The U.S. Forest Service's National Urban and Community Forestry Advisory Council (NUCFAC) funded the Bloomington Urban Forestry Research Group (BUFRG) to study tree planting projects supported by nonprofit organizations, including Forest ReLeaf of Missouri.

This brochure presents the results of part of the project: a re-inventory of trees planted in St. Louis by Forest ReLeaf from 2009 to 2011 and benefit estimates from i-Tree Streets.

Forest ReLeaf planted more than 2,000 trees in the St. Louis area from 2009 to 2011. In June and July of 2014, teams of volunteers, supervised by Forest ReLeaf, re-inventoried 101 of those trees. In our analysis of the re-inventory data we found:

- Survival rate was 86%.
- 70% of trees were in good condition.
- Average DBH (diameter at breast height) was 1.5 inches.
- River birches were the largest, with an average DBH of 3.5 inches.
- The estimated total replacement value of the trees is $23,000.
- Estimated total annual benefits of the trees are $1,400.

If all trees planted from 2009 to 2011 had the same species composition, average DBH, and mortality rates as the re-inventoried trees, they would provide around $33,000 in total annual benefits.

For more information, visit:

moreleaf.org
http://www.indiana.edu/~cipec/research/bufrg_about.php
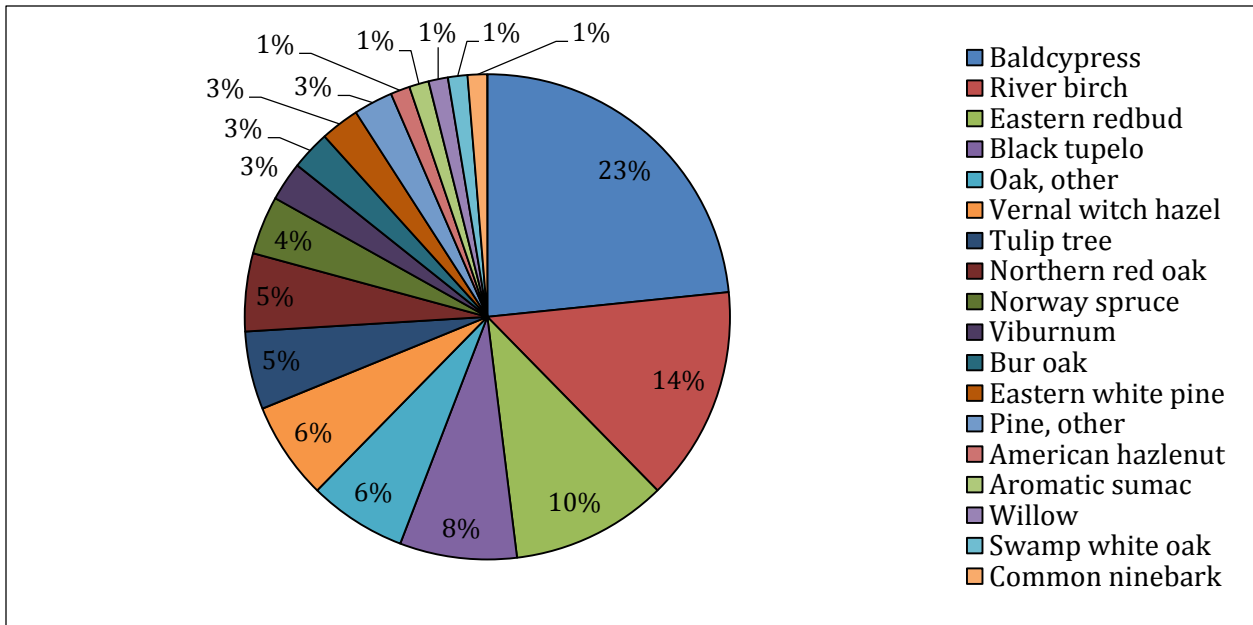www.iTreetools.org
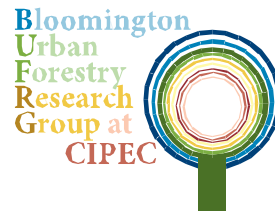
Forest ReLeaf of Missouri

Planted Tree Re-Inventory:
Survival and Benefits of Recently Planted Trees

Prepared by Sarah Widney

Bloomington Urban Forestry Research Group at CIPEC

Indiana University – Bloomington

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Pie chart legend:
- Baldcypress — 23%
- River birch — 14%
- Eastern redbud — 10%
- Black tupelo — 8%
- Oak, other — 6%
- Vernal witch hazel — 6%
- Tulip tree — 5%
- Northern red oak — 5%
- Norway spruce — 4%
- Viburnum — 3%
- Bur oak — 3%
- Eastern white pine — 3%
- Pine, other — 3%
- American hazelnut — 1%
- Aromatic sumac — 1%
- Willow — 1%
- Swamp white oak — 1%
- Common ninebark — 1%

Above: Species distribution of surviving re-inventoried trees. Bald cypress, river birch, Eastern redbud, and black tupelo trees together account for more than 50% of surviving re-inventoried trees.

Tree Benefits

We used i-Tree Streets to estimate the energy, carbon, air quality, stormwater, and aesthetic benefits and canopy cover provided by the re-inventoried trees. i-Tree takes into account the species and size class of each tree in calculating canopy cover and incorporates energy costs and climate in calculating benefits.

Most (92%) of the current annual benefits are aesthetic; we expect aesthetic benefits to become relatively less important over time as the trees grow larger and contribute more stormwater benefits.

Below: Estimated benefits per tree, by type, provided by the ten most common surviving tree species.
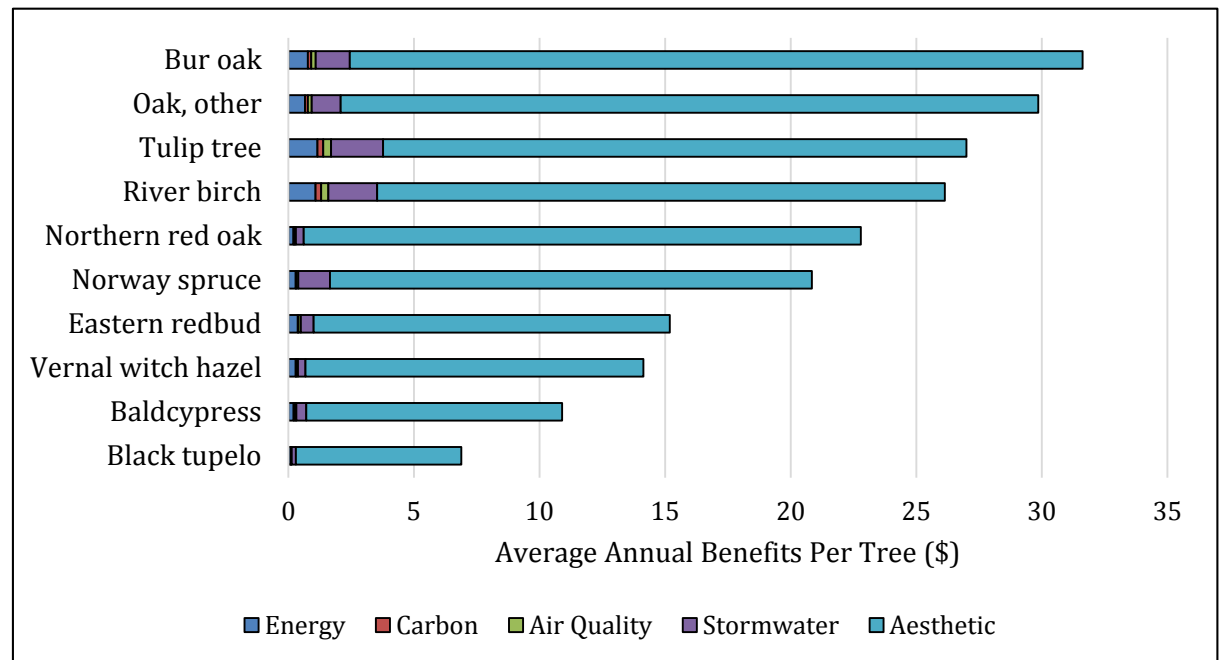
The re-inventoried trees . . .

- Provide $1,400 in total estimated annual benefits.
- Provide $35 in annual energy benefits, corresponding to 1.4 GJ of reduced energy usage.
- Sequester or avoid 840 kg of CO_2 each year.
- Take up or avoid 1 kg of ozone, 1 kg of nitrogen dioxide, 0.5 kg of particulate matter, and 2 kg of sulfur dioxide each year.
- Intercept 1,400 ft^3 of rainfall each year.
- Provide $1,240 in increased property value (aesthetic benefits).
- Provide 3,200 ft^2 of canopy cover.

Average Annual Benefits Per Tree ($) — Energy, Carbon, Air Quality, Stormwater, Aesthetic

(Bur oak, Oak other, Tulip tree, River birch, Northern red oak, Norway spruce, Eastern redbud, Vernal witch hazel, Baldcypress, Black tupelo)