higher human populations there are more introduced species. The data, however, show no clear relationship between the proportion of introduced species and proximity to urban areas or roads. We will continue to research this important issue as more data become available.

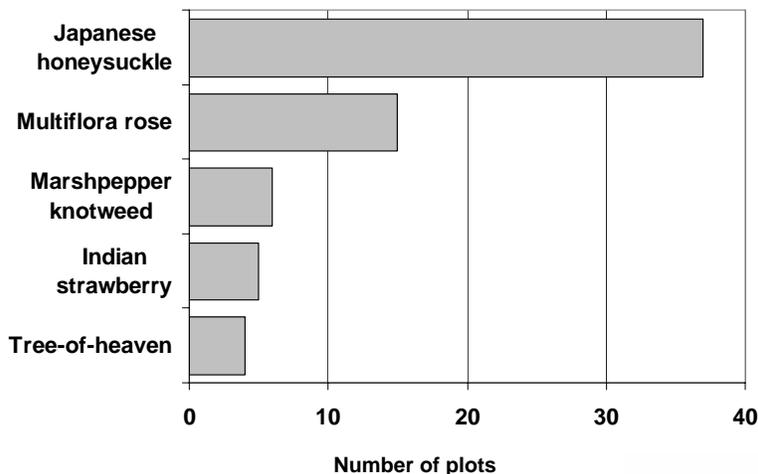


Figure 5. – Most common introduced species by plot count.

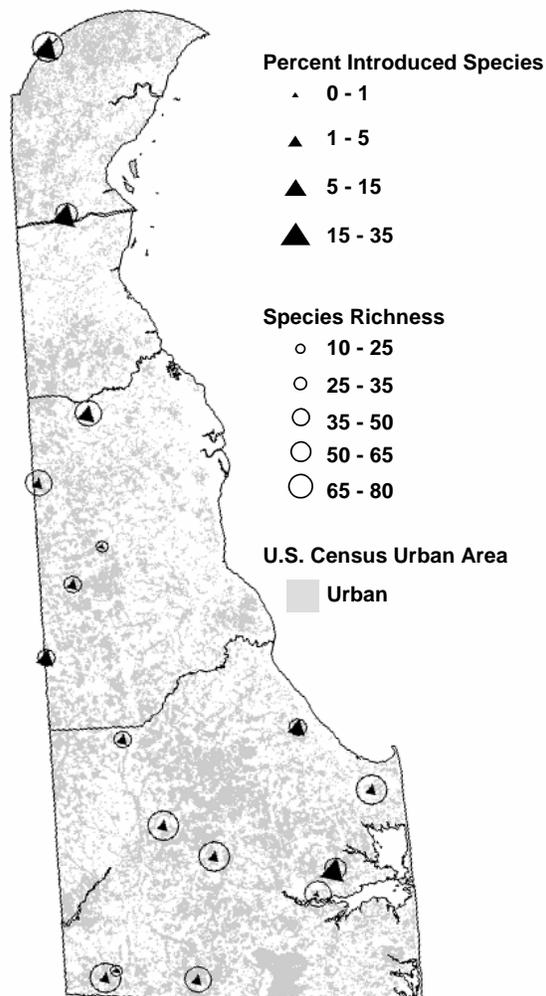


Figure 6. – Proportion of introduced species and overall species richness on FIA vegetation plots, overlaid on U.S. Census 2000 designated urban areas. Only fully forested plots are shown.



### Citation for this Publication

Lister, T.W.; Gladders, G. 2008. Delaware's forest resources, 2006. Res. Note. NRS-27. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. 4 p.

### FIA Program Information

Bechtold, W.A.; Patterson, P.L. 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.

USDA Forest Service. 2005. Forest inventory and national core field guide, field data collection procedures for phase 3 indicators, Ver. 3.0 [Online]. Available at [www.fia.fs.fed.us/library/field-guides-methods-proc](http://www.fia.fs.fed.us/library/field-guides-methods-proc) (verified 8 Aug 2008).

USDA Forest Service. 2004. Forest inventory and national core field guide, Vol. 1, field data collection procedures for phase 2 plots, Ver. 2.0 [Online]. Available at [www.fia.fs.fed.us/library/field-guides-methods-proc](http://www.fia.fs.fed.us/library/field-guides-methods-proc) (verified 8 Aug 2008).

### Additional Delaware Inventory Information

Ferguson, R.H. 1959. The timber resources of Delaware. A report on the forest survey made by the U.S. Forest Service. [Unnumbered publication.] Upper Darby, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station. 30 p.

Ferguson, R.H.; Mayer, Carl E. 1974. The timber resources of Delaware. Resour. Bull. NE-32. Upper Darby, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station. 42 p.

Frieswyk, T.S.; DiGiovanni, D.M. 1989. Forest statistics for Delaware-1972 and 1986. Resour. Bull. NE 109. Broomall, PA: US. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station. 86 p.

Griffith, D.M.; Widmann, R.H. 2001. Forest statistics for Delaware: 1986 and 1999. Resour. Bull. NE-151. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northeastern Research Station. 58 p.

The U.S. Department of Agriculture (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 alternate 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, S.W., Washington, DC 20250-9410, or call (800)795-3272 (voice) or (202)720-6382 (TDD). USDA is an equal opportunity provider and employer.