SREF-UF-004

ASSESSING THE IMPACT OF

Urban & Community Forestry Federal Grants

Southern Regional Extension Forestry

FINAL REPORT

JUNE 2017

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This impact assessment final report was created through a collaboration between the USDA Forest Service, National Urban and Community Forestry Advisory Council (NUCFAC), and Southern Regional Extension Forestry (SREF). The National Urban and Community Forestry Advisory Council annually recommends urban and community forestry projects for funding to the USDA Forest Service. NUCFAC is an advisory committee and has no contracting authority. The US Forest Service contracted with SREF to assess the impact of their National Urban and Community Forestry grants awarded from 2010-2015. The following report outlines the results of this assessment.

This publication is made possible through funding from the US Forest Service's Urban and Community Forestry Program.

Front cover image credits (clockwise from top left): Society of Municipal Arborists, Raina Sheridan (city images), Andrew Tirpak, Holly Campbell, Raina Sheridan (apartment and cars), Travis Miller, and Bryant Sharenbroch.

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> This grant program provides support for interdisciplinary applied research that advances innovative and sustainable practices.

—David Robertson, Ph.D.

2011 NUCFAC-recommended project: *Green Infrastructure Assessment: Mapping and Evaluating the Support System for Green Infrastructure Planning in the United States*

EXECUTIVE SUMMARY:

The 2010 US Census revealed that approximately 82% of US residents live in urban and suburban areas, a 12% increase from 2000 to 2010. Ensuring the vitality of urban areas requires several measures and policies that protect economic resilience, including increased property value and tourism and decreased costs associated with energy, crime, public health, stormwater management, and more. At the same time, actions that protect environmental quality are essential for human health and well-being, including measures and policies that support clean air and water, temperature reduction, pollution mitigation, and reduced storm damage. Managed properly, urban trees and forests help ameliorate the economic and environmental challenges urban areas face, while also creating an aesthetically-pleasing environment where people can live, work, and recreate.

The value of urban and community forest benefits are well known. The approximately 3.8 billion trees in US urban forests, structurally valued at $2.4 trillion,[1] provide numerous benefits to over 252 million US urban residents.[2] Some of the benefits of urban and community forests include $11.7 billion in avoided health care costs,[3] up to a 37% increase in property value,[4] storage of 700 million tons of carbon,[5] temperature reductions of 20-45°F,[6] and up to a 50% decrease in energy bills.[7] Considering this significant impact, funding that advances research and projects focused on improving the efficiency and quality of urban and community forests is economically, socially, and environmentally imperative.

The 1990 U.S. Farm Bill created The National Urban and Community Forestry Advisory Council (NUCFAC) to advise

> "Other than NUCFAC, there is no other way to get urban forestry grants for innovative and creative projects and deliver on the ground benefits for advancing urban and community forestry."
>
> – **Richard Dolesh,** 2013 NUCFAC-recommended project: *Engaging the Hispanic Community in Urban Forestry*

JOB CREATION. HEALTH. RESOURCES. EQUITY. TECHNOLOGY. EFFICIENCY. ENVIRONMENT.

the Secretary of Agriculture on matters relating to the protection, planting, and care of trees and forests in our nation's cities and communities. As outlined in the 1990 Farm Bill, specific purposes of the Council are to develop a national urban and community forestry action plan every ten years, evaluate how the plan has been put into effect, and develop criteria and recommendations for the USDA Forest Service's National Urban and Community Forestry Challenge Cost Share Grant Program. Since 1994, NUCFAC annually recommends urban and community forestry projects for funding to the USDA Forest Service (USFS). Recommended projects meet objectives outlined in the current National Urban and Community Forestry (UCF) Action Plan, which is used to expand awareness of the benefits that urban and community forests provide to urban areas. Communities are encouraged to increase investments in these urban forest resources for the benefit of current and future generations. The Plan, developed in conjunction with thousands of stakeholders and the general public, provides specific goals, actions, and recommendations for improving the status of urban and community forestry in the US and its territories.

To demonstrate the value of NUCFAC- recommended grants in supporting the numerous benefits of urban and community forests, the USFS supported an assessment of the impact of these grants. During 2016 and 2017, twenty-six grants, awarded during the years 2010-2015, were assessed. A number of indicators were evaluated, including: how project products are utilized by stakeholders; an estimated number of individuals reached through the project; how the project has been promoted; and whether the project was replicated. Other factors assessed included: if the project was used in the establishment of a business, policy, process, or other; any continued work on the project following grant closure; additional funding beyond the grant period; and unexpected project outcomes.

Impact data were collected from primary and secondary grant partners as well as individuals who directly benefited from the project, for example a graduate student involved in the project or a non-profit who used research results from a project. It is important to note that this assessment estimates the project reach based on a snapshot in time and from only one or more project partner's perspective. It can take years following the end of the grant period to publish project results and disseminate these results to the broader community. It is assumed that the actual reach of the projects presented in this report is much greater than presented here.

It is well known that NUCFAC-recommended grant projects have laid the foundation for our understanding of the value and function of urban forestry, even as far back as grants awarded in 1994. Esteemed University of Washington researcher Kathleen Wolf, Ph.D. reinforces the value of these grants by stating,

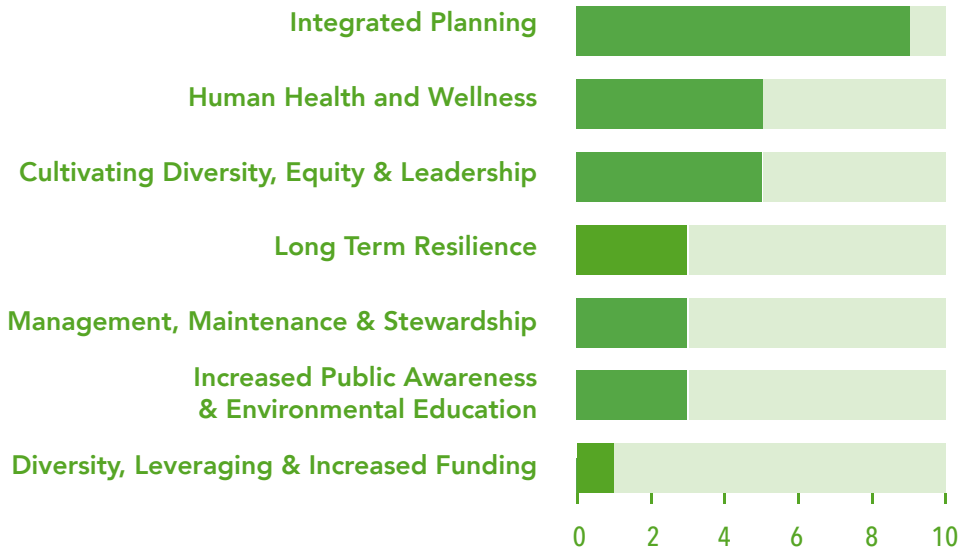
> *"NUCFAC has been on the exploratory edge. Because it is a council representing communities of all sizes, places all over the country, and diverse stakeholder interests, it puts money into supporting emerging ideas that later become mainstream. I would not be where I am now had I not received my first NUCFAC grant. In fact, I am still getting questions from people and requests to give conference presentations concerning the work that NUCFAC recommended funding for over 10 years ago. I hope the council can continue to be on top of new ideas that have value, whether program or research."*

The following summary report includes information and statistics from just 26 of the 212 NUCFAC recommended grants awarded since 1994. The actual impact and influence of all 212 grants, while immeasurable for a variety of reasons, is no doubt much, much greater. For more information about this report, please contact: Nancy Stremple, nstremple@fs.fed.us

PROJECT CATEGORIES:

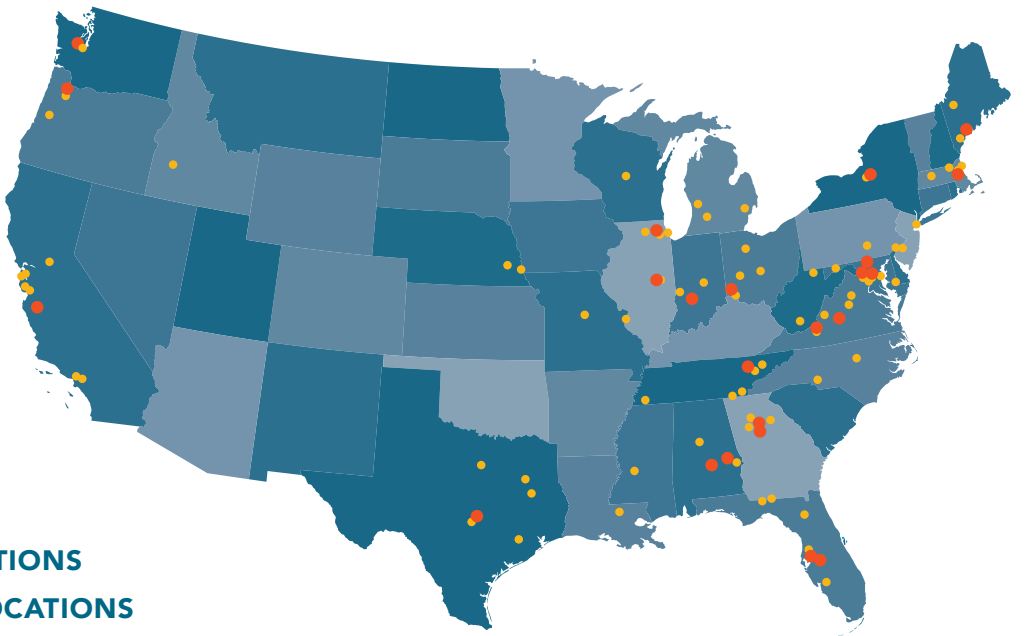
Recommended projects meet objectives outlined in the current National Urban and Community Forestry (UCF) Action Plan, which is used to expand awareness of the benefits that urban and community forests provide. The 26 grants evaluated for this impact assessment support one or more categories listed in the bar graph to the right.

NUCFAC Project Categories for 2010-2015 Grants



PROJECTS BY LOCATION:

Though projects were awarded to recipients across several US states, all projects have national implications. This map displays the location of all primary and secondary project partners.



- **PRIMARY PARTNER LOCATIONS**
- **SECONDARY PARTNER LOCATIONS**

PROJECT HIGHLIGHTS:

All twenty-six projects evaluated for this assessment vary greatly depending on development, products, promotion, outreach, and more. Despite all of these differences, each project's results or products have had or will have an extensive reach. A few of the highlights of these grants include:

- Twenty-eight municipal arboriculture college internships were created to increase job qualifications and competitiveness following graduation;
- Natural infrastructure job opportunities for under-invested communities were identified;
- Over ten thousand trees planted by underserved communities engaged community members to improve their environmental conditions and human heath;
- Over four thousand Houston and Los Angeles area Spanish-speaking residents were educated on tree care and the value and benefits of their urban and community forests;
- Mobile tree risk data collection and a GIS mapping application were developed for best tree risk management practices and post storm assessments required for FEMA assistance;
- One thousand students were educated on West Nile Virus prevention and the role urban forests play in reducing these incidences;
- Municipal stormwater management efficiency was increased through new tools and applied research;
- Nineteen articles and fifty-eight presentations were developed that promoted the relationship of urban and community forests and human health;

CASE STUDY

Urban Forests Provide Human Health and Well-being Benefits

Research indicates access to urban nature provides significant health benefits. NUCFAC-recommended research teased out the health costs offsets that high-quality natural areas near where people learn, live, play, and work can provide. Researchers found that greater investment in urban green space amounts to billions of dollars in annual savings, and the following are just preliminary figures as more analysis is underway:

$11.7 billion	in avoided health care costs
$1.3 billion	in high school graduate lifelong income
$928 million	in avoided crime costs

2011 NUCFAC-recommended project: *Urban Forest Human Health and Well-Being Benefits: Translating Evidence to Economic Valuation Models*

Learn more at: http://depts.washington.edu/hhwb/

collaboration
COMMUNITY SUPPORT
education
better understanding
valuation
diversity
research
partnerships
communication
new methods
NEW KNOWLEDGE
ONLINE TOOLS
EFFICIENCY
mentoring
sustainability

PROJECT REACH:

The twenty-six projects evaluated for this impact assessment have developed or are developing a diversity of grant products, including online tools, ecological models, assessments, case studies, tree plantings, guidebooks, published papers, best management practices, natural play areas, student internships, media toolkits, scholarships, websites, videos, technical reports, literature reviews, and demonstration sites. Project partners had an equally diverse way of promoting and marketing these products depending on their target audience (which was also quite diverse), including conference and meeting presentations, webinars, workshops, articles, newsletters, social media, and websites.

It can be difficult to estimate the exact reach of grant products and activities. Information dissemination takes time, depending on the product and promotion method. This assessment estimates the project reach based on a snapshot in time and from only one or more project partner's perspective. It is assumed that the actual reach is much greater than reported here.

The following figures estimate, for all 26 projects, the total amount of people reached through various outlets and the amount of people involved in project development.

PEOPLE INVOLVED IN PROJECT DEVELOPMENT

The Total Number of People Reached with Project Results through Different Outlets:

Online[1]
314,530

Presentations[2]
47,840

Radio/TV Impressions[3]
36,485,700

Publications[4]
583,600

Demonstration Site
12,080

College Class / Internship
540

[1] Website traffic reported by Google Analytics, YouTube video views, social media followers, e-newsletters, blogs

[2] Conferences, workshops, webinars, & other face-to-face programs

[3] Impressions are the number of exposures to an advertisement. An individual can receive more than one exposure

[4] Printed brochures, articles, other publications, and Google Scholar article views

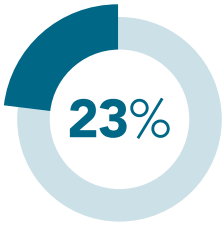
STAKEHOLDER UTILIZATION:

Developing and promoting project results is a long process, but if project products are not utilized by the target audience, or stakeholders, then their potential application and reach are limited. All project partners in this assessment have worked or will work to promote their products to stakeholders and from these stakeholders they reported utilization in a number of ways. For example, 77% of assessed projects reported that project results supported a change in practice in stakeholder agencies or organizations and 69% reported stakeholders will implement project findings.

"Project partners and other interested nonprofits continue to seek our advice on tree record-keeping protocols to better monitor tree-planting success."

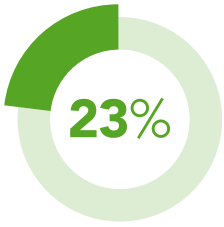
– Burnell Fisher, Ph.D., 2012 NUCFAC-recommended project:
"Trees and People" – a two-way street: A research program to assess the direct and indirect effects of urban tree-planting programs in the face of climate change

Percent of projects that reported stakeholders utilized project results in:

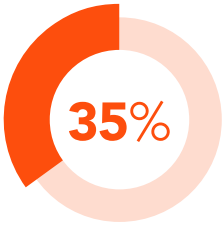


Workshop / Training

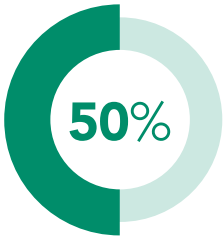
Technology



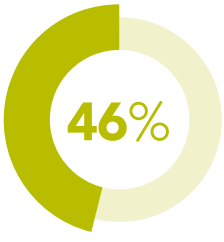
Policy Change



Trade Journal Articles



Peer-reviewed Journal Articles



New Research Project

Photo Credit: Eric Berg, Community Forestry and Sustainable Landscape Program Leader

CASE STUDY

Developing Tomorrow's Urban Forestry Leaders

The East End of Houston, Texas is faced with many challenges: at-risk youth, poverty, environmental pollution, and human health concerns. With NUCFAC- recommended project funds, students from 11 East End schools set ambitious goals to improve their community. The project aimed to transform the community from a food desert to a food forest, promote environmental justice, develop youth leadership skills and career opportunities, and provide training in urban forestry. One high school involved in the project won a $10 million grant from XQ: The Super School Project to continue work begun by this project. Just some of the many project successes include:

PROJECT REACHED:

+7,000 students

80 educators

125 civilians

OTHER PROJECT IMPACTS INCLUDE:

12 $1,000 — scholarships awarded to high school students

+120 students — served as student Green Ambassador leaders

100 planted — trees and vegetable gardens

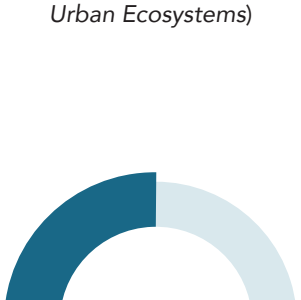
2013 NUCFAC-recommended project: *GreenSchools: A Model for Green Communities*

Learn more at: www.plt.org

ADDITIONAL FUNDING:

Additional funding was obtained for 56% of the sixteen closed grants to continue initial project objectives or develop new objectives based off the original project. A few examples of additional work this funding has supported include:

- Expansion of the municipal arborist internship project to students from non-urban forestry backgrounds, such as journalism and business, to meet the varied future job needs of the field. $210,000 (2010 NUCFAC Recommended Award: *SMA Urban & Community Forestry Internship Program: Preparing Students for Urban Forestry Positions*)
- Development of 27 urban tree management YouTube videos to increase energy conservation. $110,000 (2011 NUCFAC-recommended project: *Energy Conservation & Urban Forests eXtension Community of Practice*)
- Further investigation of the role urban forests play in stress reduction. $300,000 (2011 NUCFAC-recommended project: *A Dose of Urban Forestry*)
- Creation of over 120 new early childhood natural play areas in South Carolina, Colorado, and Texas. $1,850,000 (2011 NUCFAC-recommended project: *The Natural Play and Learning Areas Guidelines Project*)
- Continued assessment of urban forest ecosystem services, the demand and supply of these services, and environmental justice of urban forest planning and management. $285,000 (2011 NUCFAC-recommended project: *A New i-Tree Tool for Assessing Forest Impacts on Urban Ecosystems*)



9/16 grants led to additional projects being funded, totaling **$13,016,155**

ADDITIONAL FUNDING:

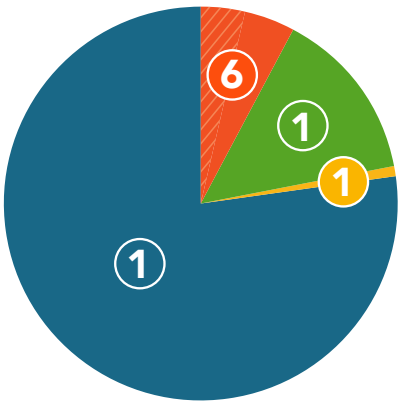
Additional awarded funding was received from federal, state, nonprofit, and private sources. Three projects received additional funds recommended by NUCFAC. The following pie graph demonstrates the number of projects that have received additional funding to continue or expand upon initial project objectives, the source of those funds, and the total amount received based on source.

"The Project Learning Tree program has changed my life in so many ways. I have gone from a person who didn't speak or write English very well, to actually designing a curriculum on pollinators and writing grants for other schools. PLT and being a Green Ambassador gave me a chance to prove that I could do things."

- Luis Cruz, Senior at Furr High School, Houston, Texas

This school was awarded a $10 million grant to continue initial project goals - 2013 NUCFAC-recommended project: *GreenSchools: A Model for Green Communities*

Source, Amount, and Number of Projects Receiving Additional Funding:



FEDERAL
$1,080,155

NUCFAC-RECOMMENDED
$505,000

STATE
$1,850,000

NON-PROFIT
$86,000

PRIVATE
$10,000,000

TOTAL: $13,016,155

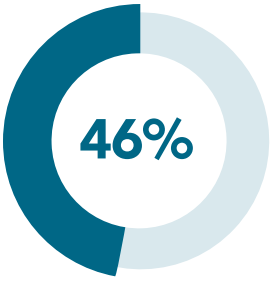
Photo Credit: Project Learning Tree, American Forest Foundation

OTHER IMPACTS:

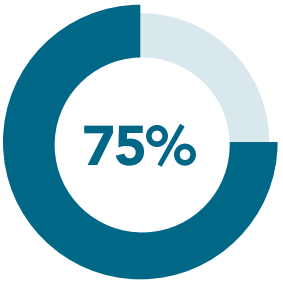
Popular press is a direct way to communicate urban and community forestry project results to practitioners as well as the public.

Sixteen out of the twenty-six projects assessed for this report are complete, meaning all grant requirements have been met and the grants are closed. The other ten grants assessed are either in the process of closing or are actively involved in project development. Of the sixteen closed grants, twelve projects continued working on the project beyond grant completion, with or without additional funds.

Project results are posted on **40+** websites



12/26 projects have or will publish project results in **popular newspapers or journals**, totaling **44 articles**



12/16 projects continued working on a project beyond grant closure, with or without additional funding

Projects had diverse target audiences, including:

UNEXPECTED IMPACTS:

As part of the impact assessment, project partners were asked if they encountered any unexpected project outcomes. Some of their responses included:

- Virginia Tech graduate course, *Infrastructure for Resilience*, developed during project still active and popular years following grant closure. (2010 NUCFAC-recommended project: *Green Infrastructure Assessment: Mapping and Evaluating the Support System for Green Infrastructure Planning in the United States*)
- Worldwide interest in research demonstrating the positive effects of urban forests on human health and well-being (2011 NUCFAC-recommended projects: *A Dose of Urban Forestry and Urban Forest Human Health and Well-being Benefits: Translating Evidence to Economic Valuation Models*)
- Green Student Ambassadors from Houston, Texas invited to Washington, DC to talk about their work on a national stage at the Environmental Justice Conference. (2013 NUCFAC-recommended project: *GreenSchools: A Model for Green Communities*)
- Increased news coverage for project occurred due to a prior outbreak of West Nile Virus (2012 NUCFAC-recommended project: *Impact of Forest to Urban Conversion on Human Health*)
- Web resource developed for urban forestry and energy conservation project generated worldwide reach, including popularity in Canada, India, the United Kingdom, Australia, and the Philippines (2011 NUCFAC-recommended project: *Energy Conservation & Urban Forests eXtension Community of Practice*)

CASE STUDY

Urban and Community Forests Create Jobs

Urban forestry and natural infrastructure provide potential job opportunities for underserved communities. A NUCFAC-recommended research grant investigated the connections between investments in urban forests, job creation in under-invested communities, and increased access to nature in the city. The project found that the total number of jobs in urban forestry and natural infrastructure are not large in relation to the size of the economy, but the number of jobs in these fields are growing. Barriers to employment in these fields exist; however, there are a range of existing interventions that are making the field of urban forestry more inclusive and accessible to people from historically underserved communities.

"Urban forestry jobs, when led with equity and inclusion, can maximize economic benefits for underserved communities."

– Chris Schildt, Policy Link, Project Partner

31,800 people reached through promotion of project results

2015 NUCFAC-recommended project: *Evaluating the Job-Creation and Community Social and Economic Benefits of Urban Forestry and Related Green Infrastructure*

Learn more at: www.ecotrust.org

GRANT RECIPIENT INSIGHTS:

"The National Wildlife Federation [NWF] had an awareness for the need of scalable strategies to reconnect children and families with nature. We saw an interest in natural play areas as an expression of that."

Allen Cooper, Director of Organizational Learning, Arbor Day Foundation—2011 NUCFAC-recommended project: *The Natural Play and Learning Areas National Guidelines Project*

"Society of Municipal Arborists [SMA] members love to share their knowledge and experience and many of them have told me that sharing their knowledge and experience with the interns has been the best part of their career."

Jerri LaHaie, Executive Director, SMA—2010 NUCFAC-recommended project: *SMA Urban & Community Forestry Internship Program: Preparing Students for Urban Forestry Positions*

"We have seen the power of monetization of urban forest [environmental services] using i-Tree. Human health monetization gets more attention than environmental services with some stakeholders. When you talk to people about health, about going walking and how much better their health is when they have trees around them in the city, people more readily connect to the idea that urban forests have economic value."

Kathleen Wolf, Ph.D., Research Social Scientist, University of Washington—2011 NUCFAC-recommended project: *Urban Forest Human Health and Well-Being Benefits: Translating Evidence to Economic Valuation Models*

"The project brought a diverse group of Cooperative Extension urban forestry professionals together."

Bill Hubbard, Ph.D., Southern Regional Extension Forester, Southern Regional Extension Forestry, University of Georgia—2011 NUCFAC-recommended project: *Energy Conservation & Urban Forests eXtension Community of Practice*

"One of the reasons we wanted to do this project was because we recognized that green infrastructure organizations and agencies were a disconnected group and could benefit from working together to access available resources and address broader green infrastructure challenges."

David Robertson, Senior Fellow and Associate Director, Virginia Tech Center for Leadership in Global Sustainability—2011 NUCFAC-recommended project: *Green Infrastructure Assessment: Mapping and Evaluating the Support System for Green Infrastructure Planning in the United States*

"There are 530 regional councils in the country. About 200 are National Association of Regional Council (NARC) members, which cover about a third of the country's population and twenty-two of the top 25 major metro areas in terms of NARC membership. As a result, this project's results were promoted very broadly."

Leslie Wollack, Executive Director, National Association of Regional Councils - 2013 NUCFAC-recommended project: *Urban and Community Forestry Framework: A Comprehensive Approach to Integrate Forestry into Communities Nationwide*

"This project got kids excited about science and encouraged kids to want to become scientists."

Michelle Cole, Outreach Administrator, Auburn University - 2012 NUCFAC-recommended project: *Impact of Forest to Urban Conversion on Human Health*

"The [Society of Municipal Arborists (SMA)] internship had a huge impact on my life. It exposed me to all responsibilities related to being a municipal arborist, including planning, budgeting, and working with diverse audiences. After completing the SMA internship, I realized this was what I wanted to do. Because of this internship, I am now working as an environmental planner at a municipality."

Andrew Benjamin, 2011 SMA Intern, Surrey, BC, Canada - 2010 NUCFAC-recommended project: *SMA Urban & Community Forestry Internship Program: Preparing Students for Urban Forestry Positions*

"Working with the bioretention project set up [at my high school for this grant] has enhanced my understanding of the importance of native trees to their ecosystem, particularly regarding erosion and soil quality. It has also influenced my ideas regarding my college major. With the information I have learned from participating in this project, I am now considering going into biology and environmental studies in college and graduate school."

Junior at West High School in Knoxville, Tennessee - 2014 NUCFAC-recommended project: *Stormwater Goes Green?: Investigating the Benefit and Health of Urban Trees in Green Infrastructure Installations*

"The Latino communities we focused on in Los Angeles and Houston [for this project] were underserved communities that had many barriers to understanding and appreciating the value of urban forests and the health and environmental benefits they brought. The park and recreation departments in both cities did a number of events that led to one on one exchanges that we think had some of the longest lasting effects on the perception and understanding of the value of urban forests."

Richard Dolesh, Vice President for Strategic Initiatives, National Recreation and Park Association - 2013 NUCFAC-recommended project: *Engaging the Hispanic Community in Urban Forestry*

PROJECT DELIVERABLES:

Project products, or deliverables, assist target audiences and stakeholders in utilizing project results. From the twenty-six projects we assessed, the following total project deliverables have been or will be created:

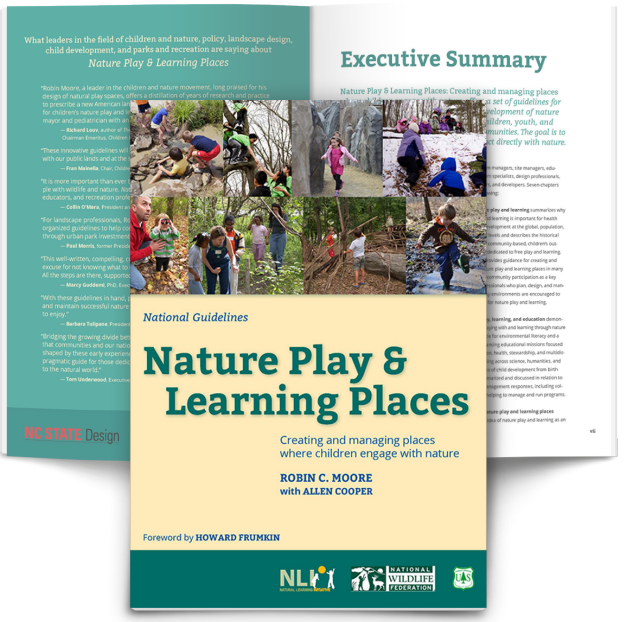
- **23** WEBINARS
- **8** WEBSITES
- **7** MAPPING TOOLS

- **44** PEER-REVIEWED JOURNAL ARTICLES
- **134** OTHER PUBLICATIONS[1]
- **4** TECHNICAL REPORTS
- **41** CASE STUDIES

- **208** CONFERENCE & MEETING PRESENTATIONS
- **30** WORKSHOPS

- **39** PUBLIC OUTREACH EVENTS

- **9** DEMONSTRATION SITES
- **13** GUIDELINES/BMP[2]
- **15** ASSESSMENTS[3]



The Nature Play & Learning Places: Creating and Managing Places where Children Engage with Nature publication has become the definitive design guide for nature play areas. It was downloaded more than **2000** times in the two weeks following publication.

—Allen Cooper

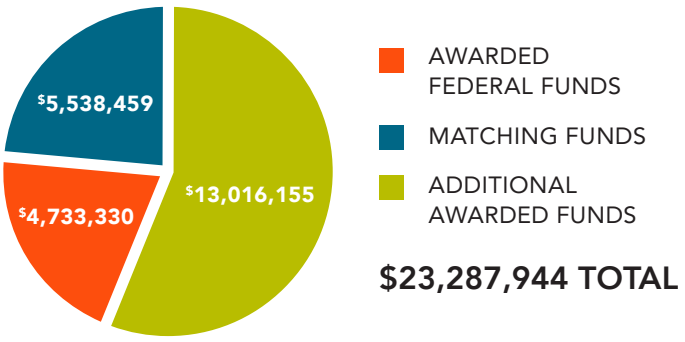
2011 NUCFAC-recommended project: *The Natural Play and Learning Areas National Guidelines Project*

[1] Non peer-reviewed publications, fact sheets | [2] BMPS-Best Management Practices | [3] Environmental and tree-planting survival assessments

CONCLUSION:

The twenty-six NUCFAC-recommended projects assessed in this analysis (current and completed) were awarded a total $4,733,330 in federal dollars which were supplemented with $5,538,459 in matching funds and $13,016,155 in further funding, totaling $23,287,944. **This equates to a return of $4.92 for every $1 of federal funds invested.**

In conclusion, this project impact assessment utilized current survey and interview techniques to evaluate some of the quantifiable impacts of the NUCFAC recommendations to the USDA Forest Service's National Urban and Community Forestry grant program over a 5-year period. From our analysis, we conclude that the USDA National Urban and Community Forestry grant program has been very effective in delivering products and services that have had a very large impact. If these survey techniques were applied to the review of the entire program from 1994 to present, (212 grants and $20 million) the result, from a very conservative perspective, would be in the range of over $98.4 to $113.2 million.



ONE DOLLAR
FEDERAL FUNDS INVESTED
= $4.92 RETURN

"NUCFAC-recommended funding helps organizations create critical connections between local communities and the urban forests that provide important health and environmental benefits, and foster learning and stewardship to help protect these areas."

– Diane Wood, 2013 NUCFAC-recommended project: *Engaging the Hispanic Community in Urban Forestry*

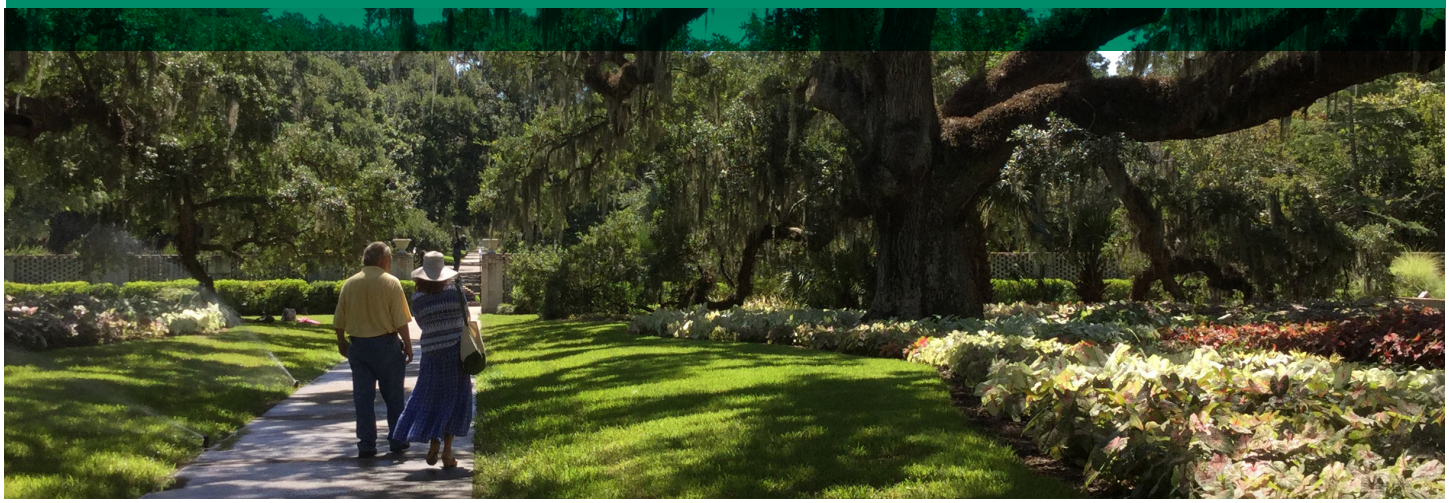


Photo Credit: Holly Campbell, Southern Regional Extension Forestry

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Appendix A: Projects Evaluated for this Assessment

2010

Project title: *Disaster Management Protocol*

Awarded to: Rachel Barker, Regional Planning and Development Commission

More information: www.urbanforestrysouth.org

Abstract: We propose to reduce the impact of storms on urban forests by helping counties and communities plan to manage trees and vegetation prior to an event so that there is less debris after an event by having them focus their efforts on trees in transportation corridors leading to critical infrastructure as well as along main thoroughfares. This will be accomplished by introducing a GIS vegetation map layer that will highlight these critical areas of urban forest to be managed. Approved urban forestry techniques such as proper species selection, proper pruning, and professional evaluation of "at risk" trees as well as proper and appropriate planting without utility interference will be outlined in a Vegetative Risk Management Plan Template and in accompanying Webinar training. We propose to lessen personal injuries and property damage by, in our Vegetative Risk Management Plan Template, identifying urban forests co-located with or en route to critical infrastructure; as well as recommending the proper and professional management techniques of trees surrounding this critical infrastructure, and all public infrastructures. This will lessen the risk of failure of these trees and the subsequent potential damage to life and property which can be caused due to storm events. Our proposal will decrease emergency management costs by reducing future potential debris as a product of managing urban forests, as well as educating local governments on the process of integrating urban forestry into both Debris Management Plans (response/recovery) and Vegetative Risk Management Plans (preparedness/mitigation). Our proposal will also provide instructions on how to obtain information for the development of Debris Management Plans as well as the templates to create the Vegetative Risk Management plans. Professionally managing a community's urban forest will directly decrease emergency management costs by creating a more viable, healthy tree canopy. Knowing how to approach and manage debris prior to a storm can also save time and money, and we will support the development of FEMA and State Emergency Management Agency approved Debris Management Plans which utilize proper professional urban forest management techniques.

Project title: *SMA Urban & Community Forestry Internship Program: Preparing Students for Urban Forestry Positions*

Issued to: Jerri LaHaie, Society of Municipal Arborists

More information: www.urban-forestry.com

Abstract: Preparing college students for careers in urban forestry is a challenge matched by employers' difficulty in finding qualified candidates to fill municipal forestry positions at all levels. This project will provide students majoring in urban forestry with a hands-on work experience in a municipal setting, and will provide guidelines for municipalities to follow in ensuring that students experience the full range of job duties, as well as an evaluation instrument for assessing students' participation. Both students and potential employers will benefit from developing job candidates who have directly experienced the job duties of the municipal forester.

2011

Project title: *Energy Conservation & Urban Forests eXtension Community of Practice*

Issued to: Bill Hubbard, Ph.D., University of Georgia-Southern Regional Extension Forestry

More information: http://articles.extension.org/trees_for_energy_conservation

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Abstract: The purpose of this project is to develop a national online resource geared towards developers, businesses, communities, planners, homeowners and the general public focused on the role urban forests play in energy conservation. Studies show that appropriately placed and cared for urban trees and forests improve air quality, increase property values, conserve energy, and promote community development. The general public, businesses, developers, and many communities continue to have little understanding of or access to information related to the role urban trees and forests can play in conserving energy. This Internet resource will utilize a nationally recognized and supported electronic delivery system called "eXtension". eXtension is a partnership supported by the USDA, land grant Universities, and key public and private groups from across the nation. Content will be developed by an Energy Conservation and Urban Forests Community of Practice and include but are not limited to fact sheets, literature and study synopses in a peer-reviewed "Wiki" format, links to tools and technologies such as CityGreen® and i-Tree based systems, live and archived webinars, Frequently Asked Questions (FAQs), online-training, and access to experts within the energy conservation and urban forestry arenas.

Project title: *Green Infrastructure Assessment: Mapping and Evaluating the Support System for Green Infrastructure Planning in the United States*

Issued to: David Robertson, Ph.D., Virginia Tech- Center for Leadership in Global Sustainability

More information: www.greeningthegrey.org

Abstract: Since the mid-1990s, the idea of green infrastructure has spread rapidly, and numerous and diverse stakeholders now practice green infrastructure planning at multiple scales nationwide. As the green infrastructure field matures, it is important for its practitioners and champions to assess past accomplishments and future opportunities. To build the capacity of the national network of green infrastructure practitioners, including the Green Infrastructure Community of Practice, and encourage a positive evolution of the green infrastructure movement into the mainstream, Virginia Tech and the National Association of Regional Councils (NARC) proposes a two-year project to conduct a comprehensive assessment of the institutional support system for green infrastructure planning and implementation in the United States. The project will produce a series of specific deliverables, including a final report and "road map" that will 1) describe the current state of practice and existing support system for green infrastructure planning (including how the system is perceived by planners); and 2) evaluate opportunities for improving the support system for green infrastructure planning at multiple scales (including specific recommendations at the national level). The project also will distribute findings to a national audience of professional planners, government program managers, and policymakers at various governmental levels.

Project title: *Encouraging Efficient Green Infrastructure Spending*

Issued to: Jennifer Cotting, University of Maryland- Environmental Finance Center

More information: https://efc-test.umd.edu/encouragingefficientgreeninfrastructureinvestment.html

Abstract: The significant impact that good green infrastructure planning has had in communities throughout the county is well documented. The benefits of green infrastructure practices span a wide range of community priorities including, but not necessarily limited to, air and water quality improvements, land and energy conservation, public health and safety, and enhanced transportation management (see literature review). Local and regional planning is at the core of successful green infrastructure implementation. Land use decision-making is primarily a function of local jurisdictions, and communities are increasingly incorporating a green infrastructure approach to their planning efforts. This approach provides both a valuable framework for planning, decision-making, and also makes sound economic sense. Achieving multiple priorities with a few strategically placed investments helps communities stretch budgets while simultaneously optimizing returns on investment.

Project title: *Managing Urban Forests to Increase Community Resiliency to Climate Change*

Issued to: Andrew Whitman, Manomet Center for Conservation Science

More information: https://www.manomet.org/program/sustainable-economies/creating-resilient-urban-and-community-forests

Abstract: Introduce a new workbook designed to help communities manage and use their urban forest resources to mitigate the impacts of climate change.

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Project title: *Urban Forest Human Health and Well-Being Benefits: Translating Evidence to Economic Valuation Models*

Issued to: Kathleen Wolf, Ph.D., University of Washington-School of Forest Resources

More information: www.greenhealth.washington.edu

Abstract: Anecdotes and stories recount how urban trees and forests contribute to human health and wellbeing (HHWB). A broad base of scientific evidence also describes such benefits. Yet the studies are distributed widely across disciplines and publications, making them difficult to access. A USFS supported team at the UW is preparing a compendium of the studies, with summaries to be available on the web in 2010. The research compilation could serve as the foundation for development of "i-Tree Community" to provide a practical analysis tool. This cost-share project would move the literature review one more step in development of the i-Tree model. Our project approach includes a multidisciplinary collaborative team to translate the evidence of HHWB benefits to economic valuation. The team will prepare a comprehensive framework of valuation approaches and outcomes, demonstrating why communities should invest in urban forestry to enhance social benefits. An expert panel will be recruited to review and revise the core work of the project team. This project will generate the economic basis of an i-Tree Community tool, expanding the current environmental benefit focus of i-Tree to include an expanded range of urban forest benefits, and build better support for urban forestry across U.S. cities.

Project title: *The Natural Play and Learning Areas National Guidelines Project*

Issued to: Allen Cooper, National Wildlife Federation

More information: www.natureplayandlearning.org

Abstract: Incidences of childhood maladies are on the rise, including obesity, diabetes, rickets, attention disorders, and depression. Today's 'indoor children' are missing the physical, emotional and developmental benefits of outdoor play in natural settings. Research indicates that children in natural settings play and learn with engagement, imagination, and symptoms of attention deficit are reduced. Experts agree: children need access to nature the same way they need nutrition and sleep. Our project will restore children's relationship with nature the same way the need nutrition and sleep. Our project will restore children's relationship with nature by bringing nature to play and outdoor learning spaces at schools, child-care centers, parks, museums, and zoos. We will develop national design guidelines which define core elements of a natural play and learning area and address the management, liability, and accessibility issues that any design must confront. The Natural Play and Learning Areas National Design Guidelines Project will bring natural play and learning area design into the mainstream by 1) developing comprehensive guidelines for designing and managing natural play and learning environments at all of the major settings where children play and learn, including schools, and childcare centers; 2) endorsing use of these guidelines; and 3) providing technical support for those who create and manage natural play and learning areas.

Project title: *A Dose of Urban Forestry*

Issued to: William Sullivan, Ph.D., University of Illinois- Department of Landscape Architecture

More information: www.urbanforestrysouth.org

Abstract: Although it is well established that viewing nature can help individuals recover from a stressful experience, the dose-response curve describing the relationship between tree cover density and stress recovery is totally unclear. A total of 160 participants engaged in a standard Trier Social Stress Test to induce stress. Participants were then randomly assigned to watch 1 of 10 three-dimensional videos of street scenes that varied in the density of tree cover (from 2% to 62%). Participants completed a Visual Analog Scale questionnaire at three points in the experiment. Analysis revealed a positive, linear association between the density of urban street trees and self-reported stress recovery, adjusted $R2 = .05$, $F(1, 149) = 8.53$, $p < .01$. This relationship holds after controlling for gender, age, and baseline stress levels. A content analysis of participants' written narratives revealed a similar but even stronger association. These findings suggest that viewing tree canopy in communities can significantly aid stress recovery and that every tree matters.

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Project title: *A New i-Tree Tool for Assessing Forest Impacts on Urban Ecosystems*

Issued to: Charles Kroll, Ph.D., State University of New York- College of Environmental Science and Forestry

More information: www.itreetools.org

Abstract: This project will create a new spatially distributed modeling tool that is an enhancement over the current USDA Forest Service's Urban Forest Effects (UFORE)/i-Tree Eco Model. The current i-Tree Eco lumps the urban area as a single unit, and thus is not sensitive to predicting the localized impact of proposed changes in urban forest structure. A distributed i-Tree Eco will allow urban planners to assess the localized impact of urban forest changes. Working intimately with our USDA Forest Service Northern Research Station partners, we will develop a consistent and efficient platform for inter-model data storage and retrieval. We will also test current i-Tree Eco inputs and assumptions against alternative distributed data sets, including those derived from remote sensing and output from US EPA models such as WRF and CMAQ. Results from this project will have a national significance, as we will develop an input structure that takes advantage of readily available national databases so that is can be applied in other cities across the United States. Case studies will include Baltimore, MD, Syracuse, NY, and Los Angeles, CA. The resulting modeling system will be integrated within the USDA Forest Service's online i-Tree Modeling Suite for wide dissemination.

2012

Project title: *"Trees and People" – a two-way street: A research program to assess the direct and indirect effects of urban tree-planting programs in the face of climate change*

Issued to: Burnell Fischer, Ph.D., Indiana University, School of Public and Environmental Affairs

More information: https://urbanforestry.indiana.edu

Abstract: We seek funds for an interdisciplinary, collaborative, multi-city research program to evaluate urban tree-planting programs' direct effects --survival/growth of urban trees --and indirect effects --engaging neighborhoods/individuals in tree-planting programs and other community projects aimed at adapting to climate change. We have partnered with Alliance for Community Trees and five tree-planting nonprofit organizations across the country to expand the research we are conducting with Keep Indianapolis Beautiful. We seek to collect data via two protocols: re-inventories of young trees for data on tree-specific and local environmental variables, and surveys and interviews about social, indirect effects for data on individual/community characteristics and management practices. We will conduct these protocols in each organization's city to assess the outcomes of their programs. Results of this research will (1) help close the gap between the organizations' desired knowledge and existing practice; (2) generate data for a national-scale assessment of community tree-planting programs in the face of climate change; and (3) inform best practices for volunteer planting programs and environmental stewardship, particularly related to communities' adaptive capacities for climate change. We are requesting $188,214 and will have $198,334 matching funds, mostly in-kind, from participating groups to perform this large-scale, holistic assessment of urban tree-planting programs.

Project title: *Carbon Sequestration and Resiliency of the Urban Forest*

Issued to: Bryant Scharenbroch, Ph.D., The Morton Arboretum

More information: www.chicagourbanforeststudy.org

Abstract: The proposed collaborative project will further understanding of urban forest responses and mitigation potential related to projected climatic change. Currently, stakeholders lack a comprehensive understanding of carbon storage in urban ecosystems, resilience of urban forests to projected climatic fluctuations, and variation in both across an urban continuum. We aim to fill these important knowledge gaps by building upon existing regional-scale urban forest data-sets with intensive sampling of carbon storage in urban soils, dendrochronological analysis of urban tree growth resilience, and development and validation of an urban tree site index. The outcomes of this work will be a more complete understanding of urban ecosystem carbon sequestration and storage potential and likely response of urban trees to projected climate change across a metropolitan

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region. We will partner with a diverse team of scientists, educators, advocates, and policy-makers to produce and disseminate this knowledge, which is essential to maintaining and promoting the benefits of urban forests. Products will be made available to a diverse audience of professionals, public, and non-traditional partners through a variety of platforms including scientific and professional meetings and publications, education and outreach events, mailings, and interactive web-based tools.

Project title: *Engaging the Hispanic Community in Urban Forestry*

Issued to: Franca Brilliant, National Environmental Education Foundation

More information: www.neefusa.org

Abstract: There is compelling evidence that urban forests are extremely important to the economic, environmental, and social health of cities but that low income, urban populations are among the most deprived groups in terms of access to forests and trees. Hispanic populations, which are concentrated in underserved neighborhoods in many US cities, face unique linguistic and cultural obstacles to accessing urban forests and green spaces. This project unites the National Environmental Education Foundation (NEEF), the National Parks and Recreation Association (NRPA) and the Hispanic Communications Network (HCN) in a two pronged, Spanish-language awareness and education campaign to engage Hispanic communities in experiencing the benefits and supporting the growth of urban forests. HCN will create a national campaign with branded messaging, radio spots for HCN's national network of 250 Spanish language stations and social media strategies. NEEF and NRPA will partner with local organizations in Los Angeles and Houston to promote community level engagement activities for Hispanics that build off existing urban forestry initiatives and will use HCN messages to enlist community support. Findings and best practices from this project will be disseminated through NEEF, NRPA, and HCN national networks and other stakeholders to promote nationwide replication.

Project title: *Impact of Forest to Urban Conversion on Human Health*

Issued to: Graeme Lockaby, Ph.D., Auburn University-School of Forestry and Wildlife Sciences

More information: www.urbanforestrysouth.org

Abstract: Urbanization is the primary cause of tree cover loss in the southeastern United States and is associated with major impacts on stream hydrology and water quality. The loss of tree cover is linked with higher incidence of some diseases, particularly arbovirus-related (i.e. mosquito vectored) such as West Nile Virus (WNV). Forested watersheds are characterized by stable hydrology and clean water; however, as tree cover declines during development, stream velocity, discharge, and concentrations of pollutants climb dramatically. These changes increase the likelihood of sewer overflows and formation of stagnant pools of polluted water, conditions which are favorable for mosquito habitat. However, there is confusion concerning the influence of different types and configurations of forests due to a lack of detail in tree cover characterization in many previous reports. We will use GIS to examine how variation in urban tree cover characteristics relates to hydrology and water quality and, finally, to incidence of WNV in mosquitoes, birds, and humans. We will transfer our findings to K-12 students, the general public, teachers, and managers in order to increase awareness of the role of urban trees in disease protection and provide suggestions for managing urban forests for reduction of WNV infection risk to humans.

2013

Project title: *GreenSchools: A Model for Green Communities*

Issued to: Dinetta Parott, American Forest Foundation

More information: www.plt.org

Abstract: Educating schoolchildren and communities in the benefits of urban forests, conservation of natural resources, and the importance of reestablishing a connection with nature are at the heart of the GreenSchools: A Model for Green Communities outreach and environmental education

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program. Innovative elements include: 1) a network establishing a continuum of developmentally appropriate urban forestry experiences from early childhood through college, 2) strengthening current investigative aspects and associated action projects related to Project Learning Tree GreenSchools! (GS) program through the implementation of GS in the educational feeder pattern for a strengthened effort within school districts, 3) professional development focusing upon arboriculture, sustainable urban forestry practices, and site inventory analysis and site planning for educators, students, and community members, 4) development of an Early Childhood (EC) guide to assist with GS implementation, 5) design of Arbor Day Foundation - Nature Explore outdoor classroom areas, 6) collaboration with non-traditional partners such as Friends NFGT Latino Legacy, Texas A&M Forest Service Diversity Outreach Team, the Chikawa Aztec Cultural Group, and associated youth leaders from diverse backgrounds, to provide mentorship, guidance, and leadership, and 7) partnership with GS, universities, and USFS in providing higher education and career pathways in natural resource conservation and management.

Project title: *Urban and Community Forestry Framework: A Comprehensive Approach to Integrate Forestry into Communities Nationwide*

Issued to: Mia Colson, National Association of Regional Councils

More information: http://giftoolkit.org

Abstract: The Vibrant Cities & Urban Forests: A National Call to Action report released in 2011, acknowledges a growing awareness that making real, sustainable progress in urban forestry and green infrastructure programs requires collaboration among citizens, organizations, and industry and local, state, and federal government, a challenge we have heard repeatedly in our Team's examination of the institutional landscape for green infrastructure implementation in the U.S. The National Association of Regional Councils (NARC) and Virginia Tech's Center for Leadership in Global Sustainability (CLiGS) are pleased to propose a one-year project to develop a framework to support regional councils and metropolitan planning organization alliances as catalysts and brokers of cross-sector partnerships to develop more integrated, collaborative and sustainable green infrastructure programs that include urban forests as a central element. The target audience for this framework is regional councils and metropolitan planning organizations because they are well positioned to serve as catalysts for change and brokering roles across jurisdictions to affect cooperation, planning and policy decisions. NARC and CLiGS (Team) is proposing to develop a freely available online framework, consisting of a series of descriptive processes, and supporting resources and materials, to facilitate green infrastructure program development at regional and local levels.

Project title: *A Regional Approach to Understanding the Urban Forestry Workforce and Building its Capacity through Collegiate Programs*

Issued to: Susan Day, Ph.D., Virginia Tech- Department of Forest Resources and Environmental Conservation

More information: http://urbanforestry.frec.vt.edu/allprojects.shtml

Abstract: Urban forestry knowledge and practice has developed significantly in recent decades. Increasingly, specialized education is required to be an effective urban forestry professional. In response, the Society of American Foresters (SAF) has developed a specialized accreditation for urban forestry curricula, and universities are investing in urban forestry programs. However, student enrollment in these programs remains low, threatening both the availability of qualified urban forestry professionals and continued development of the profession. We will address these challenges through a collaborative discovery process using regional roundtables, focus groups, surveys, and an exploration of literature to assess the needs of municipalities as well as perceptions of students and professionals. The multistate partnership includes: universities, community colleges, municipalities, and state agencies. The project will create and implement a regional recruitment plan that can be replicated nationally to increase enrollment and professional development. Recruitment products and strategies will be implemented throughout the region by each partner. Complimentary efforts will target underserved populations by leveraging a capacity-building initiative underway at Virginia State University. We will validate results via enrollment data and follow-up surveys. Results will be made available for use in other regions via a central website, presentations at conferences, and journal publications.

2014

Project title: *Mobile Tree Failure Prediction for Storm Preparation and Response*

Issued to: Andrew Koeser, Ph.D., University of Florida

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More information: https://www.treefailureproject.com

Abstract: Urban forest managers are limited in their ability to predict tree failure during storms. If funded, we would create an openly available data collection and GIS mapping mobile application to help professionals quantify tree risk in the urban forest. This process would begin with a systematic, nation-wide survey of storm-related data. Predictive models built from this data would then be incorporated into a tree-failure-prediction tool offering a direct application of the research conducted. Model building is a continual process, which requires additional data to gauge and increase predictive success. To encourage post-storm data collection, the tree prediction application will be designed to be paired with existing storm debris estimations. User failure data derived from these applications will be made openly available to all researchers and professionals through the International Tree Failure Database, providing the standardized data needed to enhance our understanding of wind-related tree failure. Finally, a storm preparation and response Best Management Practices guide-book will be developed to help urban forest managers utilize this and other tools currently available to their fullest potential as part of an integrated storm preparation and response strategy.

Project title: *Jobs for the Future Green Infrastructure Jobs Analysis*

Issued to: Mary Wright, Jobs for the Future

More information: www.jff.org/initiatives/natureworks

Abstract: Jobs for the Future (JFF), a leading national workforce development nonprofit organization focused on identifying and expanding strategies to propel low-income and other underserved populations to economic success will build upon its strong history as a leader in green sector workforce development and its unique expertise in labor market analysis to produce thorough and actionable research products intended to build the business case for the importance of green infrastructure investments in our communities. JFF proposes an 18-month green infrastructure jobs analysis that features four components: 1) analysis of existing green infrastructure projects to determine their success as engines of job creation; 2) analysis of national traditional real time labor market data to give a picture of employment in green industries; 3) study of green infrastructure job wages and how they compare to related industries; and 4) identification of promising strategies for expanding green infrastructure jobs growth in both the private and public sectors to make the business case for investment in green infrastructure projects. The primary deliverable will be a final report, which will be widely and strategically distributed for maximum impact, as well as associated products such as significant web presence, videos, and webinars.

Project title: *From Gray to Green: Tools for Transitioning to Vegetation-Based Stormwater Management*

Issued to: Kalanithy Vairavamoorthy, Ph.D., University of South Florida

More information: (Website not yet established)

Abstract: Many cities recognize the potential to use green infrastructure strategies that emphasize trees and urban forests to manage and mitigate urban stormwater runoff (e.g. nutrient load), yet most lack systematic strategies to transition from the existing conventional (gray) drainage systems to green infrastructure. This project is intended to provide natural resource managers, planners, and engineers with decision-support tools to aid the strategic planning process for transitioning to green infrastructure systems that emphasize trees and urban forests. First, a GIS-based mapping tool will help users identify areas suitable for green infrastructure, factoring in site conditions and existing drainage systems. Second, an optimization tool will help users identify an optimal mix of existing gray and new green infrastructure. A final decision support tool will help users select the preferred combination of gray and green options, given site constraints, water quality objectives, and key secondary social and ecological benefits of trees and urban forests (e.g. shade, heat-island mitigation, noise abatement). When used in combination, the proposed toolset will identify a prioritized, optimal transition pathway from gray to green infrastructure. The entire suite of tools will be supplemented with supporting documentation, including case studies in Tampa and Hillsborough County (Florida) and Milwaukee (Wisconsin).

Project title: *Making Urban Trees Count: A Project to Demonstrate the Role of Urban Trees in Achieving Regulatory Compliance for Clean Water*

Issued to: Karen Capiella, Center for Watershed Protection

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More information: www.cwp.org/online-watershed-library/

Abstract: Stormwater managers need cost-effective practices to meet Clean Water Act permit requirements and improve water quality. The use of trees as a BMP is hampered by the uncertainty of how to "credit" trees for runoff and pollutant load reduction in order to compare with other BMPs. Quantified tree benefits are not accessible to the stormwater community, limiting the potential to use for pollutant removal credits. The Center for Watershed Protection will address this challenge by developing a model design specification for urban tree planting that addresses crediting, verification, cost-effectiveness, and tree health. The expected outcome is incorporation of the specification into stormwater manuals and greater use of tree planting for MS4 compliance. The Center will conduct a comprehensive literature review, apply a tree planting credit and verification system in Washington, DC, and evaluate the influence of leaf litter on stormwater pollution in partnerships with the District of Columbia Department of the Environment and the University of Maryland. A collaboration of a panel of experts will review these results and make recommendations to inform the model design specification. The Center will transfer the project results through its network of watershed and stormwater professionals in a targeted, national dissemination effort.

Project Title: *Stormwater goes Green? Investigating the Benefit and Health of Urban Trees in Green Infrastructure Installations*

Issued to: Jon Hathaway, Ph.D., University of Tennessee-Knoxville

More information: (Website not yet established)

Abstract: Trees have many important functions within the urban environment including air quality improvements, wildlife habitat, and mitigation of the heat island effect; however, their contribution to green infrastructure used for stormwater management is not well understood. There is a critical need to understand the health and role of trees in these systems (specifically compared to other vegetation types) to enable urban foresters and engineers to select the most appropriate plant material to maximize functionality of natural stormwater treatment systems. The goal of this project is to demonstrate the role of trees in bioretention areas in the eastern United States and beyond, and to make recommendations regarding system design and tree species selection to maximize bioretention area functionality and tree health. Tree health and function will be quantified using a field survey of existing systems, a laboratory experiment to compare tree performance to other types of vegetation, and a field performance study of tree-specific stormwater treatment devices. Based on the results of these studies, design guidelines will be developed which explain how best to integrate trees into bioretention areas. These guidelines will be distributed through various internet media, readily available electronic fact sheets, and nationally promoted webinars.

2015

Project Title: *Planning for Equitable Urban Landscapes*

Issued to: Robert Fahey, Ph.D., Morton Arboretum

More information: www.nrs.fs.fed.us

Abstract: This project will develop new tools and maps focused on identifying communities underserved by urban forest green infrastructure, evaluating resilience under future scenarios, and optimizing management strategies to mitigate disparities and risks. Specific project objectives are to: 1) develop tools within the US Forest Service's i-Tree platform to identify current ecologically underserved locations and prioritize urban forest management practices; 2) incorporate future scenarios of tree species composition, climate, pests and urban development into tools developed in objective 1 ; 3) create databases of underserved communities within 10 US urban areas, evaluate likely risks and resilience for these communities under climate and development scenarios, and develop optimized urban forest management strategies based on current and future estimates of composition and age structure, plantable space, and benefits; 4) disseminate developed tools and results through the i-Tree software platform, partnerships with regional urban planning agencies, a national planning workshop, conference presentations, journal articles, and webinars. Underserved communities will be engaged through The Nature Conservancy's Leaders in Environmental Action for the Future program and community stakeholders. Deliverables from this project will provide urban managers/planners across the country a toolset to identify underserved communities and optimize investments focused on mitigating current conditions and future risks.

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Project title: *Integrating Trees into Stormwater Management Design and Policy-A Guide for Local Decision Makers*

Issued to: Travis Miller, Ohio-Kentucky-Indiana Regional Council

More information: www.treesandstormwater.org

Abstract: Integrating Trees into Stormwater Management Design and Policy – A Guide for Local Decision Makers will be a valuable resource for promoting, facilitating and increasing the use of trees for stormwater management. In spite of the proven value of trees for reducing stormwater flows and pollutants, there is widespread lack of understanding, acceptance, and credibility of their use for managing stormwater. The Guide will overcome these barriers by providing a practical tool that informs local governments of options and best practices for including trees in stormwater facility design regulations and policies. OKI and its team of national partners will develop a guide that is applicable across the nation. OKI will identify the most practical solutions based on perspectives of local government in its tri-state region. Davey Resource Group will draw upon its vast knowledge and understanding of forests and green infrastructure to ensure that the Guide is scientifically sound and feasible. Virginia Tech will compile a national inventory of local government policies and incentives for integrating trees into stormwater management solutions. NARC will work with OKI and its other members to ensure the Guide's applicability to other regions, with particular interest to ensure applicability for arid and tropical climates, and to promote it through NARC's national membership.

Project title: *Evaluating the Job-Creation and Community Social and Economic Benefits of Urban Forestry and Related Green Infrastructure*

Issued to: Noah Enelow, Ecotrust

More information: https://ecotrust.org

Abstract: Ecotrust, Verde, and PolicyLink propose an analysis of the job creation and social and economic benefits of community-scale, private sector investments in urban forestry and related green infrastructure. We will produce rigorous evidence of the impacts of these investments, particularly on low-income underserved communities; identify emerging green infrastructure markets; and detail a replicable model of community-based social enterprises that connects low-income people and people of color to the benefits of these investments. Our approach will combine a landscape analysis of projects across the U.S. with a more detailed analysis of case studies of urban forestry and related green infrastructure that bring environmental assets to low-income underserved neighborhoods, engage in local workforce training, and create contracting opportunities for minority-owned and women-owned businesses. Case studies will be based on Verde's direct experience with triple-bottom line social enterprises connecting green investment with communities of color and PolicyLink's experience with, and access to, data on green infrastructure projects nationally. These data will allow us to test the potential triple-bottom-line benefits of a strategy that combines greening infrastructure and targeting it to underserved communities of color with opportunities to train workers of color on new green technologies.

Project title: *Monitoring tree survival and performance in street-side stormwater management facilities*

Issued to: Igor Lacan, Ph.D., University of California-Cooperative Extension

More information: http://bioswales.net (future site)

Abstract: Street-side stormwater infiltration basins ("stormwater facilities") planted with vegetation that often includes ornamental trees are becoming increasingly common. However, little is known about the performance of trees – survival, growth, and health/pests – planted therein. This project evaluates tree survival, growth, and condition in stormwater facilities, over period of three years, with street trees of the same species and comparable age used as controls. We use the city of Portland, OR (>10 years experience with trees in stormwater facilities) as a long-term comparison for three cities in the San Francisco Bay Area (San Francisco, San Jose, El Cerrito; 0-4 years experience). Study will result in two products: a publication, and a monitoring protocol. Study results will be presented in a peer-reviewed article, trade journal article, and a webinar. The study results will also be used to construct a standardized monitoring protocol for trees in stormwater facilities, to be used by cities that are installing their own stormwater facilities. The protocol will be informed by the study results as well as the suggestions from partner cities, and will include instructions, data collection templates and calculation sheets, as well as a discussion of lessons learned in this study.

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Appendix B: Glossary-

Arboriculture- the cultivation, management, and study of individual trees and other woody plants. The science of arboriculture studies how trees grow and respond to cultural practices and their environment. The practice of arboriculture includes cultural techniques such as selection, planting, training, fertilization, pest and pathogen control, pruning, and removal.

Arborist- professional who possesses the technical competence gained through experience and related training to provide for or supervise the management of trees and other woody plants in residential, commercial, and public landscapes.

Community forest- A forest regarded as a resource for a local community; specifically a forest, usually close to an urban area, created both for recreational purposes and as part of a program for social, economic, and environmental regeneration.

Community forestry- forest management that actively promotes the rights of communities living in and around a forest to both participate in management decisions and to benefit (financially and in kind) from the results of the management.

Green infrastructure- living plants and natural materials within developed areas. Can be incorporated with gray infrastructure (utilities, paved surfaces, and buildings) to perform important ecological functions such as stormwater management, erosion control, temperature buffering, and more.

Urban forest- a forest or collection of forests within a city, town, or suburb.

Urban forester- an individual trained in or practicing urban forestry.

Appendix C: References-

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