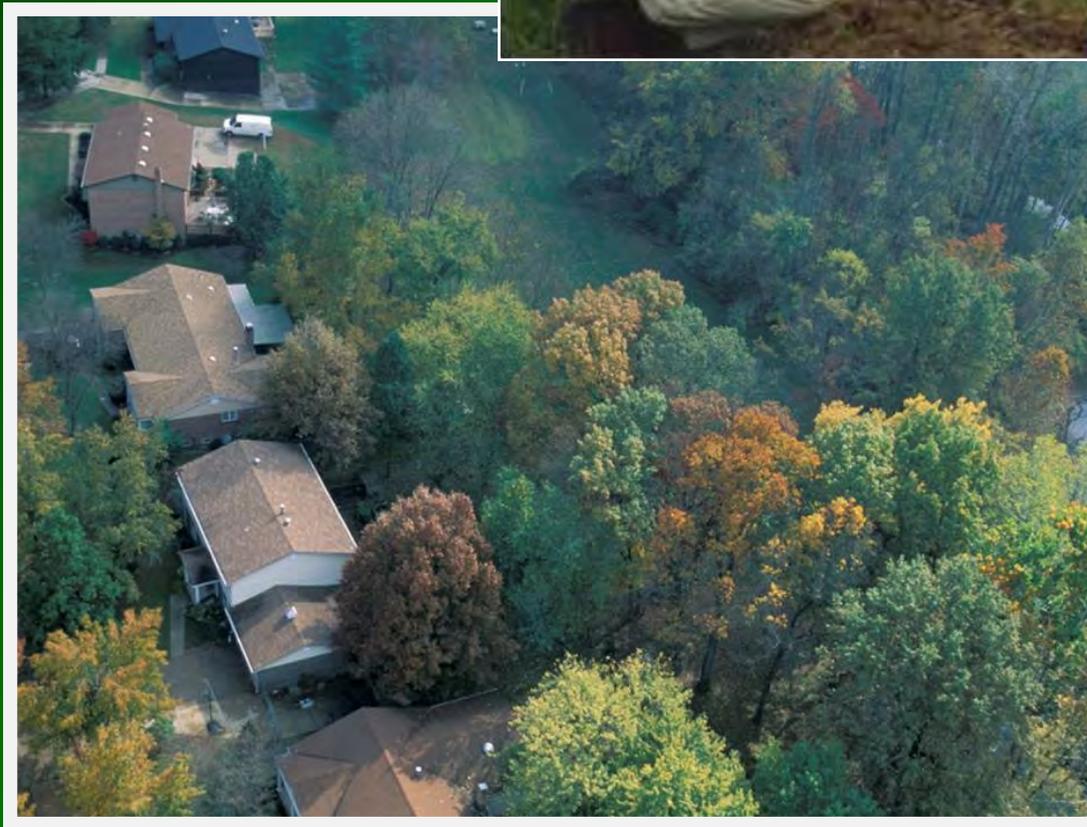




MDC Resource Science

Missouri's 2010 Street Tree Economics

Science Notes



Missouri's 2010 Street Tree Economics



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Information Need:

To promote the Missouri Department of Conservation's (MDC) Community Forestry Program and help communities foresters need to help community decision-makers visualize forest resources as an infrastructure asset. The Community Forestry Program targets city and county governments, arborists, non-profit organizations, regional planning councils, the nursery industry, homeowners and other groups with an interest in managing community trees. Forestry Division annually spends ~ \$440,000 in cost-share programs such as Tree Resource Improvements and Maintenance (TRIM). Understanding barriers to active management will allow MDC to target TRIM dollars to gain the greatest return.

Tree Plots and Values

In 2010 statewide measurement of community-owned street trees in Missouri collected physical tree attributes which can characterize their economic value. Community tree values are "public goods;" they do not come with a price tag attached but they benefit the entire community. Economists have many methods for estimating a dollar value of such public goods. The Forest Service has created software called "i-Tree," a peer-reviewed package that provides urban and community forestry analysis and benefits assessment. i-Tree helps communities understand the environmental services trees provide. i-Tree has been used by communities, non-profit organizations and consultants to report on the urban forest at various scales from individual trees to entire states.

Results

Using i-Tree, Missouri street trees provided annual benefits of \$148 million in 2010, or about \$5,800 per mile of street in Missouri's communities, with the highest per mile annual benefits occurring in Kansas City, at \$9,423/mile, and the lowest in communities between 150,000 and 250,000 population at \$1,549/mile. These estimates represent future benefits to the community, as long as community trees are maintained. Economists often use net present value (NPV) to express the current value of future benefits. One way of thinking about NPV is how much money would be needed in the bank today to pay out a certain amount of interest every year in the future. For example, putting \$100 in the bank today at a 4% interest rate pays \$4 every year.

Clearly, NPV is dependent upon the discount rate. At the Federal Funds rate of 0.18% for the spring of 2011, near historic lows, the net present value of an infinitive stream of \$148 million annual benefits is \$82.2 billion. Using a more conservative 50-year average Federal Funds rate of 5.47% shows a NPV of \$2.7 billion.

i-Tree also breaks down estimated annual benefits and replacement costs by type and species. In 2010, the largest

source of benefits were "aesthetic/other," which includes increased property values at 33%, energy reduction at 32%, and stormwater retention at 29% (see Figure 1). Silver maples accounted for \$26 million of total benefits. Pin oaks represented the largest part of total replacement costs at \$196.4 million, while pecan has the highest replacement cost per tree at \$7,932/tree.

Type	Statewide	%
Energy	\$46,712,968	32%
CO ₂	\$3,964,662	3%
Air Quality	\$5,290,273	3%
Stormwater	\$43,424,787	29%
Aesthetic/Other	\$48,536,940	33%
Total Benefits	\$147,929,630	100%

Table 1. Estimated ecosystem benefits provided by street trees by type of benefit.

Using the Information

MDC's urban foresters and policy makers will be able to use these findings to help community leaders understand the value of their urban forest and advocate for adequate resources for their management. In general, it appears that small cities put very little into tree care so benefit potential is high - they are not using their resource at its full potential. Larger communities, 50-150,000, current benefits are greater but management is still not optimal, while larger cities have active long-term programs.

Analysis Class	Per Mile
Less than 5,000	\$7,191
Between 5,001 and 10,000	\$4,426
Between 10,001 and 20,000	\$3,917
Between 20,001 and 50,000	\$2,667
Between 50,001 and 150,000	\$7,666
Between 150,001 and 250,000	\$1,549
St. Louis suburbs	\$7,704
Kansas City suburbs	\$2,013
St. Louis	\$7,174
Kansas City	\$9,423

Table 2. Estimated ecosystem benefits provided by street trees by community type.

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