New York City Urban Field Station
2015 Annual Progress Report

The New York City Urban Field Station's mission is: ***To improve quality of life in urban areas by conducting and supporting research about social-ecological systems and natural resource management.***

The NYC Urban Field Station (NYC UFS) is both a physical place to conduct research and a network of relationships among scientists, practitioners, and facilities focused on urban ecology. The NYC UFS is sustained through a core partnership between the USDA Forest Service Northern Research Station (USDA FS) and the NYC Department of Parks & Recreation (NYC Parks). They were joined by the non-profit Natural Areas Conservancy (NAC) in 2013. Since its founding in 2006, the NYC UFS has actively collaborated with non-profit, academic, and government partners creating innovative "research in action" programs to support urban ecosystem management and sustainability initiatives in New York City. Working in NYC, an urban social-ecological system, offers all of us a range of opportunities for engaging with a diverse set of human communities, urban ecosystems, and associated interactions.

2015: A Year of Trees in the City

The year 2015 was a big year for trees in New York City. It was the year we saw both the millionth tree planted and the beginning of the third decadal street tree census. The millionth tree of the **MillionTreesNYC campaign**, a lacebark elm, was planted in Joyce Kilmer Park in the Bronx on November 20, two years ahead of the 2017 deadline. This was the culmination of an eight-year public-private partnership led by NYC Parks and New York Restoration Project, which added one million trees to NYC's urban forest. Although many cities have started tree-planting programs, New York City is the first to reach its goal of one million trees. The NYC Urban Field Station has played a pivotal role in MillionTreesNYC by assisting with mapping and prioritizing placement of additional trees, monitoring survival rates, and researching the role of stewardship in relation to this program. A New York Times article about the millionth tree event can be found here.

Figure 1. NYC UFS and NYC Parks staff at Joyce Kilmer Park, next to the Millionth tree (left to right, Lindsay Campbell, Kristy King, Morgan Monaco, Ruth Rae, Fiona Watt, Novem Auyeung, Erika Svendsen, Bram Gunther, Sue Donoghue, and Jennifer Greenfeld).

NYC Parks conducted tree censuses in 1995 and 2005 with the help of hundreds of volunteers to inventory the city's street tree population. Data from past tree censuses have helped NYC Parks create a block pruning and tree maintenance program and better understand the ecosystem benefits of provided by street trees. This year, **Trees Count!2015** teamed up with Azavea , a technology company, and TreeKIT, an organization that developed a web-based tool for mapping street trees, to create the first spatially-accurate census for NYC street trees. TreesCount!2015 is built on a model where volunteers, in groups or as individuals, signed up for an area they were responsible for mapping. The NYC UFS signed up as one of these groups and reserved 50 blocks in Bayside, Queens. We mapped 1,315 trees with the help of many UFS visitors and students. A major outcome of this decade's census will be an interactive web site hosted by NYC Parks, which allows land managers to track stewardship activities and stewards to track each other, enabling community teams to combine efforts. This link between tree maintenance and stewardship is vital to tree and green space sustainability. A Queensborough Community College English class led by Matthew Lau, in collaboration with QCC's service-learning program and with the help of Lindsay Campbell (USDA FS), Michelle Johnson (USDA FS), and Novem Auyeung (NYC Parks), integrated TreesCount! into their English curriculum and drew upon the theme of stewardship. In addition, a group of New York State Department of Environmental Conservation foresters from upstate assisted with data collection; they were visiting the Urban Field Station to learn about urban forestry. The NYC Urban Field Station also served as a loaning hub for equipment used by volunteers citywide.

To understand the motivation for participating in stewardship activities, we surveyed participants enrolled in the TreesCount! 2015 street tree census. The survey closed in December 2015. With over 541 individuals responding, the survey had a 22% response rate. Next year, we will analyze these data through qualitative and quantitative methods, to explore people's motivations for participating in the tree census. Participating NYC UFS researchers include Erika Svendsen (USDA FS), Lindsay Campbell, and Heather McMillen (USDA FS), in collaboration with Kat Bounds (NYC Parks).

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Research Updates

Our research updates are organized by our 2014 Science Plan research themes, although many projects fall under multiple themes. These themes were created through multiple working sessions in 2014 where NYC UFS staff and affiliates identified and prioritized central research questions.

Tree and Vegetation Health

NYC Afforestation Project, Kissena Park, Queens

How successfully do constructed, native urban forests sustain themselves, and how resilient are they to invasive species?

In coordination with the NYC Parks Forest Restoration team (led by Kristy King), researchers collected data on over 1,100 trees for a fifth year, tracking growth and health of the planted trees and recruitment dynamics in the young forest established through MillionTreesNYC. Soil quality, water and carbon storage capacity are improving because of these afforestation efforts. In addition, adding compost and planting shrubs improved tree growth and survival. These results were published in *Forest Ecology and Management* and *Restoration Ecology*, respectively. Our analysis efforts are also examining the role of the previous year's health as factor in new growth by the planted trees and shrubs. Future research efforts will continue this long-term study and expand to include research on seedling and sapling recruitment. Rich Hallett (USDA FS) and Michelle Johnson continued their collaboration with Yale University researchers Alex Felson, Mark Ashton, Mark Bradford, Sara Kuebbing, Emily Oldfield, and Robert Warren II to investigate the sustainability of constructed, native, urban forests and their resilience to invasive species.

Freshkills Landfill to Park Transformation

How does the planting palette affect canopy closure in a young forest grown on a former landfill?

This project will compare three types of long-term plots: 1) native genotypes of willow/poplar trees, which are quick-growing early successional species, 2) the NYC Parks species palette selected for the site, and 3) a combination of native willow/poplar and the selected NYC Parks palette. Installation of the four-acre Freshkills afforestation project was completed in October 2015. Alex Felson of Yale also contributed design inputs for the planting scheme and paths outside of the research plots. In summer 2015, Rich Hallett, Max Piana (Rutgers University Center for Resilient Landscapes Fellow), and Alix Contosta (University of New Hampshire) collected and analyzed samples for soil carbon within each of the 12 plots. The core research team includes Rich Hallett, Ron Zalesny (USDA FS), Michelle Johnson, and Max Piana, and received assistance from Novem Auyeung, Brady Simmons (NYC Parks), Susan Stanley (NYC Parks), and Vittoria Gnetti (a visiting student from GreenInUrbs, Rome). Beyond the NYC Urban Field Station's NYC Parks staff, the effort also involved significant collaboration with NYC Parks' and Freshkills staff, including Kip Stein, Cait Field, Andrew Deer, Kristy King, and David Moore. Lindsay Campbell and Rich Hallett both serve on the newly formed Science Advisory Board for Freshkills Park.

How does the public perceive the transformation from landfill to park?

An article on social science research regarding perceptions of shifting from landfill to park, led by Lindsay Campbell, Stephanie Snyder (USDA FS), Christine Vogt (Arizona State University), and Dave Klenosky (Purdue University) recently was published in the *Journal of Parks and Recreation Administration*. For more information about this study and how it has been used by Freshkills staff and partners, visit: http://freshkillspark.org/os-research/social-science.

Trees Flooded by Hurricane Sandy

What are the impacts of saltwater inundation on NYC's urban forest?

This project examines tree health response after saltwater flooding during Hurricane Sandy. In year three of this effort, we re-measured 50 red maple street trees and 50 London plane trees flooded by Sandy and 50 of each of these species not impacted by saltwater in Queens. We collected foliage and will measure foliar chemistry for all

trees. These data will provide the basis for future work as we strive to understand the chronic health impacts of hurricanes on urban forests in coastal areas. Preliminary analysis showed London plane trees were harder hit than red maples; almost half of the flooded London plane trees were removed by August 2015. Analysis also showed some recovery of the red maples from year 1 of the study. A manuscript is being drafted for submission to an academic journal. The Nature Conservancy (TNC) interns assisted with 2015 data collection as part of a USDA FS-TNC Healthy Trees, Healthy Cities partnership. The core team is Rich Hallett, Michelle Johnson, and Nancy Sonti (USDA FS Baltimore Field Station).

Long-Term Street Tree Plots with The Nature Conservancy
How does street tree health vary over time and across neighborhoods?

In collaboration with the Philadelphia Urban Field Station and TNC, we designed long-term street tree segments in Manhattan and the Bronx to evaluate changing street tree conditions over time. Lara Roman (USDA FS) and Jason Henning (Davey Trees) matched this approach for all of Philadelphia. Together, we trained TNC interns to assess these segments in NYC and Philadelphia for tree mortality, health, and pest metrics. This project is in collaboration with TNC's Healthy Trees, Healthy Cities program in NYC. More than 50 ½-mile segments were collected by six field crews and three supervisors in July and August 2015. These data are being matched with Trees Count! 2015 volunteer-collected data, to assess data agreement and quality. Rich Hallett and Michelle Johnson are the core team in NYC and collaborated with Lara Roman and Jason Henning of the Philadelphia Urban Field Station.

Smart Forest at Alley Pond Park
How can we visualize large amounts of data on forest climate and phenology?

After installation of the Smart Forest in Alley Pond last year, our focus has shifted to exploring how to visualize the climate and phenology data that is now being collected and streamed online for this site, which is part of larger Smart Forest network across the US. Rich Hallett traveled with Joel Rodriguez and Kaari Casey (City Parks Foundation) to attend a National Science Foundation (NSF)-funded workshop titled "Real-Time Data Visualizations: A 21st Century Confluence of Art, Music and Science at Ecological Research Sites." The workshop at Hubbard Brook Experimental Forest in New Hampshire drew 35 participants who explored integrations between ecological scientists, neuroscientists, artists, and science educators. Organized by Hubbard Brook team leader Lindsey Rustad, participants helped re-envision Waterviz, an online tool that creates digital art and music generated from environmental sensors. Waterviz currently displays real-time data from Hubbard Brook, but is being adapted to display data from HJ Andrews Experimental Forest and others. The core team for this effort includes Rich Hallett, Lindsay Rustad, and colleagues at Drexel University, including Franco Montalto.

Jamaica Bay Restoration Project
How will Jamaica Bay fringing habitats respond to sea level rise and other climate change effects?

The *Restoration of Jamaica Bay fringing habitats: post-Sandy status and new approaches for a resilient future* project received a National Park Service (NPS) award in 2015. The impact of Hurricane Sandy will be assessed as a precedent for future storms and vulnerable habitat areas will be identified. The capacity for inland migration of these habitats will be investigated and restoration steps to increase resiliency to storms and sea level rise will be experimentally tested. Results will inform resiliency efforts in coastal areas. NAC has provided data from the *Ecological Covertype Map* and advised on plant selections based on Ecological Assessment data collected in 2013 and 2014 in NYC Parks maritime natural areas. NAC also coordinated a NYC Parks and NAC review of

Rutgers-generated shapefiles representing Sandy damage. Core team members are Helen Forgione (NAC) and Bram Gunther (NYC Parks, NAC).

Green Infrastructure Plant & Soil Research Project
Do tree health and soil properties vary according to the type of green infrastructure design?

For the second year, this project assessed tree health and soil properties across different green infrastructure designs: right-of-way bioswales, stormwater greenstreets, and street trees. The goal is to determine if there are differences in the health of five commonly planted trees (ginkgo, pin oak, red maple, swamp white oak, thornless honeylocust) and soil properties across the different green infrastructure designs, surrounding land use, and volume of storm water intercepted. With the help of high school students Silvana Rodriguez, Jordan Orange, and Shanjida Salam, we expanded our study to include 140 trees in the Bronx and Queens. Preliminary analysis shows that tree health varies across land use and borough, but not across different green infrastructure designs. The core team includes Novem Auyeung, Rich Hallett, and Nandan Shetty (NYC Parks).

Long-term Outcomes of Forest Restoration in an Urban Park
What are the outcomes for species diversity, vegetation structure, and ecological processes decades after urban forest restoration?

Published in October 2015 in *Restoration Ecology*, this article details the long-term outcomes of different restoration strategies on plant diversity, vegetation structure, and native tree seedling recruitment in Pelham Bay Park. We found that restored plots had greater plant diversity, greater forest structure complexity, and evidence of regeneration and retention of native trees than unrestored plots. In addition, higher levels of intervention improved restoration outcomes: clearing exotic species and planting native ones improved tree diversity and canopy closure compared to clearing alone. The mechanical removal of invasive plants after native plantings further improved tree diversity and native tree regeneration. These results suggest that the restoration approach adopted by NYC Parks is moving the site towards a more desirable plant community dominated by native species and that continued intervention is needed in order to maintain these communities. This article is one in a suite of articles and research projects that comprised the NSF-funded Urban Long-Term Research Area Exploratory (ULTRA-Ex) program in NYC. The core team includes Brady Simmons, Rich Hallett, Nancy Sonti, Novem Auyeung, and Jackie Lu (NYC Parks).

Disturbance and Recovery

Landscapes of Resilience
How do the processes of collaborative planning, shared creation, and the stewardship of natural resources and sacred spaces support recovery from disasters?

This cross-disciplinary research project explores how urban green spaces promote individual and community resilience in Joplin, Missouri and New York City, after disturbances from a tornado and hurricane, respectively. At the Beach 41st Houses in Queens, New York, the team studied the restoration of a local community garden and new greening initiatives in the surrounding area. In addition to research, team members at each site are hosting workshops and implementing landscape designs of new “Open Spaces Sacred Places”, with partial funding support from the TKF Foundation. In Joplin, the Joplin Butterfly Garden in Cunningham Park was completed and dedicated. In New York, staff and consultants from New York City Housing Authority (NYCHA)’s Garden and Greening division spent a year organizing and re-activating resident gardeners. All community garden plots are now in cultivation, and two of the resident gardeners are receiving citywide horticulture

awards. TILL Design developed a conceptual plan for creating shared community spaces adjacent to the existing community garden. In 2016, the plan will be built by Natural Garden Landscapes, in partnership with New York Restoration Project. Outcomes of our research engagement to date include collaborative events like Cleanup and Beautification days with the Rockaway Waterfront Alliance and NYCHA. The research team presented their work at a local conference (Parsons Disturbanist Discourse) and a national meeting (FEMA/ASLA Storm Resilient Landscapes for the 21st Century Workshop). The research team is currently organizing a team-writing workshop for April 2016 and a national workshop entitled Greening, Recovery, and Resilience for June 2016. For more information, click here.

The core team includes Erika Svendsen, Lindsay Campbell, Nancy Sonti, and newly hired Landscapes of Resilience Project Coordinator, Renae Reynolds. Collaborators include Keith Tidball (Cornell University), Traci Sooter, Nancy Chikaraishi (Drury University), Chris Cotten (City of Joplin), Donna Coble (Forest ReLeaf of Missouri), Victoria Marshall, Kira Shelly (TILL Design), and Lee Trotman and Elizabeth Gilchrist (NYCHA, Garden and Greening).

Living Memorials Project

How do community-based landscapes created for remembrance and healing evolve and function over time?

The Living Memorials Project (LMP) was created in 2001 by the USDA FS following the attacks of September 11, 2011 at the request of Congress. It has been both a program to support the initial creation of memorials as well as an ongoing research initiative to understand changes in the use and stewardship of trees and open space following September 11th. Fourteen years after the events that inspired their creation, we revisited 21 living memorials in the New York City metropolitan area (New York, New Jersey, and Connecticut). As part of this longitudinal research that investigates environmental stewardship, its role in emotional recovery, and its potential to impact ecological health, we observed and documented ongoing evidence that people engage with the landscape and its flora as a source of healing, and we documented the benefits of and challenges at the sites. We described this recent work in the USDA blog, and we shared reflections on the September 11 anniversary ceremonies at six memorials in The Nature of Cities (TNOC) blog. This follow-up research is also featured in an article in review for a special issue on therapeutic landscapes in *Medicine Anthropology Theory* and in another article in process focused on the symbolism and meaning of flora at the living memorial sites. Core team members include Erika Svendsen, Lindsay Campbell and Heather McMillen.

Figure 2. 9/11 Memorial Service at Tribute Park, Queens.

Social Capital and Urban Greening
How is social capital — an indicator of community resilience — affected by community stewardship and greening at the neighborhood level?

This project evaluates the effects of a four-year reforestation and community stewardship program on social capital in Queens, New York. The team hypothesized that different types of social capital (bonding, bridging, and linking) were enhanced by this initiative. Preliminary results highlighted the creation of nine active stewardship hubs, which supported this finding. Qualitative analysis of workshops and interviews will be added to the final results this year. Core team members include Ruth Rae, Toni Castro (PhD candidate, The New School), and Julie Welch (Partnership for Parks).

Stewardship and Civic Engagement

Tree Planting as a Democratic Practice
What inspires people to volunteer in tree planting activities? How does the experience of planting trees impact other civic and environmental actions?

Published in February 2015, *Urban Environmental Stewardship and Civic Engagement: How planting trees strengthens the roots of democracy* (Routledge) is co-authored by Dana Fisher of University of Maryland, Erika Svendsen, and James Connolly of Northeastern University. The volume describes the role of urban natural resources stewardship in contributing to a more democratic and involved society. The authors interviewed MillionTreesNYC volunteers over two years, finding tree planting can be an important catalyst for other civic action and democratic practices.

Stewardship Mapping and Assessment Project (STEW-MAP)
Where in urban areas are civic groups engaging in environmental stewardship? How are they sharing resources and information and influencing local environments and quality of life?

In 2007, Erika Svendsen, Lindsay Campbell and Dana Fisher initiated the Stewardship Mapping and Analysis Project (STEW-MAP) in NYC. Since then, this work has expanded to other locales in the United States via Forest Service research teams in Chicago, Baltimore, Seattle, Philadelphia, Los Angeles, and San Juan. This research deepens our understanding of stewardship as a phenomenon and also results in a tool that communities can use to strengthen strategic partnerships and enhance environmental quality. In 2015, several new publications were released, including a chapter on mixed-methods for understanding urban stewardship in the edited volume, *Handbook of Research Methods and Applications in Environmental Studies*. STEW-MAP collaborator James Connolly prepared for Boston STEW-MAP. Erika Svendsen gave an invited talk, and Michelle Johnson contributed a multi-city STEW-MAP poster to the University of Maryland's Civic Stewardship Conference in April 2015. That same month, Erika Svendsen and Lindsay Campbell traveled to San Juan, Puerto Rico, to present findings and lessons learned to the San Juan ULTRA-Ex, including the USDA FS International Institute of Tropical Forestry (IITF), USDA FS State & Private Forestry, and collaborators who launched a San Juan STEW-MAP this year. Invited by Tischa Muñoz-Erickson (USDA FS IITF), the team also worked on developing a manuscript that synthesizes findings about governance of sustainability transitions from STEW-MAP research in various locales. A new multi-city website is in development and will serve as a portal to STEW-MAP data across the country. A companion General Technical Report (GTR) will be released in 2016. Both Erika Svendsen and Lindsay Campbell presented on STEW-MAP at local, national (FS Urban Connections webinar), and international (Urban Biosphere Initiative Webinar) meetings. The full STEW-MAP team includes FS researchers and collaborators throughout the US.

New York/New Jersey Harbor Estuary Program Waterfront Access Study
What is the quality of public access to the NY/NJ estuary and how do stewardship groups interact with the waterfront?

STEW-MAP methods of understanding stewardship groups were applied to a waterfront access study of the NY-NJ Harbor Estuary Program / Hudson River Foundation (HEP/HRF). A joint HEP/USDA FS intern developed a geodatabase of mapped waterfront stewardship organizations, activities and current outcomes that contributed to a needs analysis completed by HEP/HRF. A white paper of these efforts will be available in early 2016 and findings from the work will inform HEP/HRF grants, programs, and outreach efforts going forward. The core team included Michelle Johnson, Lindsay Campbell, and Erika Svendsen from the NYC UFS, and Kate Boicourt, Rob Pirani, Oliver Stringham, and Rosa Perez from HEP/HRF.

Neighborhood Nestwatch – Sheffield, UK
How do geographic and cultural variation in human attitudes and socio-economic factors generate barriers or positively influence sustainable yard management?

How do birds respond to different types of yard management activities, in terms of behavior and physiology?

This project is in early planning stages, but includes social-ecological research focused on understanding the interrelationships between people, yard management activities, and birds' selection and use of yards. In May 2015, we conducted a 10-day planning visit to Sheffield, United Kingdom (UK) to establish Neighborhood Nestwatch (NN), a mentored citizen science program with the dual objective of scientific inquiry on the health of common yard birds across an urban gradient and educating the public about bird biology and the scientific process. Major activities included recruiting 15 people from a local natural history group, conducting site visits to test the feasibility of collecting bird data in five yards, conducting key informant interviews with 10 homeowners to assess the attitudes and motivations for yard care and wildlife, and sponsoring a workshop with 10 UK and 5 American scientists. Future efforts will expand this work in Sheffield and also extend it to Jamaica, Queens. The core team includes Erika Svendsen, Susannah Lehrman (USDA FS/University of Massachusetts), Peter Marra (Smithsonian Migratory Bird Center), and Karl Evans (University of Sheffield).

Ecosystem Services and Health

NYC Ecosystem Services Project
This project synthesizes and summarizes the ecosystem benefits of green space in NYC based on existing datasets. We plan to produce a report that will be accessible to decision makers and the general public. This report will include talking points and fact sheets that clearly describe the different benefits of green space and how they contribute to a more resilient NYC. We hope that this report will influence decision-makers to invest in green spaces and natural areas as capital improvements to their community. The core team includes Ben Triscuit (NYC Parks), Bram Gunther, and Novem Auyeung.

Urban Foraging in the City
How do culture, social meaning, and plant species intersect in urban foraging activities in New York City?

This project aims to understand how different communities in NYC (Chinese, Chinese-American, Mexican, and Mexican-American) use foraged plants for cultural and personal purposes. This project has primarily focused on ethnographic aspects of use and meaning, but we also are beginning to assess the nutritional and contaminant

composition of foraged plants. We collected herbarium specimens of the species foraged, information on the ways in which foraged plants are prepared, and have started testing for nutrient and heavy metal content in foraged plants after preparing samples in the NYC UFS lab. An article on preliminary results from the ethnographic work was published in Urban Omnibus in the fall. Participating NYC UFS researchers include Erika Svendsen, Lindsay Campbell, Michelle Johnson, Rich Hallett, and Novem Auyeung in collaboration with Marla Emery (USDA FS), Patrick Hurley (Ursinus College), Joana Chan (Cornell University), Maite Lascurain (Instituto de Ecología in Xalapa, Mexico), and Rena Lee (volunteer).

Wildlife and Habitat

Colonial Waterbird Surveys
In summer of 2015, UFS ecologists joined NYC Audubon in counting nests and chicks of colonial nesting waterbirds on islands of the New York Harbor. As an annual event, the long-term data allow scientists to look at population trends and habitat preferences of these birds over time and is helpful in the development of management strategies. Core team members include Susan Stanley and Ellen Pehek (NYC Parks).

Figure 3. Susan Elbin (NYC Audubon) working with NYC Parks staff to band American oystercatcher chicks.

Endangered Bird Management
The Rockaway Beach Endangered Species Nesting Area gained a new species of concern for New York State: the black skimmer, a large, colonial shorebird, showed up in high numbers this year. In late 2014, the Army Corps of Engineers finished post-Sandy beach replenishment and the first season of this much wider beach attracted over 200 breeding skimmers. The federally threatened piping plovers had another good year, coming in just below the US Fish and Wildlife Service productivity goal (1.5) with 1.38 chicks per plover pair. NYC Audubon staff also joined the NYC Parks team to band American oystercatcher chicks. Two mid-summer surveys were conducted for New York State threatened species with the maximum number of least terns at 674 while common terns were far fewer at 30. Susan Stanley presented on this year's program at the annual NY/NJ regional avian conference and at the Wildlife Working Group at Manhattan's Central Park Zoo.

Lifetrack Egret
This program tracks great egrets with Global Positioning Systems (GPS) and cell phone technology to understand their daily, seasonal, and annual movements. Two great egrets were tagged and rereleased in the NYC area in July 2015. Each tagged bird is matched with a class who receive regular text messages on the bird's locations. Lifetrack Egret has also been implemented through the Philadelphia and Baltimore Urban Field Stations. The capture and tagging of the birds can be viewed in photos on the website. Core team members included John Brzorad (Lenior-Rhyne University), Susan Elbin (NYC Audubon), Barbara McGuiness (USDA FS), Susan Stanley, and Michelle Johnson.

Stream Salamanders
What local and landscape level factors explain salamander persistence in New York City?

Ellen Pehek and Susan Stanley published an article in a special issue on wildlife in *Cities and the Environment* entitled "A Case Study of Urban Streamside Salamander Persistence in Staten Island, NY." This article discusses the population dynamics of salamanders in four streams of varying condition in the least-developed borough of New York City, concluding that local features such as dams and stream order affected population densities, but may also obscure the effects of landscape-scale factors.

Urban Wildlife Management
While **coyotes** are not new to NYC, their population is on the rise and sightings by parks staff and the public are becoming more common. For these reasons, UFS ecologists worked with the Urban Park Rangers to develop guidelines and train park staff about coyotes. This included educational sessions on coyote ecology and behavior, how to prevent habituation by helping maintain a proper fear of humans and ensuring no direct or indirect feeding of these wild animals. An educational webpage entitled "Living with Coyotes in NYC" was added to the NYC Parks website at: http://www.nycgovparks.org/programs/rangers/wildlife-management/coyotes. Core team members include Susan Stanley, Kevin Heatley (formerly NYC Parks), Nathan Payne (NYC Parks), Rich Simon (NYC Parks), and Sarah Aucoin (NYC Parks).

White-tailed deer herds have become established in NYC. NYC Parks is currently working with other agencies to research and implement a deer management strategy, through an interagency task force. Susan Stanley is developing a deer impact monitoring plan and working with US Department of Agriculture, Wildlife Services on an environmental assessment for deer management in New York state. A recent symposium in Manhattan brought together researchers and natural resource managers from around the NYC region who have worked with various forms of deer population control. Core team members include Susan Stanley, Tim Wenskus (NYC Parks), Jennifer Greenfeld (NYC Parks), and Kevin Heatley (formerly NYC Parks).

In 2015, Susan Stanley chaired the **NYC Interagency Wildlife Hazard Task Force**, which aims to reduce risks to human health and safety and wildlife around airports. This task force includes NYC Parks, National Park Service, NYC Department of Environment Protection, the Port Authority of NY & NJ, NYS Department of Environmental Conservation, USDA Fish & Wildlife Service, and USDA Animal and Plant Health Inspection Service (APHIS). In working with APHIS Wildlife Services on a study to assess the feasibility of relocating American kestrels from local airports, Susan performed a GIS analysis to determine appropriate habitat for these small falcons in NYC Parks. She also worked with NYC Parks restoration staff and others to evaluate appropriate habitat for raptor platforms along the Queens coast.

Inventory and Monitoring

NRG Archive Project
This goal of this project is to convert NYC Parks archived records to digital documents. In total, the project has brought in over $60,000 and employed three additional staff. This program has organized and inventoried over 150 cubic feet of records from citywide Parks projects, such as acquisitions, salt marsh and forest restorations, and wildlife inventories. This project will continue with a Document Management Program for NRG and Parks staff at the field station. Documents and data from 220 different Parks and other locations citywide will be available for research and natural resources management. Core team members include Brady Simmons and Karen Murphy (NYC Parks).

NRG/UFS iMapInvasives Project
Since 1986, NYC Parks has been mapping the vegetation communities of parks citywide. This vegetation database has continued to grow and has been used for natural areas management for many years. NYC Parks is contributing to work by NY Natural Heritage to map the invasive species of NYC using iMapInvasives. This web tool provides the public with a mapping tool to view invasive species throughout the city, for visualizing the challenges our parks face with the introduction of non-native plants. Core team members include Brady Simmons, Tim Wenskus, Craig Mandel (NYC Parks), and Chisato Shimada (NYC Parks).

Threatened / Endangered Plant Monitoring & Protection Project
South of the Rockaways boardwalk, UFS ecologists and Greenbelt Native Plant Center (GNPC) botanists monitored and surveyed the federally listed *Amaranthus pumilis*, which occurs on dunes. This plant species had a highly productive year with 160 plants observed in early August. The number of vehicles that were accessing the beach for the boardwalk construction put this population of plants in grave danger. Together, both teams flagged individual plants to deter the vehicles from destroying the habitat and running over this small plant species. Every effort was taken to mitigate loss from construction and development throughout the city and seed collection and plant relocation play a large role in retaining sensitive plants and local genotypes. In an ongoing effort, UFS ecologists continue to assist GNPC with standardizing its data with database updates and improvements. This is contributing to a larger data sharing effort within NRG. The core team includes Brady Simmons, Susan Stanley and GNPC botanist Heather Liljengren.

NYC Lake & Pond Bioblitz
On August 6, 2015, NYC Parks, led by Kathleen McCarthy, conducted a rapid water quality and condition assessment at 13 lakes and ponds across the city. Ten teams collected samples of temperature, dissolved oxygen, pH, salinity, Secchi depth, total phosphorus, total nitrogen, and chlorophyll-α as well as lake depth, presence of aquatic vegetation, presence of cyanobacterial blooms, and shoreline conditions including natural and piped inlets. The information will help identify management concerns, water quality problems, underlying causes, and inform future management and restoration decisions. Results show these predominantly shallow water bodies to be eutrophic or hypereutrophic according to Secchi depth and phosphorus concentrations whether in highly urban or natural areas. Chlorophyll-α concentrations in two water bodies were in the mesotrophic range; eutrophic and hypereutrophic conditions existed in all other water bodies. Although density of aquatic vegetation was not measured, six of the nine nitrogen limited water bodies have very high total phosphorus concentrations and teams observed minimal or no rooted aquatic vegetation. Dense vegetation was prominent in the mesotrophic water bodies indicating a positive effect of submerged aquatic vegetation on water quality. Likely sources of nutrients include untreated stormwater, waterfowl feces, and lake sediments. Core team members include Kathleen McCarthy (NYC Parks), Brett Branco (Brooklyn College), Karen Murphy, Emily Mesiti (NYC Parks), Ryan Morrison (NYC Parks) and Ben Triscuit.

Management Evaluation

Effects of Forest Management on Salamanders
How does forest restoration affect terrestrial salamanders?

This long-term project investigates how forest restoration affects terrestrial salamanders in multiple parks across the city. Preliminary results in the Bronx site show salamanders are smaller at sites with predominantly invasive vegetation than those at sites with mostly native vegetation. However, after restoration, there was no difference in the size of salamanders at either site. These results are in line with findings at our Manhattan site and point towards the improvement of habitat after forest restoration. Core team members include Ellen Pehek and Susan Stanley.

Seton Falls Bird Survey
How does riparian restoration affect bird communities in Seton Falls Park?

A breeding bird study using the spot mapping method was conducted in Seton Falls Park in the Bronx to examine changes in bird communities after a riparian restoration in 2003. Initial surveys were conducted during the restoration effort. Seton Falls is a small park of 30 acres but retains a mature canopy of oak, which surprisingly has not been disturbed since the Revolutionary War. A natural creek that was dammed in 1835 created a riparian zone running the length of the park, which provides additional habitat to the migrating and resident birds. This year, we observed the normal cast of characters, such as American robins, warbling vireos, red-winged blackbirds and Baltimore orioles. The large oaks and open understory provided a valuable stopover for migrating warblers like black and white warbler, Cape May warbler, and black-throated green warbler. The park even had a Louisiana waterthrush stop by to check out Rattlesnake Creek before continuing up the coast. Future work will compare this year's spot mapping results against the 2003 survey. This effort is part of a larger project with Brian Olechnowski (Fairleigh Dickinson University). Core team members included Brady Simmons and Susan Stanley.

Street Tree Requestor Survey
What are service, satisfaction, and stewardship issues held by residents requesting street trees from NYC Parks?

The New Street Tree Request Survey investigated the recipients' satisfaction with NYC Parks' tree planting service. This included motivations and feelings about trees, current tree stewardship activities and information needed to support stewardship. Survey responses also informed the ongoing development of new programmatic features in NYC Parks' tree planting program. The research discusses how a survey research methodology can be used as a tool for natural resource managers to be more responsive to the public, improve their delivery of services, and provide important information to street tree stewards. Initial data analysis has been completed on this research; we anticipate completing a white paper and an article for a practitioner publication in 2016. Core team members include Ruth Rae, Tessa Levarone (NYC Parks), Matt Stephens (NYC Parks), and Neil Barrett (NYC Parks).

Ecological and Social Assessments

Social Assessment
What are the uses, meanings, and values of public greenspace in New York City?

The social assessment explores the use and social meaning of NYC parklands on a sample of 39 parks. In collaboration with the NAC and NYC Parks, the social science team continued to analyze results from the 2013-2014 field season efforts of assessing park use and meaning in NYC Parks. Early results from the data have been shared in a range of presentations and formats, including an article in TNOC blog authored by former NYC Parks Commissioner Adrian Benepe and a feature article in *Urban Omnibus*. Novem Auyeung met throughout the year with NYC Parks managers to discuss ways of integrating research findings into site-level park management. In April, Lindsay Campbell presented on the social assessment (along with STEW-MAP) at the Storm Resilient Landscapes for the 21st Century Workshop and presented a poster on 'Engagement in, potential for, and barriers to stewardship among NYC park users' at the University of Maryland Environmental Civic Stewardship Conference. The team currently has a manuscript in review with *Environmental Science and Policy* about the cultural ecosystem services provided by New York City parkland and another in review at the *Journal of Ethnobiology* about the psycho-social-spiritual benefits of interacting with parks and natural areas. Next steps include completing a white paper summarizing the 2013-2014 results, the development of additional projects

with collaborators interested in drawing from this dataset, and integrating data from this project with ecological assessment results. More information can be found on our website. Core team members include Erika Svendsen, Lindsay Campbell, Novem Auyeung, Nancy Sonti, Michelle Johnson, and Heather McMillen.

Fuzzy Cognitive Modeling of a Healthy NYC Forest

Under a partnership model, how do researchers and managers interact to produce and apply social-ecological knowledge?

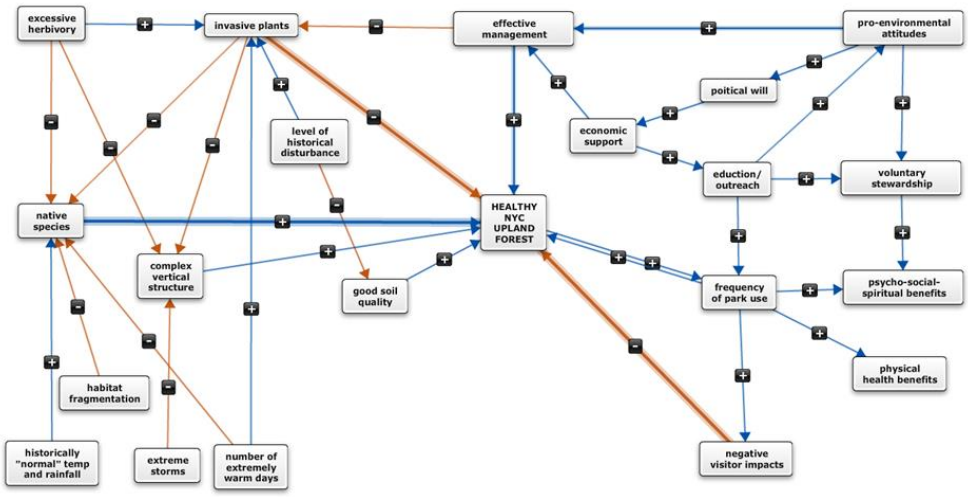

Figure 4. Resulting fuzzy cognitive model of a healthy NYC forest.

To facilitate thinking about how to integrate the social and ecological assessments of NYC parks and natural areas and to inform their management as social-ecological systems, two workshops were conducted (March 23 and June 3, 2015). Heather McMillen, postdoctoral social science researcher at the NYC UFS, organized and led the workshops, which focused on engaging in fuzzy cognitive modeling (FCM) exercises to explore the factors that affect and are affected by healthy NYC upland forest. To understand the range of ways that researchers and managers conceive of a healthy urban upland NYC forest, participants created individual models and then a shared model. The process itself as well as the final product helped to clarify communication; facilitate shared thinking; and identify assumptions, gaps in knowledge, and hypotheses to explore in future work. We also conducted follow up interviews with the same participants to better understand the effects of engaging in FCM and factors that support interdisciplinary collaboration in applied research and management. This work informs the creation of visual products/communication tools for a non-technical audience and is the basis for developing two publications: one focused on the modeling itself and one focused on the emergent interdisciplinary collaboration surrounding the social and ecological assessments. Michelle Johnson presented preliminary results from this work at a social-ecological poster session at the Ecological Society of America on August 4, 2015, in Baltimore, Maryland. Core team members include Heather McMillen and Michelle Johnson.

Inwood Hill Park Hazard Tree and Social Assessment

How do the uses, meanings, and values of Inwood Hill Park vary across four seasons?

In combination with a mapping study of hazard trees in Inwood Park, the social assessment project was expanded and intensified at Inwood Hill Park. With grant funding from NYS DEC, the social assessment team collaborated with Kat Bounds (NYC Parks), Justin Bowers (NAC) and other NAC staff to inform a stewardship and management plan for the park. The enhanced methodology examined seasonal variation in use and social meaning by repeating the protocol in fall, winter, and spring. In addition, the structured observation and interview methodology was triangulated with participant observation, more fine-grained photo documentation, and focus groups. These data have led to the development of a 'hot-spot' map of sites of social meaning and

ecological significance in the park, and a final report is in preparation. Core team members included Erika Svendsen, Lindsay Campbell, Kat Bounds, Justin Bowers, Patrick Padgen (NYC Parks), Michelle Johnson, and Novem Auyeung.

Restored Salt Marsh Assessment
What are the long-term outcomes of salt marsh restoration in NYC?

NYC Parks' Wetlands team collected data to assess the condition and function of restored salt marshes on parklands across NYC. The team consulted with Brady Simmons, Novem Auyeung, and Helen Forgione (NAC) to collect completed salt marsh restoration design files and monitoring data and to get assistance and feedback in developing the study design and field protocol for the assessment. Soil samples were collected from six restored salt marshes using methods developed by the UFS, and the laboratory facilities at the UFS were also used to store and process 210 aboveground and 70 belowground salt marsh plant biomass samples with four summer interns from Lafayette College, APEC, and Bronx Science. The team also consulted with Novem Auyeung and Helen Forgione to review and refine the statistical methods for analyzing the collected field data. The data will be used to develop new guidelines for salt marsh restoration monitoring and design. Core team members include Chris Haight, Kim Thompson, Ryan Morrison, Rebecca Swadek, and Marit Larson, comprising NYC Parks' salt marsh assessment team, and collaborators Brady Simmons, Novem Auyeung, and Helen Forgione.

Urban Vernal Pool Assessment
What is the species composition and abundance in NYC vernal pools?

To better understand how these ephemeral ecosystems function in an urban environment, we are studying urban vernal pool fauna. We arecomparing species abundance and composition to other sites throughout the greater metropolitan region over two years. This project investigates aquatic species presence in vernal pools in NYC, including invertebrates and amphibians. Susan Stanley presented a poster on this project at the Black Rock Forest Symposium in June. She also continued to identify invertebrate species from samples collected in vernal pools in NYC. This project is headed by Susan Stanley.

Science Outreach and Communication

The NYC UFS facility is an excellent space to brainstorm, present research in progress, and hold workshops. In the meeting space upstairs that is part of the common area for the residence, the UFS hosted **9 strategic planning meetings** for sharing ideas and developing strategies, including discussions around urban wood waste, green infrastructure, and differences and similarities in urban and rural forestry. We also held **16 Brown Bags talks**, where researchers presented and discussed their research-in-progress with participants. These talks addressed social and ecological themes. Examples include:

- "Biocultural Perspectives of Social Resilience on Islands: Hawaii and New York" (Heather McMillen NYCUFS),
- "Connecting Urban Centers of Maple Nation: A Healing Wandern Between The Twin Cities and New York City" (Kaitlyn Flick, University of Minnesota Natural Resource Science and Management) ,
- "Civic engagement and ecosystem governance in a rapidly changing city – perspectives on urban environmental stewardship from Bangalore" (Johan Enqvist, Stockholm Resilience Centre), and
- "Filters that shape biodiversity" (Myla Aronson, Rutgers University).

The UFS co-sponsored two major symposia this year. The first was the **Yale "Urban Nature as a Health Resource" Symposium**, held at Yale University's Hixon Center for Urban Ecology, and co-sponsored with the Yale Office of Sustainability in February 2015. The Yale **"Science and Management of 21st Century Urban Parks"** Symposium was held at Yale University's Hixon Center for Urban Ecology in November 2015. The UFS also partners with a range of academic and civic institutions to organize a rotating seminar series: **"Science of the Living City."** In March 2015, the NYC Urban Field Station held a Science of the Living City seminar on **Urban Coastal Resilient Forests** featuring Malgosia Madajewicz (Columbia University) and Walter Meyer (Local Office Landscape Architecture). NYC UFS Scholar in Residence Franco Montalto organized a year-long series of presentations and webinars on 'Green Infrastructure, Climate, and Cities' via the Consortium for Climate Risk in the Urban Northeast and Drexel University. A full description of past events can be found here.

In January 2015, the Urban Field Station hosted Drexel University professor Dr. Franco Montalto and about ten of his graduate students for a **green infrastructure research summit** where they presented their findings on NYC green infrastructure performance. It turns out that our Nashville Blvd greenstreet in Queens retains 70% of all rainfall from its watershed area, which is about one sixth of an acre. Retention was not correlated with storm size surprisingly, but rather heavily dependent on maintenance visits - when inlets are clogged, not much water is absorbed. The Drexel team also presented coefficients to calculate rates of transpiration for common greenstreet species, and *Echinacea purpurea* and *Carex lurida* are two of our thirstiest greenstreet plants.

New Partnerships

Rutgers University: The USDA FS launched a new partnership with Rutgers University, to implement a **Center for Resilient Landscapes (CRL)**. This partnership is also a collaboration among the NYC and Philadelphia Urban Field Stations, Silas Little Experimental Forest, and the USDA FS Strategic Foresight & Rapid Response Research Work Unit. In 2015, Nazia Arbab joined as a Rutgers/USDA FS postdoctoral fellow to work on social-ecological modeling related to resilient landscapes. Her current research focuses on a model of emerald ash borer (EAB) spread in New Jersey, in collaboration with efforts of the New Jersey EAB Task Force. Max Piana and Matt Drews joined as Rutgers Fellows. Max worked on the Freshkills afforestation project; he also incorporated aspects of his dissertation into the research design. Matt worked on parameterizing a forest model for windthrow, working with Rich Birdsey in the Forest Service's Newtown Square office. Lindsay Campbell and Frank Gallagher (Rutgers University) are working via the Rutgers CRL to organize a spring 2016 panel on restoration ecology at Freshkills Park and Liberty State Park, NJ. For more information, visit: http://crl.rutgers.edu/.

Urban Heat Island Working Group: Bram Gunther and Kristy King are part of the Urban Heat Island Working Group. The group is headed by the NYC Mayor's Office of Recovery and Resilience and involves scientists and practitioners working in academia (City College of New York, Columbia University, Hunter College, and Princeton University), non-profit organizations (Global Cool Cities Alliance, Natural Resources Defense Council, and TNC), and NYC agencies (Department of Health, Department of Environmental Protection, and Office of Emergency Management). The group aims to better understand the impact of prior and current investments in urban heat island mitigation efforts, identify data gaps and inform data collection, and provide recommendations for future investments to mitigate the urban heat island effect.

Urban Woodlands Management Forum: NAC and NYC Parks attended the *Urban Woodlands Conservation and Management Workshop* on March 11, 2015, at the National Parks Training facility in West Virginia. The Steering Committee is composed of NAC (Helen Forgione), Univ. of Maryland (Lea Johnson), USDA FS (Wayne Zipperer & Richard Pouyat), and NPS Capital Region (Patrick Campbell). The goal of the workshop was to identify and create

opportunities for greater collaboration among urban woodland managers and researchers to connect and to share data and information. As a result of the workshop, a **SESYNC–LTER Postdoctoral Fellowship** application was submitted December 2015 to support John Lagrosa's proposal "*Integration of long-term ecological datasets to assess the effect of urbanization on vegetation dynamics and biodiversity in forest fragments along an urban-to-rural gradient in the Northeastern United States*".

North American Forest Commission: The North American Forest Commission (NAFC) is one of six regional forestry commissions of the Food and Agriculture Organization of the United Nations (FAO) . Established in 1958, NAFC provides a policy and technical forum for Canada, Mexico and the United States to discuss and address forest issues on a North American basis. An Urban Forest Working Group was officially launched in 2015, co-chaired by the NYC and San Juan Urban Field Station USFS team leaders, Erika Svendsen and Tischa Munoz-Erickson and including senior representatives from the Canadian Forest Service and CONAFLOR. The working group is committee to establishing shared goals and objectives across the urban landscape and participating in an international exchange of knowledge sharing and cooperation.

Forest Service Visits

In 2015, we received a number of special visitors to the NYC Urban Field Station from USDA Forest Service personnel.

Figure 5. Associate Chief Mary Wagner, Jim Beck, NYC Urban Field Station staff and collaborators visiting Beach 41 St gardens.

In August 2015, the NYC Urban Field Station hosted **Associate Chief Mary Wagner**, Jim Beck (USDA FS Partnerships office), and First Deputy Commissioner Liam Kavanagh for a field tour of research and management sites in the Rockaways, Queens. The day started with visits to the New York City Housing Authority Beach 41 St Houses resident community garden (Landscapes of Resilience project), street trees (TNC Healthy Trees Healthy Cities partnership/tree health project), a MillionTreesNYC planting, and a street corner meeting with Friends of Arverne, a neighborhood stewardship group participating in TreesCount! 2015. The day wrapped with a visit to the waterfront 9/11 Tribute Park located in the viewshed of the former World Trade Center site. This park continues to be stewarded by community volunteers (Living Memorials Project). Associate Chief Wagner was engaged and excited by all of the efforts of the NYC Urban Field Station and our many partners, as we work to care for the lands and serve people *where they live*.

International Forest Day: In collaboration with the USDA FS International Programs branch, the United Nations (UN) working group, UN Forum on the Forest, also left their conference room at the United Nations building and joined the NYC Urban Field Station in a field visit. We spent a Saturday morning walking through the urban forests of Inwood Hill Park in upper Manhattan and Wave Hill public garden in the Bronx. As we walked through

these forests, we exchanged ideas about urban forest management and research with UN representatives from Japan, the United States, Canada, Switzerland, Korea, Norway, New Zealand, and Australia.

Figure 6. Chief Tom Tidwell taking a selfie with NYC 4th graders in Hamilton Grange National Memorial, Manhattan.

In October 2015, **Every Kid in a Park (EKIP)** held a special event at the Hamilton Grange National Memorial, in the Hamilton Heights neighborhood of Manhattan. EKIP is a new White House initiative that the USDA Forest Service, in partnership with the National Park Service and other organizations, is assisting, to "engage and create our next generation of park visitors, supporters and advocates". **Chief Tom Tidwell** spoke to and distributed passes for fourth graders and their families to visit public lands. Representing the NYC UFS, Lindsay Campbell and Michelle Johnson also assisted at the event, and even rode the NYC subway back with Chief Tidwell and Ellen Shaw (USDA FS Partnerships office).

People at the UFS

New UFS Staff

Bram Gunther takes on a new role at NYC Parks as the Director of the Urban Field Station, the science and research hub of Forestry, Horticulture, and Natural Resources of NYC Parks. He is also the President of the Natural Areas Conservancy. Bram was previously Chief of Forestry, Horticulture, and Natural Resources for NYC Parks. He joined NYC Parks in 1991 as an Urban Park Ranger and took on the role of director three years later. In 2000, he joined Central Forestry first as Deputy Chief and then as Chief leading the division through a time of significant growth.

Heather McMillen is a postdoctoral research social scientist with the U. S. Forest Service at the New York City Urban Field Station. Heather earned her PhD in Anthropology and a certificate in Ecology, Evolution, and Conservation Biology from the University of Hawai'i at Mānoa. Her research investigates the relationships among local knowledge, resource management, global environmental change, and well-being. Most of her work is applied and participatory. She has conducted research in Tanzania, Hawai'i, and NYC. At the NYC UFS, she is part of a team exploring urban green spaces and the multiple roles, values, and ecosystem services they co-produce with people. Previously, she contributed to a USDA FS-supported effort to understand subsistence gathering in Hawai'i and she was a co-organizer and researcher for a project to understand local knowledge and resilience to environmental and climate change in north Kona. Heather is also an affiliate faculty member in the Department of Natural Resources and Environmental Management at the University of Hawai'i at Mānoa.

Renae Reynolds is a graduate of Parsons New School for Design with a Masters in the Theories of Urban Practice. Renae is an interdisciplinary urban practitioner who utilizes integrated methods of research and design to better understand critical issues related to urban spaces and people. Her research has investigated the historical context and policy mechanisms (urban renewal, redlining, planned shrinkage) and its effects on the

social and physical fabric of cities and in particular the Rockaway Peninsula in New York City. She has designed collaborative and participatory workshops to engage young people to increase knowledge about their neighborhood history and to support active citizenry in addressing currently pressing issues. As the Project Coordinator of the Landscapes of Resilience with the US Forest Service, Renae is a participant researcher exploring community greening and stewardship practices to understand how such practices impact and are impacted by the social resilience of people.

Ben Triscuit is a NYC Parks Conservation Corps fellow with Forestry, Horticulture and Natural Resources. His research is on the role of ecosystems services in NYC . The expected outcome of this research is an education and outreach product to help engage the general public in sustainable decision-making. Ben is also working with Kathleen McCarthy to collate and interpret data on NYC's lakes and ponds. Originally from Erie, Pennsylvania, Ben became a Brooklynite as of September 2015. He obtained his Bachelor's degree in Biology from Lafayette College in Easton, Pennsylvania, where he engaged in several research projects and community-oriented internships.

Awards

In May 2015, Lindsay K. Campbell was awarded the Northern Research Station's Early Career Scientist award for her work on urban natural resources governance and stewardship. This award is given each year to a scientist early on in their career for their research excellence.

Scholars & Fellows

Scholars-in-Residence: Scholars in residence are senior scholars on sabbatical or visiting status who are working with the USDA FS and NYC Parks over the course of several months to a year. In 2015, we continued to welcome two scholars-in-residence. **Dr. Franco Montalto** of Drexel University is a licensed civil/environmental engineer and hydrologist with 20 years of experience working in urban and urbanizing ecosystems as a practitioner, designer, and researcher. **Dr. Maite Lascurain Rangel** is ethnobotanist from the Mexican Institute of Ecology's Department of Environment and Sustainability, working on urban foraging. Read more about Franco and Maite here.

Totten Fellows: The Totten Fellows are emerging scholars—PhD candidates, early-career academics, and educators—from a broad range of social science disciplines conducting research on urban social-ecological systems. An inaugural workshop was held in June 2014 to launch this program, bringing together nine participants from the United States and Canada. They reconvened at Fort Totten for a writing workshop in January 2015 that led to both the development of TNOC roundtable on different ways of producing knowledge for urban ecosystem management and a special section on power in urban social-ecological systems in the journal *Urban Forestry and Urban Greening*, co-edited by Lindsay Campbell and Nate Gabriel of Rutgers University, to be released in mid-2016. Meet the fellows here.

Vittoria Gnetti is a PhD candidate at the University of Rome Three, Department of Science, Faculty of Biological Science, Rome, Italy. She is conducting research on Green Infrastructure and Urban Forests in Europe and on the Role of Urban Field Station model of collaborative planning and stewardship in the United States with a grant from the EU project GreenInUrbs COST Action FP1204. Vittoria resided at the New York City Urban Field Station from October–November 2015 and at Baltimore Field Station, Philadelphia Field Station, and visiting the Washington Office from November-December 2015. She will create final presentation and report on the Urban Field Station model and how it could be adapted for the European context.

Interns & Mentoring

Green Girls: Susan Stanley led a dragonfly program at Queens' Forest Park for the City Park Foundation's Green Girls Summer Institute for middle-school students. Green Girls is a program that provides after school and summer activities and field trips for girls from 6th to 8th grade centered on science, technology, and the environment.

Green Horizons: The Green Horizons program, which pairs middle school students across the city with natural resources professionals, celebrated 15 years at the Brooklyn Botanic Garden. Dr. Monica Lear, Director of Forest Health Protection, opened the career day with a short presentation on the USDA Forest Service and entertained students with a short Q & A about careers in natural resources. Brady Simmons was the "Leader" of the "Create a Forest" station, one of nineteen stations arranged throughout BBG. Students learned about forest restoration and careers that can help maintain healthy forests.

Figure 7. WERMs (Silvana Rodriguez, left & Jordan Orange, right) and a NYC Parks intern (Shanjida Salam, middle) collecting field data from a stormwater greenstreet.

NYC Parks Intern: Shanjida Salam, a student from Bronx High School of Science, helped Novem Auyeung collect and analyze data for the Green Infrastructure Plant & Soil research study.

Wave Hill Woodland Ecology Research Mentorship (WERM) program: Susan Stanley led a salamander workshop for WERM students, a group of academically high-achieving high school students from underserved areas in NYC, at Riverdale Park. Novem Auyeung also led a workshop focused on soil, photosynthesis and statistics. She also served as a WERM mentor during the summer and worked with Silvana Rodriguez (Manhattan Village Academy) and Jordan Orange (Columbia Secondary High School) to collect data for the Green Infrastructure Plant & Soil Project. The students learned to assess tree health, collect soil cores, determine soil bulk density, and run statistics using R.

West Point Cadets: Two West Point cadets, Reilly Kissinger and Aloysius Tekippe, each spent two weeks in the summer interning at the NYC Urban Field Station. They were some of the first West Point cadets to intern with the USDA Forest Service, in a new partnership. Both cadets helped with many of the NYC UFS's research projects, but also had time to attend more reflective days, like a Terminal Moraine walk and a fuzzy cognitive modeling meeting at Rutgers University.

Figure 8. Reilly Kissinger (left), West Point cadet, mapping Kissena Afforestation plots and Aloysius Tekkippe (right), West Point cadet, measuring chlorophyll florescence of flooded trees.

Wildlife Conservation Society's Advanced Inquiry Program: Susan Stanley and Ellen Pehek teamed up to lead a field day for students of the Wildlife Conservation Society's Advanced Inquiry Program. Students assisted the ecologists in monitoring coverboards for vegetation as part of a long-term study on forest restoration impacts.

UFS Facilities

Once again, it has been a busy year, with a variety of staff and collaborating researchers making use of the field station's residential, lab, and office spaces. From EPA-funded Saltmarsh Restoration research to Alley Creek benthic sampling, from WERM workshops to brown bag talks, from facilitating field equipment maintenance to facilitating the digitization of Parks' archives, the NYC Urban Field Station's space serves as a hub for a variety of interacting and intersecting individuals and groups.

Residents

The Urban Field Station has hosted a variety of researchers who stayed in our residential facility, conducting NYC-based socio-ecological research. The busiest months were June and July when we had a 94% and 95% occupancy rate, respectively; in August we had a 64% occupancy rate. Residents came from Maryland, upstate New York, Canada, Italy, Denmark, and Mexico. Research projects facilitated by our residential space in 2015 examined urban forest restoration, salt marsh sparrow conservation, green infrastructure, oyster reproduction, and urban foraging.

Research Permits

This year, 93 research permits were granted by NYC Parks. Out of all the permits granted, 33 were renewals of ongoing research projects. Research projects were distributed throughout the five boroughs and spanned multiple parks, habitat types and taxa. This year, the majority of research projects were focused on plants, soil, and arthropods. To read more about the 2015 research permits, see our research permit annual report.

Laboratory
Researchers from NRG and WERM students used the lab to sieve and process soils, preserve benthic macroinvertebrate samples, test water quality, and dry and weigh plant tissue. Foraged plants that were part of the Urban Foraging Project were also dried and used to brew tea that will be analyzed for various heavy metals and nutrients.

UFS in the Media

The NYC Urban Field Station found itself in the media spotlight many times in 2015. Here are a few snapshots of our media coverage:

CBS Moneywatch – New York City still feeling the wrath of Superstorm Sandy:
http://www.cbsnews.com/news/new-york-city-still-feeling-the-wrath-of-superstorm-sandy/

Urban Omnibus - New Yorkers of the Urban Wild:
http://urbanomnibus.net/2015/09/new-yorkers-of-the-urban-wild/

Nature Sacred – A Season of Change at Beach 41st Community Gardens: September 2015 Updates:
http://naturesacred.org/articles/a-season-of-change-at-beach-41st-community-gardens-september-2015-updates/

Urban Omnibus – Forager's Metropolis: A Conversation with Marla Emery:
http://urbanomnibus.net/2015/09/foragers-metropolis-a-conversation-with-marla-emery/

Time Warner Cable News, NY1 – Local College Students Studying Trees Impacted by Hurricane Sandy:
http://www.ny1.com/nyc/queens/news/2015/08/12/local-college-students-studying-trees-impacted-by-hurricane-sandy.html

The Nature of Cities blog - Encountering the Urban Forest:
http://www.thenatureofcities.com/2015/03/04/encountering-the-urban-forest/

The Nature of Cities blog – September 11, 2015: An Event Ethnography of Living Memorials:
http://www.thenatureofcities.com/2015/09/30/september-11-2015-an-event-ethnography-of-living-memorials/

The Baltimore Sun – Planting Trees for a Better Democracy:
http://www.baltimoresun.com/news/opinion/oped/bs-ed-tree-advocacy-20141104-story.html

In a Queens Forest, Compiling a Picture of Urban Ecology:
http://www.nytimes.com/2014/12/03/nyregion/high-tech-woods-in-queens-help-us-monitor-urban-ecology.html

Contact the Field Station

For additional information, please visit http://nrs.fs.fed.us/nyc