



Research *Review*

Understanding and Caring for New York City's Urban Forest

Chances are you or someone important to you is an urban dweller. The United Nations has recently reported that urban dwellers worldwide now constitute about half of the world's 6.7 billion people. The United Nations has reported that there are 476 cities having at least 1 million inhabitants, with 36 having at least 10 million. Because so many people are already urban dwellers and more and more people are migrating to cities, urban livability is important to all cultures.

New York City (NYC) is America's largest and most diverse urban area, with a core of skyscrapers and concrete canyons in Manhattan plus four boroughs, each large enough to be major cities in their own rights. (For example, before Brooklyn became part of NYC in 1898, it was the fourth largest city in the United States.) There are now about 9 million people living in the five boroughs of the official New York City and 19 million people in the NYC urban "agglomeration"—or metropolitan region—making it the fifth largest in the world. NYC is full of many different and diverse neighborhoods, with residents living in varied communities of people with all sorts of ethnic, social, professional, and economic backgrounds, and cultural/artistic interests.

NEW YORK CITY'S URBAN FOREST

Although most parts of New York City are heavily developed, there are still many places that are not, and many that are changing. Millions of trees and plants in all the various neighborhoods with many different habitats make up what foresters call an "urban forest." There is even a little old-growth forest in the Bronx, Queens, and northern-most Manhattan. Although the phrase "urban forest" may seem somewhat contradictory, the urban forest is vital for the quality of life for residents and workers. Many urban dwellers are passionate about their greenery, whether it is the 590,000+ street trees or their rooftop garden in the Upper East Side or SoHo, the tiny backyard behind their Brooklyn brownstone, their community garden in Harlem, their suburban yard in Staten Island, their waterfront park in the South Bronx, or the shared parks all over the city. NYC has 29,000 acres of city parks: big ones like Central, Riverside, and Inwood Parks in Manhattan; Prospect Park and the Brooklyn Botanical Garden in Brooklyn; Pelham and Van Cortland Parks and the New York Botanical

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... [T]he effects of nature's qualities on health are not only spiritual and emotional, but physical and neurological.

Oliver Sacks, MD, New York City resident, neurologist, and author

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Garden in the Bronx; Flushing Meadow Corona Park in Queens; and the 2,200-acre landfill-to-park project at Fresh Kills in Staten Island. In addition, there are smaller neighborhood parks all over the city; plazas for many commercial buildings have trees and potted gardens; and citizens of many neighborhoods have their urban gardens and parks in vacant lots and schoolyards. In 2007, Mayor Michael Bloomberg and NYC Parks and the nonprofit New York Restoration Project committed to planting a million trees in NYC. This program involves many local, city, and state organizations, as well as the recently established U.S. Forest Service's Northern Research Station New York City Urban Field Station.

URBAN FIELD STATION IN NEW YORK CITY

The Northern Research Station's New York City Urban Field Station (UFS), established in 2006, provides an official Forest Service presence in the city and hosts scientists visiting from the units elsewhere. (The station's urban forestry unit in Syracuse, NY, has provided much of the basic science on the ecological benefits of urban trees and the Evanston, IL, unit has provided basics on their social benefits.) The scientists at the UFS work to:

- Promote natural resource stewardship and ecological literacy, with the goal to advance human well-being for residents of NYC and its metropolitan area
- Partner with municipal managers to create innovative "research in action" programs to support urban ecosystem management
- Conduct comparative research and disseminate information throughout other metropolitan regions in the United States and globally
- Link to a growing network of Forest Service scientists and facilities and university cooperators focused on urban research

Cities are constantly changing and presenting new challenges for urban land management and ecology. Important similarities exist between urban areas and more forested locales; questions regarding policies, public access and benefits, and forest fragmentation and health in urban areas are similar to those posed in forested communities, even though the urban environment might appear quite different on the surface.

The NYC UFS is a joint enterprise of the U.S. Forest Service Northern Research Station and the New York City Department of

Parks and Recreation and a rising center of excellence in urban natural resource stewardship. Two research social scientists, Erika Svendsen and Lindsay Campbell, have offices in lower Manhattan, and NYC Parks and the UFS are now sharing a supporting facility, at historic Fort Totten in Bayside, Queens, that features laboratory and office space plus residential units for visiting scientists. Since the founding of the UFS, its scientists have engaged with more than 30 nonprofit, governmental, and academic partners to make a far-reaching urban-ecology research network. This network is currently focused on stewardship mapping; urban tree canopy; public health, well-being, and urban livability; and environmental literacy. Within New York City, there are thousands of local community stewardship groups that are creating and caring for diverse open-space resources. The UFS works to connect with these groups and work synergistically. As a result of its unique relationships with the City of New York and its partners, the UFS received the Forest Service's 2008 Partnership Award.

NRS URBAN FIELD STATION PROJECTS

The UFS is working to care for urban lands and serve the people of NYC through many projects, including the following recent ones:

Getting Like Minds Together

Stewardship is one of the means by which civic groups have contributed to the sustainability of their local environments. These groups work alongside or independent of public agencies and private businesses in managing urban landscapes. The Urban Field Station's Stewardship Mapping and Assessment Project (STEW-MAP) provides a database and interactive maps that allow the public to visualize where and how environmental groups are working in New York City. The project has collected information from nearly 5,000 local citizens' groups and displays basic data for 405 groups citywide on the OASIS website alongside other open space data layers. These groups are involved with conserving, managing, monitoring, advocating for, and educating the public about their local environments (including water, land, air, waste, toxics, and energy issues). They range from informal block associations and kayak clubs to tree planting groups and environmental justice coalitions, in addition to the formal nonprofit educational institutions and museums. The project highlights existing stewardship gaps and overlaps and creates a framework to connect potentially fragmented stewardship groups, and to measure, monitor, and maximize the contribution of our civic resources.



The New York Restoration Project. Photo used with permission.

A newly planted street tree being watered by a volunteer.

STEW-MAP helps natural resource managers, funders, policymakers, civic groups, and the public find each other, connect, and work together. STEW-MAP was created in partnership with Dana R. Fisher (Columbia University), Jarlath O'Neil Dunne, an NRS scientist at the University of Vermont Spatial Analysis Laboratory, and the City College of New York (CCNY) Mapping Center, along with dozens of data providers and nonprofit partners. The stewardship research will be extended and further developed through the New York City, National Science Foundation-funded ULTRA-Ex project, "Understanding the Dynamic Connections Among Stewardship, Land Cover, and Ecosystem Services in New York City's Urban Forest," led by Fisher. This study looks at changes in stewardship, land cover, forest fragmentation, and meta-population capacity over the last 25 years, and UFS scientists will collaborate with Fiona Watt and Jacqueline Lu (NYC Parks), Christopher Small (Lamont Doherty Earth Observatory) and Gareth J. Russell (New Jersey Institute of Technology). The following websites are available:

To use the searchable database, visit: www.tinyurl.com/stewmap

To explore the online maps, visit: www.urbanresearchmaps.org/oasis/map.aspx

To read more about the research: www.nrs.fs.fed.us/nyc/focus/stewardship_mapping/

To learn more about the ULTRA-EX, visit: <http://iserp.columbia.edu/research-initiatives/centers-and-projects/environmental-stewardship-project>

Forest Service Funding Helps NYC Provide Green Jobs

The USDA has provided \$2 million for a program entitled "Restoring Community Ecosystems in New York." This program is creating "green jobs" in urban forestry, horticulture, and ecological restoration for 18- to 24-year-old graduates of the Million Trees Training Program (MTTP, a joint program of NYC Parks and the New York Restoration Project) and will also include research on the effectiveness of green jobs as pathways out of poverty.

The 20 participants graduated from the MTTP on May 29, 2009, and received 1-year appointments with the NYC Department of Parks and Recreation, New York Restoration Project, Central Park Conservancy, Prospect Park Alliance, New York City Housing Authority, Bronx River Alliance, New York Botanical Garden, or Wave Hill Garden. The NRS research on MTTP graduates will use multiple methods to follow participants to examine the usefulness of green jobs as career pathways out of poverty.

How Many Trees, How Much Forest?

In 2006, Northern Research Station scientists Morgan Grove, Jarlath O'Neil-Dunne, and David Nowak, working with Jeff Walton of Paul Smith's College, reported the citywide assessment of the urban tree canopy (UTC) that provided much of the basis of the Million Trees NYC campaign. The UTC assessment increased decisionmaker's understanding of their urban forest resources, both present and potential. Building upon the initial UTC report for New York City, advanced spatial analysis students from the Rubenstein School of Environment and Natural Resources at the University of Vermont worked with UFS scientists and natural resource professionals from NYC Parks in the Summer/Fall 2008. These students met with leaders of NYC Parks, neighborhood stewardship groups, and other city and federal agencies. They then designed and developed several alternative methods to determine priorities for planting. Selection criteria for priority areas included the need for new vegetation, socioeconomic characteristics of residents, and proximity to other features, both natural and built. The assessment can be read at the following website: www.nrs.fs.us.fed/nyc/local-resources/downloads/Grove.UTC.NYC.FINAL.pdf.

Exploring the Role of Urban Spaces in Human Health and Well-Being

In May 2009, the Northern Research Station published *“Restorative Commons: Creating Health and Well-being Through Urban Landscapes”* (GTR-NRS-P-39) in partnership with the nonprofit organization Meristem, to share lessons learned from the fields of urban natural resource management and design with other practitioners, policymakers, and the general public. The book expands from a 2007 conference that explored the relationships of human health, well-being, and the urban landscape and documenting some of the most compelling practices and principles currently utilized to create restorative commons either as small-scale experiments or as larger efforts to “institutionalize innovation.”

The Restorative Commons book comprises 18 articles of academic writing by researchers in the fields of medical history, evolutionary psychology, and urban planning as well as essays on practitioners’ experiential knowledge. The observations of practitioners and writings of theorists echo each other’s recognition of the primacy of citizen stewardship and creative design in developing new health-promoting environments. Thousands have ordered the book or downloaded the electronic version, which can be viewed or downloaded at the following website: www.nrs.fs.fed.us/pubs/8810.



Mark Twery, U.S. Forest Service. Photo used with permission.

Former Forest Service Chief Abigail Kimball is helping these students from Harlem Link Charter School to know more about their urban forest.

Helping Urban Children Know Nature

The Urban Field Station has supported a wide variety of local environmental literacy programs and partnerships with schools and organizations such as the Harlem Link Charter School (a K-5 public elementary school), Bronx Helpers–New Settlement Apartments (a teen leadership and service program), the New York City Housing Authority, Trees New York, Horticultural Society of New York, and Council on the Environment of New York City. Funding has been received through the U.S. Forest Service’s More Kids in the Woods Program in 2007 and 2008 and the U.S. Forest Service Civil Rights Program. More information can be found at the following website: www.nrs.fs.fed.us/nyc/focus/environmental_literacy/



Erika Svendsen is a research social scientist with the Northern Research Station’s Urban Field Station in New York City. She previously was director of the NYC Parks Department’s citywide community gardening program, GreenThumb, and before that she worked for the Rockefeller Foundation’s Global Environment Program and LEAD International. Svendsen also worked as the neighborhood stewardship coordinator for “Revitalizing Baltimore”, a former urban forestry project of the U.S. Forest Service, the Urban Resources Institute, and City of Baltimore. Svendsen is a graduate of Yale University School of Forestry and Environmental Studies and is currently a doctoral candidate at Columbia University’s Graduate School of Architecture, Planning and Preservation.

Lindsay Campbell is research social scientist with the Northern Research Station’s Urban Field Station. She began working for the Forest Service on a 1-year fellowship funded by the Princeton Class of 1956. She has a bachelor’s degree from Princeton University’s Woodrow Wilson School of Public Policy and International Affairs and a master’s degree in city planning from the Massachusetts Institute of Technology, where she was a MIT-USGS Science Impact Collaborative Graduate Fellow. She is currently a doctoral student at Rutgers University Department of Geography.

Svendsen and Campbell were awarded the 2008 Environmental Design and Research Association’s Places Award for Research for their work on the Living Memorials Project.





What a difference! A New York street in 1931 and 2007 (93rd between 5th & Madison Avenues).

In the South Bronx at a MillionTreesNYC restoration site (April 8, 2009), U.S. Secretary of Agriculture Tom Vilsack and former Forest Service Chief Abigail Kimball joined NYC Mayor Michael R. Bloomberg, Congressman Jose E. Serrano, and the first class of trainees from the MillionTreesNYC Training in announcing the \$2 million commitment by the USDA to support green jobs and restore urban forests.



NYC Parks Commissioner Adrian Benepe (left), Mayor Michael Bloomberg (2nd from left), and former Forest Service chief Abigail Kimball (far right) look on as singer and actress Bette Midler, founder of New York Restoration Project, speaks.



Proud participants in the MillionTrees NYC Campaign.

References and Resource

- NRS Urban Forestry Programs: www.nrs.fs.fed.us/urban/utc
- New York City Parks and Recreations Department: www.nycgovparks.org
- NYC million trees: www.milliontreesnyc.org
- PlaNYC: [www.nyc.gov.html.planyc2030/html/home/home.shtml](http://www.nyc.gov/html.planyc2030/html/home/home.shtml)
- OASIS: www.oasisnyc.net
- National Geographic on the geography of NYC before European settlement:
<http://ngm.nationalgeographic.com/2009/09/mannahatta/mannahatta-animation>
- World's agglomerations: www.citypopulations.de and www.worldbymap.org
- The Restorative Commons Initiative: www.restorativecommons.org



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Our research themes are (1) Managing Forests with Disturbance, (2) Urban Natural Resources Stewardship, (3) Sustaining Forests, (4) Providing Clean Air and Water, and (5) Natural Resources Inventory and Monitoring.

There are 157 NRS scientists working at 20 field offices, 22 experimental forests, and universities located across 20 states, from Maine to Maryland, Missouri to Minnesota.

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