

HIXON CENTER FOR URBAN ECOLOGY

The Hixon Center for Urban Ecology provides an interdisciplinary forum for scholars, students, and practitioners to work collaboratively on integrated research, teaching, and outreach to improve our understanding and management of urban ecosystems within the United States and around the globe.

The ecological health and integrity of urban ecosystems have a profound impact on urban economic productivity and quality of life. Pioneering research, new theoretical understanding, and innovative practice will be required to provide the knowledge and tools necessary to foster healthy natural systems essential for the future well-being of the modern city and the people who live there. This need has never been greater than today, when a majority of the world's population either resides in or is rapidly migrating to urban areas.

To accomplish its mission, the center builds upon and strengthens the work of several programs at the School, including the Urban Resources Initiative and the Urban Watershed Program.

The Hixon Center has a strong focus on collaboration within the School, across the University, and beyond. The center sponsors lectures and symposia as a means to disseminate ideas about and understanding of the critical issues confronting urban ecosystems.

The Hixon Center also supports Yale faculty initiatives to optimize sustainability and resilience through observational and experimental research on the urban water cycle, green infrastructure, vegetation, and urban green spaces. In addition, the center supports students' basic and applied research through fellowships connected to current Hixon Center priorities in the realm of urban ecology. The center will continue to build the urban environmental focus at Yale while strengthening the School's urban dimension, creating new models and approaches for addressing urban environmental challenges.

URBAN RESOURCES INITIATIVE

The Urban Resources Initiative (URI) is a not-for-profit/university partnership dedicated to community participation in urban ecosystem management. A substantial body of learning recognizes that sustainable urban ecosystem management depends on the meaningful participation of local residents. Those who know local conditions and whose daily actions influence the health and quality of urban ecosystems must play a central role in designing and implementing rehabilitation strategies. Sustainable natural resource management and conservation cannot be achieved by technical, scientific solutions alone. Conservation efforts, especially in urban areas, must emphasize social revitalization alongside environmental restoration.

Yale's URI program draws on these essential elements to facilitate community participation in urban ecosystem management. "Community" is defined quite broadly. It includes the group of neighborhood leaders with whom interns work to restore neglected lands near their homes. Community is a group of teens who are learning how to assess the tree canopy of their city. Community is the staff and leadership of city agencies who have the responsibility and resources to become the environmental stewards of their city. URI's approach responds to and engages all of these communities.

URI offers a number of clinical learning opportunities that allow F&ES students to gain real-world practice in their field. Listening to local concerns and developing environmental programs in cooperation with neighborhood groups, NGO partners, schools, and city agencies are the cornerstones of our work. Through these programs YSE students can make a real contribution to the New Haven community while they enrich their academic work by applying theory learned in the classroom with supervised clinical training. These programs include the Community Greenspace program, Green Skills, environmental education/job training program, research opportunities, and training in urban forestry practices.

Community Greenspace Each summer YSE students work as community foresters as part of the Community Greenspace program, a citywide initiative to revitalize New Haven's neighborhoods by planting trees along streets and in parks, remediating lead from soil in front yards, reclaiming neglected lots, and building community. Each intern works with community groups who develop restoration goals and design an implementation strategy for the summer. The interns support neighbors to conduct an inventory of existing trees, select species and prepare sites for new plantings, and plant perennials, shrubs, and trees.

The Greenspace program is an opportunity for Yale students to learn urban forestry practices. Neighbors initiate the process by identifying their environmental priorities in their community. URI looks to the local experts—the people who live in New Haven neighborhoods—as partners in defining and then assessing, designing, implementing, and sustaining urban restoration sites.

Environmental education/green job training Over nearly two decades, URI staff and interns worked directly within the New Haven school system, teaching thousands of elementary school students about environmental stewardship through the exploration of the city's open spaces. During the 2009–2010 academic year, the City of New Haven officially incorporated the pond and rivers units from URI's Open Spaces as Learning Places curriculum into the district's science curriculum. Now, students in every sixth-grade classroom have the opportunity to learn about watersheds as they canoe New Haven's rivers and explore local ponds.

URI's GreenSkills program creates opportunities for teens and adults to learn about and improve New Haven's tree canopy and to gain practical job skills. Launched in 2007, the GreenSkills program creates an opportunity to address a critical predicament—a growing deficit in New Haven's street tree canopy that can be countered by a career development program bringing together Yale and high school interns. In 2010 the GreenSkills program was expanded to include adults with barriers to employment, particularly those recently released

from incarceration. Its goals are to improve New Haven's street tree canopy by engaging adults and local high school students in the planting effort, thereby providing them with job skills and mentoring opportunities in environmental careers, and to foster a sense of environmental stewardship.

Research URI activities provide valuable research opportunities in community organizing and development, urban forestry management, environmental education, and monitoring and evaluation of community-managed ecosystems. Some examples of past student research activities include a community survey to determine human health impacts of vacant lands; measurement of biological communities found in Greenspace sites and abandoned lots; how community group dynamics affect urban street-tree survival; and measurement of how children's behavior at play is affected by the design of schoolyards.

URBAN WATERSHED PROGRAM

The Urban Watershed Program promotes faculty and student research on the unique relationships, impacts, and demands of watersheds in urban areas. Watersheds in urban areas encounter unique stresses, while sharing common characteristics and following natural laws of all water systems. Urban watersheds are often polluted and heavily engineered. Stream courses are often transferred to pipes running underground, and thereby visually disconnected from residents. Population density exacerbates stresses on waterways. As cities emerge from a period when they ignored their rivers and harbors, new relationships are being developed with adjacent waterways. Past practices that marginalized waterscapes from the urban environment are being reevaluated. Now, with more attention to urban environmental quality and environmental justice, there is a greater understanding of the vital role waterways play as sources of open space, transportation, recreation, and habitat.

The Urban Watershed initiative currently has two major activities. One is a study of an urban ecosystem restoration project situated in an urban park. For nearly a century, flow in the West River, on the New Haven–West Haven border, has been regulated by tide gates that allow the outward flow of freshwater, but restrict flushing by seawater. These restrictions are being replaced by self-regulating tide gates, which close only in the rare event of potentially hazardous storm surges. As a result, the current degraded tidal freshwater marsh will evolve into a healthier salt marsh, the ecosystem type that existed there in the past. This restoration is being monitored, using a nearby, gated marsh that will not be restored. Monitored parameters are water quality, hydrology, vegetation, fish populations, bird communities, and the attitudes, values, and recreational and stewardship behaviors of people who use the park. This before-after-control-impact (BACI) experiment is almost unprecedented at this scale.

The second major activity of the Hixon Center's Urban Watershed Program is to monitor, evaluate, and optimize green infrastructure solutions to manage stormwater and improve water quality in partnership with the City of New Haven. In New Haven, three rivers flow through densely settled urban areas before draining into New Haven Harbor and Long Island Sound. Large areas of impervious surface and compacted soils lead to significant overland flow of contaminated stormwater. The contamination in the waterways is the direct result of stormwater runoff from the city's impervious surfaces, overloading the city's combined and separate storm sewer systems, and eventually discharging into Long Island Sound. Green infrastructure such as infiltration bioswales significantly reduces storm flows and improves water quality. In partnership with the City of New Haven, URI and EMERGE (local NGO) are installing two hundred bioswales to improve stormwater quality and reduce storm flows to separated and combined sewers.

YALE EXPERIMENTAL WATERSHED

The Yale Experimental Watershed (YEW) is a living laboratory of urban ecology located adjacent to the School. The YEW, a 5.5-acre site between Prospect and Mansfield streets, is being transformed from an underutilized and overgrown site to one that is of great value to the University and the community—where academic research and teaching are conducted, and community members can learn and explore.

Fieldwork and research projects have included tree identification and mapping, coarse woody material assessment, soil sampling and analysis, land cover mapping, bird habitat investigation, and site hydrology and groundwater monitoring. The site has also been used as an educational resource for graduate courses in the School of the Environment and for high school students in the Common Ground Green Jobs Corps and the Yale SCHOLAR program.