FUNDING

Goal: Match funding to desired level of service for urban forestry management

Urban forestry and public education services often must compete for funding with established community services such as law enforcement, fire protection, and infrastructure construction and repair. Decreased and insufficient funding is one of the greatest challenges facing our nation's urban forests today.

No doubt the level of funding will determine the viability and sustainability of Pittsburgh's urban forestry program within the broader context of all of the City's responsibilities. Only with sufficient financial resources can the City's urban forestry program best fulfill its mission, respond to change and challenges, and serve the public.

No precise formula exists to determine how much funding is needed for a proactive, sustainable forestry program. There should be sufficient funding for performing preventive tree maintenance, emergency response, and adequate planting, as well as for staff, equipment, and contractual services. Based on reports that 3,130 communities submitted to the National Arbor Day Foundation for Tree City, USA certification in 2006, the average municipal urban forestry budget for a city the size of Pittsburgh was \$1,870,000, an average expenditure of \$5.83 per capita. Based on these averages, the City's annual budget is 36% below the average, and the per capita spending amount is 38% below average. [59]

Current Conditions

Funding for our urban forestry program comes from a variety of sources. The following table displays the primary and secondary sources of funds and estimated amounts for 2012: [60]

Source	Amount	Activity	Amount	% of Total
City of Pittsburgh	\$1,208,000	Planting	\$ 444,000	17%
Pittsburgh Shade Tree Commission	\$ 120,000	Maintenance	\$1,160,000	44%
Tree Pittsburgh	\$ 933,000*	Public Outreach	\$ 249,500	9%
DCNR/TreeVitalize [®]	<u>\$ 400,000**</u>	Administration	\$ 348,000	13%
Total	\$2,661,000	Other	\$ 459,000	17%

- Includes a \$100,000 USFS special grant that will not be renewed.
- TreeVitalize[®] program's \$200,000-per-year funding agreement with DCNR will end after 2012; it will continue to fund planting for the next five years but at a greatly reduced rate. Western Pennsulvania Conservancu also provides a 50/50 in-kind match. [25]

budgets are developed. Issues

- Current public surveys and feedback indicate that only a minority (14%) of citizens would support a not want to pay for it through increased taxes.
- agency and the master plan.

Recommendations

- maintenance programs.
- and expenses.
- Each major entity providing urban forestry services should perform a cost-benefit analysis to inform future management decisions that maximize benefits.
- Launch a public, education campaign to develop the political support needed for any necessary budget increases, emphasizing sound resource management as a positive investment.
- needed to accomplish urban forestry goals.
- Increase penalties for developers and builders who damage trees and ensure enforcement.

Urban forestry budgets in US cities are typically allocated for maintenance (58%, includes pruning and removal), planting (14%), and administration (8%). [61, 62] There is no national standard for effective urban forest budget allocation. Planting should be a significant portion of the total budget, second only to maintenance, and generally should not exceed 50% of the operating budget.

Pittsburgh's urban forestry program funding allocation from all sources is generalized; the allocation should be continually adjusted depending on condition of the trees, planting needs, incidences of severe weather, insect and disease threats, and the desires of the citizens and community leaders at the time

special fee or small tax increase to generate additional funds to support urban forest management. The majority (60%) of citizens clearly wants more tree planting and maintenance services but does

An accurate accounting of the true and complete budget for urban forest management in Pittsburgh is prevented by the various accounting methods of partners, the sharing of grant funds between more than one agency, accounting overlaps/duplication, the lack of consistent documentation of in-kind services for grants, and lack of readily available and comparable financial data for every entity that works in the City's urban forest. Therefore, it is unknown whether the current funding levels of the City, Tree Pittsburgh, and other partners are sufficient to achieve the goals of each

• Reassess the City's urban forestry program budget in terms of achieving street tree and UTC planting goals, the recommended seven-year preventive maintenance cycle, and the young tree

Each major entity providing services should accurately account for urban forestry-related income

Sustain established partnerships and create new partnerships as a means to leverage resources

Funding Mechanisms in Various US Cities

Special Assessments: One of the most stable sources of funding for urban forestry programs is a special assessment. Some states authorize cities to assess all property owners for specific public benefits and services such as stormwater and sewer systems, and public trees. The assessment can be levied as a fee per foot of right-of-way frontage or as a percentage of the property value. The cities of Cincinnati and Toledo, Ohio have a frontage street tree assessment authorized by state and city codes that has been in effect for over 30 years. The same enabling state law restricts the use of this revenue for anything other than maintenance and planting of trees. The City of Pittsburgh should investigate the legality and potential for a citywide special assessment to fund the urban program pursuant to PA. STAT. ANN. tit. 53, §§ 1721,1081 (construct, reconstruct, pave, grade, alter, or renew streets, alleys, footwalks, parking, landscaping, bridges, sewers, drains, and piers). Special assessments are approved annually by Council with the support of the community. In Cincinnati, the average cost to property owners is \$7 year, and the assessment generates over \$1 million annually for the program. A special assessment in Pittsburgh could supplement and/or reduce general fund support.

Neighborhood Improvement Districts (NIDs): In Pittsburgh, NIDs already exist (the Pittsburgh Downtown Partnership and the Oakland Business Improvement District) and offer a legal and equitable way to generate funds to provide a variety of enhanced and new services that would be less likely to come from the City. Often described as offering the services of "safe, clean, and green", NIDs can help plant and maintain trees as well as fund other infrastructure upgrades and neighborhood needs. There is interest to move the City's best prepared Main Street programs into NIDs which follow a model that has been one of the most successful nationwide. Tree Pittsburgh should campaign the idea of creating NIDs and ensure that higher level urban forest management services are included in the NID budgets.

Taxes: Many cities throughout the US attain funding for urban forestry through special taxes. St. Louis, Missouri implements a property transfer tax and a sales tax (1/2 cent) to pay for the City's urban forestry program. In Burlingame, California, a portion of a gas tax has provided \$100,000 to the urban forestry's departmental budget in previous years. While new taxes are currently politically unpopular, earmarking a small percentage of existing taxes may be a source of revenue to consider.

Capital Improvement Project Budgets: Capital projects have large, comprehensive budgets that have been carefully determined. All aspects and impacts of the project can be accounted for with these kinds of funds. Although restricted to the specific project, often tree maintenance, tree preservation, and planting can be included as a valid expenditure. If trees are viewed and defined as capital assets, then during road and bridge construction and utility projects, funds can be allocated for protection of existing trees, remediation treatment for any trees impacted by construction activities, and planting new trees after the project is complete. The City of Milwaukee has had success making trees part of its street and road improvement projects for decades.

Tree Work Permit, Development, and Inspection Fees: These common funding mechanisms can be used for urban forest management, to the extent permitted under state and local codes. Examples include:

- <u>Permit and Plan Review and Inspection Fees</u>: Cities often require private developers and businesses to provide funding for plan review and site inspection. Charging for the time and expertise needed to approve permit applications, review plans, and make site inspections might be a viable option to finance additional urban forestry positions.
- <u>Development Fees</u>: Landowners in a "benefit area" may be required to pay for a proportionate share of the public facilities required to serve a development. Trees can be considered public facilities, and the costs to plant and care for them can be supported by these fees. Developers could also be required to pay a set amount to support a community's overall urban forestry program, as a cost of doing business within the city limits. The fee could be a percentage of the total project cost, based on the number of housing units built, or based on the area of land being developed.

Compensatory Payments and Environmental Fines: Trees on public land are public property, and the City should be compensated for the loss or damage to public property. If tree damage or loss occurs due to a development project, vehicular accident, vandalism, private utility work, etc., then the responsible party should be required to pay for the appraised or replacement value or repair costs. This source may not generate a great deal of money, but it is a legitimate and often under-pursued source of funds. Generally, the compensation is collected from the insurance company of the person/agency responsible for the damage or directly from the business that caused the damage to public trees. Compensation funds can be used to remediate the specific damage or for other legitimate urban forestry functions. Environmental fines can be another source of legitimate funding. Since the enactment of federal and state clean water and air legislation, companies in violation of those laws are often required to pay significant sums through environmental court fines. By coordinating with the enforcement agency, all or a portion of those fines can be directed to the urban forestry program.

Sale of Municipal Wood Products: If City policies allow public property to be sold, the wood waste from tree maintenance can be a source of funds. Rather than pay for removal and disposal, many cities sell excess wood products (firewood, hardwood timber, rough wood chip mulch, and compost) to the general public and commercial businesses. A new trend is to use the removal of a significant or historic public tree as a source of creative fund raising. The logs and useable wood are given to local craftsmen who create furniture, sculpture, and other collectibles from it. These are sold and proceeds are returned to the urban forestry program. Another new trend is to use tree removals due to invasive insects and disease as a source of quality lumber products. The cities of Winnipeg, Manitoba, and Cincinnati sell logs from trees that have succumbed to Dutch elm disease and EAB to local companies that mill dimensional lumber as environmentally sustainable products used in buildings and projects that qualify for LEED certification.

Biogenic Utility Payments: A biogenic utility is a utility based on the net benefit of freed energy and other benefits from trees, which can be calculated in dollars, pounds of pollution filtered, gallons of rainwater intercepted, and kWh of energy not used. Trees provide Pittsburgh measurable benefits as documented by the i-Tree Streets and Eco reports—the annual value of avoided energy and air pollution control costs exceeds \$3 million each, \$330,000 in storm water mitigation, and nearly \$9.5 million in carbon storage and sequestration. The City of Kent, Ohio performed a feasibility study to explore the possibility of calculating the economic value of the beneficial functions trees perform and devising a funding mechanism to pay for these functions. The income generated would be used to manage and enhance the urban forest to meet goals of increased canopy cover within the City. The rationale is that urban forests, like urban infrastructure, require planning, management, and oversight; they are not self-sustaining like natural forests. In Colorado, Denver Water, the utility that supplies drinking water to 1.3 million people, and the Forest Service signed a \$33 million cost-sharing agreement for forest management and watershed restoration. The average residential water user will pay an extra \$27 over the course of five years to match the Forest Service's \$16.5 million allocation. Denver's agreement is an example of an emerging financial tool, "ecosystem services", in which a market value is applied to environmental functions that users usually exploit without payment. Healthy forests provide safe drinking water as well as other environmental and public health and safety benefits at far lower cost than it would take to build infrastructure to replace those services. Other cities are realizing this, and Pittsburgh may want to begin exploring this developing trend in municipal financing. [3, 4]

Benefit Summary for Pittsburgh's Street Trees

Total Benefits	\$2,400,975
Mesthetic/Other	\$572,882
Stormwater	\$334,601
🔄 Air Quality	⁸ 252,935
🖹 CO2	\$35,424
Energy	^{\$1,205,133}
+ Benefits	Total (\$)



on its municipal

forestry program.





PROACTIVE MANAGEMENT

Goal: Develop a proactive management regime for public trees

Proactive urban forest management includes assessing the resource (an inventory), developing a management plan, engaging citizens and other stakeholders in a plan process and program operations, thoughtful planting of new trees in targeted locations, establishing systematic inspection and maintenance cycles that include training young trees, and supporting research that seeks to better understand the urban ecosystem.

Proactive management can reduce program costs, increase public safety, reduce utility outages from storms, and improve the appearance of the urban environment.

Current Conditions

The City's 2005 street tree inventory and management plan provided direction for the urban forest management program and recommended a continual routine maintenance cycle for the tree population to ensure the pruning of all trees every seven years. This part of the plan has not been implemented, and the City does not have sufficient resources to respond to all requests for service to street trees. [1]

While cyclical pruning reduces long-term costs because of pruning crew efficiencies, it can also prevent problems before they exist in the case of pruning to train young trees. Young trees that receive training pruning develop good form and long, straight trunks with few defects. The resulting trees are structurally more sound with less chance of failure as they mature.

A 2008 i-Tree analysis of Pittsburgh's public street trees indicated that they provided \$2.4 million in annual benefits (\$81 per street tree, \$7.38 per capita). When compared with the annual costs of \$816,400, these benefits provide a benefit-cost ratio of \$2.94 (that is, the City received \$2.94 in benefits for every dollar spent on street tree programs). This benefit-cost ratio indicates a positive net return on investments made to the City's street trees; however, a closer look reveals that this positive value may not be sustainable. [3]

Pittsburgh has an aging tree population and is spending a large portion of its resources on removals and very little on tree planting. Proper maintenance and regular pruning is crucial to maintaining these levels of benefits in the existing tree population and can result in the difference between a functional street tree and a tree with defects that create an unacceptable level of risk. In 2008, the City was only allocating 2% of its tree-related funding to pruning. To achieve a sustainable resource, these trends must be reversed.

Issues

- The last comprehensive street tree inventory occurred in 2005 and has not been regularly updated.
- No current protocol exists for a regular inspection of street trees to monitor maintenance needs, risk, and pests. Updating the tree inventory will identify required maintenance and will monitor the population for high-threat pests (such as emerald ash borer, oak wilt, and Asian longhorned beetle) that can rapidly devastate our urban forest.
- Engaging the public during the development of urban forestry plans (both citywide and project focused) will reduce the chance for costly delays and greatly improve overall public opinion about the state of our urban forest. If dissent occurs, a strong background of support from other engaged citizens can help to educate and inform those with different opinions and to avoid public reactions that might hinder effective program functioning.

Recommendations

- Regularly monitor public trees for maintenance needs, risks, and pests.
- Develop a protocol that provides for regular updating of the public tree inventory.
- inspection.
- Ensure that cyclical maintenance includes pruning of medium-sized and large trees to reduce risk and extend the productive life.
- years.
- Communicate and engage with the community regarding the urban forest plan.



Small tree pits that do not meet code prevent tree growth and survival.

Implement a cyclical maintenance schedule of all street trees that provides for a seven-year cycle of

• Ensure that cyclical pruning also includes care for newly planted and young trees in their formative

Ensure the Tree Tender program continues so that the City can narrow its focus on mature tree care.

Cincinnati, Ohio Urban Forestry Department

Project Description

The Urban Forestry Program in the City of Cincinnati, Ohio is responsible for planting, maintaining, and protecting more than 80,000 street trees on more than 1,000 miles of public rights-of-way. The program is currently part of the Park Board's Natural Resource Management Section.

Accomplishments

Urban forestry activities are funded through a dedicated urban forestry property tax of \$0.18 per "front foot" for each property owner that abuts a public right-of-way. The assessment has been in place for 30 years and currently provides \$1.8 million annually. State law requires that funds generated from this dedicated tax be used solely for urban forestry activities.

Services provided from the collected funds include emergency response to streets blocked by fallen limbs or trees, individual service requests for pruning or removal of hazardous trees, planting of about 3,000 trees each year, and stump grinding.

The funds also provide support for proactive activities such as young tree training and fertilizing of 4,000 small trees at three and six years after planting. Trees greater than 6 inches in diameter (at 4.5 feet above ground) that are located on public property receive preventive maintenance at least once every six years. The City is divided into six management zones and all public trees within each zone are visited block by block (or park by park) to increase efficiency.

Maintenance and planting work is contracted to local professionals, and City staff provides program administration, inspections, and other support. City staff consists of five urban foresters and three urban forestry technicians; all are Certified Arborists (through the International Society of Arboriculture) and are Ohio Licensed Pesticide Applicators. Additional proactive efforts include education programs for schools and community groups.

Lessons Learned

Utilizing a highly trained staff supported by a dedicated tax, the City of Cincinnati has been able to create efficiencies with performing tree work on a proactive basis and has improved the overall health of its urban forest. The protocol has created efficiencies in service and reduced per tree costs for maintenance. While most of work is proactive and performed systematically, there are still about 350 individual service requests each year that are addressed.



Preventive maintenance pruning of mature trees is an example of a proactive management task that improves tree health, strengthens structural stability, decreases storm damage, and reduces risk on public property.



Cincinnati is divided into six management zones, and all public trees within each zone are visited once every six years.



RISK MANAGEMENT

Goal: Develop a proactive risk management program for public trees

Trees provide valuable benefits to a community, and these benefits typically increase as a tree matures. Along with this increase in benefits can come an associated increase in risk. Entire trees may fail, or limbs may fall from standing trees. Understanding risk, identifying levels of risk, and taking reasonable steps to mitigate or reduce risk are challenges that face those who manage the urban forest.

The first step in dealing with this challenge is performing an inventory of public trees to determine the level of benefits and risk that are present. Pittsburgh's 2005 street tree inventory assessed 31,524 tree sites and found that 909 trees (2.88%) were considered high-priority removals as a result of severe risk. An additional 1,546 (4.90%) trees were identified as needing high-priority pruning. Additional trees were identified for priority removals and pruning that posed high or moderate levels of risk. By the end of 2008, much of priority risk management work was completed reducing overall tree risk to a more acceptable level. The cost of this work was significant.

Current Conditions

The 2005 street tree inventory provided a baseline for tree condition data; however, an urban forest continually changes over time. New trees are planted each year and younger trees grow larger. As they grow, they increase the level of risk if they not systematically monitored on a periodic basis. The City of Pittsburgh utilizes a tree database and tree management software that enables them to keep records of all inspections and maintenance activities. [1]

Pittsburgh's public urban forestry is currently managed with a system that addresses only the most urgent needs and requests, which means that many young and middle aged trees do not receive valuable periodic maintenance. Young tree training and a cyclical pruning program can focus resources on smaller trees that are less costly to maintain, and create older trees with fewer defects.

Issues

- The 2008 i-Tree analysis of Pittsburgh's street trees indicated that for every dollar spent on the street tree • program at that time, there was a net return of \$2.94. Increasing public safety by reducing tree defects can reduce potential costs and improve overall street tree health. [3]
- Some communities have experienced serious negative publicity following incidents of high-risk trees causing injury. This can translate into a loss of public support for urban forestry programs.
- While identifying and removing high-risk trees and limbs is a critical part of a risk management program, preventing risk can reduce costs, increase public safety, and create a healthier urban forest. A stronger emphasis on systematic inspection and maintenance needs to occur in Pittsburgh to take advantage of these positive benefits.
- Repairs to existing infrastructure can cause damage to tree roots and may increase risk to unacceptable levels. Sidewalk and curb repair often requires the removal of offending roots that may also provide critical support.
- Underground utility repairs or installation also sever critical roots needed for tree stability. A quick inspection by an arborist can determine the extent of root damage that can occur without causing unacceptable risk.

Recommendations

- Facilitate a systematic tree maintenance program for public trees.
- address both tree inventories and tree risk assessment. [63, 64, 65]
- Create a prioritization scheme in the public tree inventory that rates trees based on risk levels.
- regularly scheduled inventory updates.
- loading.
- Promptly remove and prune trees identified with severe and high risk.
- tracks proposed work near public trees.
- nonprofits or obtain new funding stream.



Tree Risk assessment should be performed as part of Pittsburgh's ongoing inventory system.

Maintain an updated tree inventory with risk rating data that utilize the tree risk assessment standards in ANSI A300 (Part 9) and the Best Management Practices published by the ISA that

Use qualified individuals such as ISA Certified Arborists to monitor public infrastructure improvements for potential increase in tree risk and to identify potentially high-risk trees as part of

Perform re-inspections after storms that include heavy winds or snow that may increase branch

Integrate a sidewalk repair program with proper arboricultural practices and a permit system that

Maintain adequate funding levels for risk management using in-house funding or partnerships with



Large trees with defects can create extreme levels of risk if located near high value targets.

Removal of High-Risk Trees in the Squirrel Hill Neighborhood

Project Description

The 2005 Pittsburgh street tree inventory identified 555 trees with significant defects in the Squirrel Hill neighborhood, and the trees were scheduled for removal between 2006 and 2008. Tree Pittsburgh (known as Friends of the Pittsburgh Urban Forest in 2006) raised much of the funding necessary to complete Priority 1 pruning work throughout the City and in the Squirrel Hill neighborhood. Additional funding came from the Shade Tree Commission's trust fund and the City's capital funding sources.

Accomplishments

The City began removing trees in Squirrel Hill neighborhood in late 2007. The area surrounding Squirrel Hill is one of the more densely tree populated areas of the City and many of the several blocks were lined with large oaks and London planes. Plans included removal of 555 trees in the neighborhood and replanting with some of the 4,200 trees slated for the City between 2007 and 2011.

A public meeting was held in the area in 2005 when the original project plans were underway. However, Squirrel Hill residents were surprised when forestry crews appeared and began removing trees in 2007. A meeting was called in January 2008 and attracted over 70 residents who were upset about the removals. The meeting was attended by City officials and the Director of Tree Pittsburgh.

Comments from residents at the meeting included concern for trees throughout the City, not just Squirrel Hill. One resident lamented the potential loss of a row of seven, large London plane trees near her home. City officials countered with their concerns about public safety and explained that they were implementing a planned program to revitalize the City's street tree population by removing high-risk trees and replacing them with new trees where appropriate. Representatives from Tree Pittsburgh agreed with the City's proactive stance and reported that caring for trees should take priority over planting new ones.

Lessons Learned

A moratorium on public tree removals was called in January 2008 and in July 2008; the Pittsburgh City Council adopted new legislation that required the City to notify residents at least four weeks before cutting down street trees unless the trees pose an immediate hazard. Residents then had the right to appeal the removal. The legislation also required replanting at or near where trees were removed.

While useful, the legislation may not have been necessary if better communication with local residents had been part of a tree management program. To casual observers, tree removal is always much less appealing than new tree planting. However, good communication about sustainable urban forestry would help to reduce concerns about tree removals that improve public safety. A comprehensive program will always include new tree plantings, systematic maintenance, and removals.

Sources: [66-70]



Young trees on Forbes Avenue in the Squirrel Hill neighborhood.



Boulevard of Trees on Wightman Street in the Squirrel Hill neighborhood.



TREE PLANTING Goal: Ensure tree benefits for future generations through a sustainable planting program

A few decades ago, Pittsburgh had a robust tree planting program and even operated a municipal tree nursery, but by 2006 relatively little city funding was allocated for tree planting. While some city projects had tree planting components, no formal planting program existed. Funding and managing a citywide planting program is essential; without a balanced approach to tree maintenance and tree planting, the urban forest is unsustainable.

Current Conditions

Working in partnership with community groups, nonprofits, and municipal agencies, TreeVitalize® Pittsburgh is a joint project of Allegheny County, The City of Pittsburgh, the PA Department of Conservation and Natural Resources, Tree Pittsburgh, and the Western Pennsylvania Conservancy. Since 2008, the TreeVitalize® program has leveraged over \$5.2 million for planting projects and has become a model for cooperation and partnership among the many urban forestry partners in the City. [25]

The benefits that trees provide our City must be maintained and expanded through a sustainably funded tree planting program. Without a tree planting program, Pittsburgh's tree resource, especially the street tree resource, will decline and become a burdensome liability. Canopy goals cannot be met and benefits from the urban forest remain stagnant or even decline. Equally as unsustainable is the planting of trees without dedicated funding for long-term maintenance of new trees.

With the challenging goal of increasing tree canopy cover citywide from 42% to 60% over the next 20 years, significant amounts of trees will need to be planted. A wide variety of methods are currently employed to increase overall tree canopy in Pittsburgh. These range from creating cut-outs in sidewalks for street trees, incorporating structural soils and Silva Cells to increase rooting volume in heavily built areas, to planting smaller, bare-root trees in native soil and establishing seedlings in naturalized areas.

Urban forestry partners across the City currently utilize a variety of proven, well-adapted, but relatively uncommon species for all types of planting projects. The Pittsburgh Shade Tree Committee publishes and maintains a recommended species list for plantings along streets that includes selections for use under power lines. Tree Pittsburgh maintains policy guidelines to assist tree planting agencies with achieving overall resource diversity objectives. See Appendix D for the Tree Diversity Goals and Recommendations.

Tree Pittsburgh also operates a small nursery within the City for small-scale production of trees. The purpose of this nursery is to propagate and grow genetically local, native trees for restoration and reforestation projects on river banks, hillsides, parks, and vacant lots.

Issues

- Based on the most current data, Pittsburgh's street tree population has four species that together ٠ represent 44% of the street tree population (Acer platanoides, Pyrus calleryana, Acer rubrum, and Tilia cordata).
- While diversity among the tree resource has steadily improved since 2008, maple continues to dominate the street tree population.
- Pests and diseases (both native and exotic) pose serious threats to many species in the Pittsburgh urban forest. ALB and emerald ash borer are two very significant examples. EAB threatens 8.8% and ALB 67.1% of the urban forest.

- According to survey results, in Pittsburgh there is broad support for more trees in general, for people planting on their own private property, and for increased funding for street tree planting.
- In the heavily urbanized areas of the City where street trees can provide the greatest benefits, planting sites must be planned for and engineered into the built environment.
- Currently, there is no funding for planting in the City's municipal budget and no City codes that require tree planting as part of development projects that are not consistently enforced.
- The City's current tree request form process limits the tree planting program's effectiveness.

Recommendations

- Choose performance-based planting strategies geared towards improving specific benefits, such as planting conifers to improve air quality through year-round particulate matter removal.
- Establish street tree stocking goals for each neighborhood and for the entire City.
- Expand the Pittsburgh Shade Tree Committee's recommended species list to include options for parks and private property.
- Emphasize the preferential use of locally grown trees and locally sourced seeds for nursery trees, such as those of the Tree Pittsburgh nursery, to improve the likelihood of tree survival, offset the impact of abiotic stressors on urban trees, and to preserve genetic diversity.
- Adopt Tree Pittsburgh's Tree Diversity Goals and Recommendations for all agencies that plant trees.
- Reduce or minimize conflicts between trees and infrastructure by careful species selection, site evaluation, and the tenants of the *Right Tree Right Place* concept.
- Enforce city codes that require tree planting to be a part of development projects.
- Facilitate tree planting on private and public properties to help the City sustain and improve its overall tree canopy cover and resulting benefits.
- Develop programs that assist private property owners with tree purchase, selection, and planting.
- Target natural areas and forested hillsides for restoration planting projects. •
- Ensure there is sustainable funding for necessary levels of tree maintenance to grow newly planted trees into safe and healthy, mature trees.
- objectives.



Volunteers can easily plant bare-root trees without use of heavy equipment.

• Track all new tree plantings in an accurate and reliable inventory system to faciliate the use of tree data for research purposes, project costs, maintenance needs, and to evaluate progrees towards diversity



Tree planting on Memory Lane in the Hill District.

Case Study: Tree Planting

Hartwood Acres Park 1,000 Trees Project, May 2, 2009

Project Description

At Hartwood Acres, National Wildlife Federation members from around the country joined with local volunteers to plant more than 1,000 seedling trees in a sloping meadow near the Saxonburg Boulevard park entrance. And a large area that had previously been routinely mowed was allowed to naturalize. Simultaneously, other volunteers were doing a smaller planting project at North Park.

The project was financed by the National Wildlife Federation and the Pittsburgh-based Katherine Mabis McKenna Foundation. The plantings were sponsored in collaboration with TreeVitalize[®], a partnership of nonprofit and government agencies, including the Western Pennsylvania Conservancy, Tree Pittsburgh (know as Friends of Pittsburgh Urban Forest in 2009), the City of Pittsburgh, Allegheny County, and the State Department of Conservation and Natural Resources (DCNR).

The seedlings planted at Hartwood Acres were one to three years old. They were planted with a plastic tube covering them above the surface to protect the young trees from deer, but allowing them to get air, light, and water.

Accomplishments

The trees are doing well; protected by tree tubes, they are growing rapidly.

Lessons Learned

While it is very important to plant medium- to large-caliper street and park trees, establishing these trees in the heavily built, urbanized environment can cost between \$1,500 to \$2,000. In these situations, it is appropriate to plant a \$300 tree in a \$1,500 "hole". This is critical work that often requires a high level of planning and engineering for each tree planted.

A way to significantly increase canopy over time and realize a tremendous return on investment is to plant smaller trees wherever feasible. Going down the scale this would include 1.25-inch stock, 0.5- to 1-inch whips, 3-gallon potted trees, 2-year transplants, and seedlings.

Due to lower risk exposure and shorter production schedules, nurseries are able to provide greater diversity of species with smaller stock.

The use of volunteers greatly enhances the return on investment and directly involves citizens in their urban forest. The use of social media, specifically Twitter and Flickr in this case, helped ensure the success of the project.

Recommendations

- Utilize the Hartwood Acres model to plant tens of thousands of young trees.
- Work with local nurseries to increase diversity by encouraging the propagation of desired species and varieties.
- Explore contract growing with local tree growers to ensure the availability of required quantities.
- Continue to employ social media to recruit, organize, and celebrate volunteer tree planters.
- Identify and prioritize appropriate planting sites such as vacant lots, brownfields, medians, and parks.
- Give high priority to mowed areas that can appropriately be allowed to revert to forest. This gives the added advantages of reducing greenhouse gas emissions and lowering fuel, labor, and equipment expenses.
- Create public education messages for use during and after a storm event appropriate for all types of media.



Meadow area within Hartwood Acres Park prior to planting.



Over 1,000 seedlings were planted on the meadow within Hartwood Acres Park.



National Wildlife Federation members joined volunteers for a day of planting.

