

Indiana's Street Tree Species Distribution

Street trees generate benefits by increasing energy conservation, stormwater management, air quality improvements, carbon dioxide sequestration, property values, and social benefits. The Indiana DNR, Division of Forestry, Community and Urban Forestry statewide sample inventory project suggests there are 243 distinct tree species along Indiana's municipally managed streets. Collectively, Indiana communities have a good mix of trees along their streets; however, many of these street tree populations are heavily concentrated towards a single species—silver maple. In combining 23 communities' tree populations, the percentage of silver maple and the benefits its population provide are by far the greatest:

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Silver maple composes approximately 18% (58,935 street trees) of the sample communities' total estimated population (326,788 street trees).
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The value of the benefits provided by silver maple is approximately 27% (\$7.9 million) of the \$30 million in total benefits provided by all street trees from the sample communities.

To reduce Indiana's dependence on silver maple for shade and benefits and to guard against future catastrophic losses in urban trees, a goal for improving species distributions must be established. Planting underutilized yet high benefit-producing tree species will help spread the contribution of benefits across a larger mix of species. The list provided in Table 1 includes suggested species that are large-growing and are well suited for planting along Indiana's community streets. Replacing over-utilized species, such as silver maple and other maples, with a greater mix of large-growing trees will help improve species distribution and reduce the impact of species- and genus-specific pests or disease. Silver maple constitutes 18% of the estimated population and the genus maple comprises 34% of the population. Planting other large-growing trees that perform well as street trees will result in a more sustainable flow of benefits for future generations.

There is a concern for the sustainability of Indiana's street tree populations and the corresponding environmental and economic benefits they provide. Heavy concentrations of a single species and/or genus among a population put those benefits at risk from catastrophic events such as storms, drought, disease, or pests. These stressors can have a large impact on a population with low diversity which will affect the flow of benefits to a community over time. A historical

example that highlights the importance of a broader distribution of species occurred in the 20th century when streets lined with American elm trees lost all their trees due to the introduction of Dutch elm disease. Today, we see the same potential for devastating losses with the introduction of emerald ash borer, an invasive, non-native insect that has killed tens of millions of ash trees in urban, rural, and forested settings in the region. Ash species comprise approximately 10% of the sampled Indiana communities. Unpredictable and often uncontrollable instances like these highlight the importance of proactive management to achieve diverse street tree populations. A widely accepted rule among urban forest managers is that no single species should represent more than 10% of the total population and no single genus should represent more than 20% of the total population. Most Indiana communities exceed this industry guideline, as demonstrated in Table 2.



Table 1. Suitable Large-Growing Street Tree Species – Substitutions for Silver Maple

Common Name	Botanical Name
northern catalpa	<i>Catalpa speciosa</i>
yellowwood	<i>Cladrastis kentukea</i>
ginkgo	<i>Ginkgo biloba</i>
thornless honeylocust	<i>Gleditsia triacanthos inermis</i>
Kentucky coffeetree	<i>Gymnocladus dioicus</i>
American sweetgum	<i>Liquidambar styraciflua</i>
London planetree	<i>Platanus x acerifolia</i>
American sycamore	<i>Platanus occidentalis</i>
white oak	<i>Quercus alba</i>
bur oak	<i>Quercus macrocarpa</i>
northern red oak	<i>Quercus rubra</i>
American basswood	<i>Tilia americana</i>
common baldcypress	<i>Taxodium distichum</i>



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Table 2. Species Distribution Per Community

Community	1st (%)	2nd (%)	3rd (%)	4th (%)	5th (%)	Total Trees
Towns (Unclassified)						
Fort Branch	blue spruce (18.5)	silver maple (11.1)	sugar maple (11.1)	red maple (9.3)	white ash (9.3)	363
Newburgh	Siberian elm (11.1)	white mulberry (8.5)	sugar maple (8.5)	flowering dogwood (7.7)	eastern red cedar (7.7)	918
Brookville	sugar maple (21.8)	callery pear (11.3)	silver maple (9.8)	Norway maple (6.8)	littleleaf linden (5.3)	695
Upland	silver maple (33.8)	sugar maple (11.3)	white ash (8.5)	Norway maple (8.5)	eastern redbud (4.2)	534
Cedar Lake	white oak (13.8)	bur oak (11.0)	black oak (11.0)	silver maple (6.2)	northern catalpa (5.5)	2,402
Third Class Cities (Population less than 35,000)						
Washington	red maple (15.5)	silver maple (14.3)	sugar maple (11.3)	white ash (9.2)	plum (7.6)	2,883
Madison	sugar maple (15.6)	red maple (9.8)	flowering dogwood (8.0)	silver maple (6.2)	magnolia spp. (4.3)	1,557
Greendale	sugar maple (10.9)	blue spruce (9.1)	eastern white pine (8.0)	callery pear (6.2)	silver maple (5.8)	276
Beech Grove	silver maple (33.1)	callery pear (11.5)	apple (10.1)	sugar maple (5.0)	littleleaf linden (5.0)	1,699
Peru	silver maple (25.3)	Norway maple (18.0)	sugar maple (7.4)	black maple (4.6)	eastern white pine (3.7)	2,967
Kendallville	sugar maple (16.7)	apple (12.5)	silver maple (11.4)	callery pear (8.4)	Norway maple (6.1)	3,095
Rushville	silver maple (27.8)	sugar maple (14.8)	callery pear (7.8)	red maple (7.0)	Norway maple (5.2)	1,492
East Chicago	silver maple (24.6)	apple (6.9)	littleleaf linden (6)	Japanese lilac (5.7)	Norway maple (5.4)	4,882
Second Class Cities (Population 35,000 up to 250,000)						
Anderson	silver maple (19.3)	sugar maple (10.2)	apple (6.6)	Norway maple (5.7)	plum (4.4)	12,943
Bloomington	red maple (17.0)	callery pear (10.2)	sugar maple (8.5)	silver maple (5.9)	northern pin oak (4.9)	11,671
Evansville	callery pear (9.3)	sugar maple (8.5)	silver maple (7.5)	ash spp. (7.0)	red maple (6.8)	10,073
Fort Wayne	green ash (18.3)	silver maple (12.5)	sugar maple (8.3)	Norway maple (7.9)	honeylocust (7.1)	55,482
Gary	silver maple (48.9)	Siberian elm (17.2)	Norway maple (4.3)	honeylocust (3.6)	American elm (1.8)	34,009
Lafayette	silver maple (11.3)	apple (7.5)	red maple (7.2)	white ash (7.0)	callery pear (6.2)	10,611
Mishawaka	silver maple (23.9)	Norway maple (11.3)	callery pear (7.6)	sugar maple (6.3)	red maple (5.4)	6,011
Muncie	silver maple (22.2)	sugar maple (6.6)	green ash (6.0)	apple (5.6)	sycamore spp. (3.6)	10,627
South Bend	silver maple (17.0)	Norway maple (12.8)	sugar maple (10.8)	red maple (8.0)	callery pear (6.9)	32,562
First Class Cities (Population 250,000 and over)						
Indianapolis	silver maple (14.0)	sugar maple (6.0)	northern hackberry (5.1)	apple (4.9)	white ash (4.9)	119,036

In 2008, Indiana DNR, Division of Forestry, Community and Urban Forestry program commissioned a study to assess the status of the state's urban forest resource via a sample statewide inventory and analysis. The Sample Urban Statewide Inventory project utilized i-Tree's STRATUM application to capture forest resource structure, function, and value in 23 communities across Indiana. The combination of street tree inventories and STRATUM analyses has provided the state of Indiana with scientifically reliable estimations of the species composition present throughout the state. Planting the largest-growing tree suitable for the site and proactively managing species distribution will help achieve greater stability in the population, thus providing dependable environmental and economic benefits provided to Indiana communities over time.

