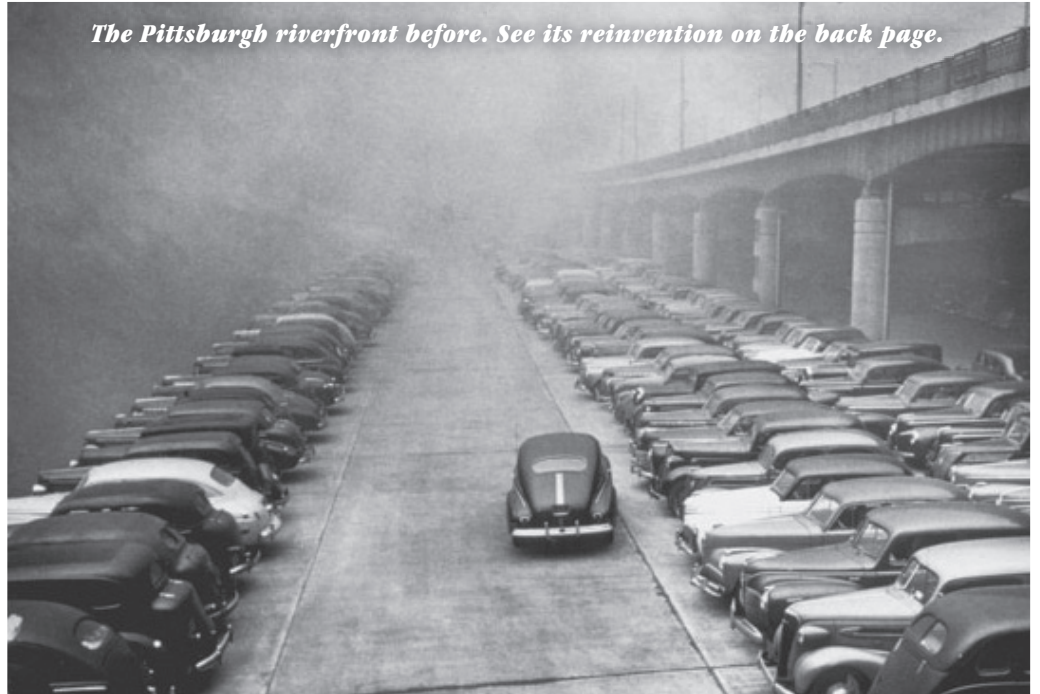


*Newsletter of the
Urban Resources Initiative
at the Yale School of Forestry
& Environmental Studies*

The Pittsburgh riverfront before. See its reinvention on the back page.



by
Dylan Walsh

NEW WAYS OF DEALING WITH WATER IN THE CITY

We looked down on the tops of clouds from the thirtieth floor of the federal building. They drifted low over the Hudson River like thin and ragged boats, shifting shape.

That was proper: clouds integrated among the barges and bridges of Manhattan commerce.

We were all – me, the thirty-five or so other people in the room – attending the annual conference hosted by the Urban Ecology Collaborative (UEC), this one titled "Urban Waters and Green Infrastructure: New Ways of Dealing with and Relating to Water in the City." Jennifer Greenfeld, UEC Steering Committee Chair and Director of Street Tree Planting at the New York City Department of Parks and Recreation, offered brief introduction. "It's always a bit difficult to describe UEC," she

said. "But I think of it as a loosely disciplined group of researchers. We exchange information in a really informal way."

Some attendees wore suits, others a fleece over t-shirt. They chatted and japed and interrupted each other like extended family. This was the tenth anniversary of the UEC, Jennifer announced, and a small burst of applause circled the room.

Tree-planting groups representing eight eastern cities hold membership in UEC, from Boston down to Washington D.C., with a westward lariat to tie in Pittsburgh. The cities are similar in climate; they share the rust of an industrial shadow. URI was a founding member of the organization in 2002 and New Haven remains the smallest city represented.

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Urban Issues
Dylan Walsh, Editor

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In 1950, 30 percent of the world's population lived in urban areas. Today that figure has crested 50 percent. More than 80 percent of the U.S. population is urban.

The trend is expected to continue, with cities adding 2.5 billion people by 2050, most of this growth occurring in medium-sized cities of about 1 million inhabitants.

This is a radical and important change, and yet our understanding of the interaction between cities and the natural environment remains comparatively thin. Just a few decades ago, cities weren't thought of as ecosystems. Rather, cities were something isolated from their surrounding environment. Now, of course, countless organizations – URI among them – are working to understand the deep and necessary connections between the city and its environment.

"When one tugs at a single thing in nature, he finds it attached to the rest of the world," John Muir wrote.

The work of this past summer's Hixon Fellows showcases the inextricability of city and nature along with the slow and detail-laden process of learning about this relationship. Six students took on a broad range of questions focused on urban environments and spent the summer seeking answers, however preliminary.

In this issue's cover article we describe the Urban Ecology Collaborative, a partnership of eight eastern cities striving to define and share best management practices for the urban environment. "How," UEC members wonder together, "do we learn from problems of the past? How do we define and implement solutions for the future?" All critically important questions to answer when we considered that two-thirds of the world's energy is consumed by cities and urban areas generate 70% of global greenhouse gas emissions.

One outcome of intensified urbanization is a change in exposure to nature: the majority of our global population will soon, or already does, experience this contact within the city. If our experience with nature shapes our environmental ethic, will we see shifts due to urbanization? In this issue we present the second of four profiles on our Greenspace emeritus leaders, each revealing an individual's environmental ethic through long-term stewardship. With simple historical account of New Haven resident Jody Kelly – her persistent care for a small parcel of greenspace – we distil the personal from the abstract. The broad sweep of theory in our other articles is honed to the scale of one resident who above all else finds herself "connecting with those – young or old, friend or stranger – who want to protect and enjoy" the natural assets of New Haven.

Over the past decades we have begun to learn about our cities, those forces of gravity for the global population. Much learning remains if we are going to sustainably manage urban resources amid swelling city borders. But, on the bright side, 50 percent of the world's people inhabit just 2 percent of its land surface. Striving to get it right in cities will ultimately play a pivotal role in the health of our planet's ecosystems, whether urban or not.

Colleen Murphy-Dunning

Urban Ecology Collaborative

(continued from page 1)

Each year a few cities present on innovative practices for a particular urban issue – how to optimize tree planting crews, how to maintain a volunteer base, more effective pruning techniques, measuring ecosystem services, and so forth. Monthly conference calls reinforce this information sharing.

The Collaborative is essentially a clearinghouse for best practices in the management of urban environments. Its value is not necessarily derived from the few annual presentations, but from the strong connections intrinsically built over years of interaction.

As the title of this year's conference suggests, the focus was on the relationship between a city and its water: how can cities take better care and advantage of their rivers, rainwater, sewers, coastlines, harbors, lakesides?

"Water is taking a place in our thoughts that it hasn't before," said Bram Gunther, Chief of Forestry and Horticulture for the New York City Department of Parks and Recreation, at the beginning of the conference. Growing urban populations and changing climates are stressing the water supply of cities.

Efforts to understand and naturally manage urban hydrology are growing in popularity. Ailing 'gray' infrastructure – impermeable concrete, sewers, hard sloping roofs – is being replaced with green infrastructure like roadside rain-swales and green rooftops. This kind of innovation is essential to passive and effective management of the urban watershed.

Pittsburgh, a city as famous for its three rivers as its monstrous steel industry – author H.L. Mencken described industrial Pittsburgh as "Hell with the lid taken off" – is working to restore its riverfront, now recognized as one of the city's most valuable assets.

Agencies and non-profits across the city are coordinating to recapture the riverfront from its historically polluted legacy. Since this initiative started,



Before

boating has become the fastest growing recreation sport in Pittsburgh. REI spotted the trend and moved in with two stores: one in the suburbs, one along the water in a redeveloped brownfield.

Waterfront reclamation projects have proven to be far more than simple beautification efforts; they have restored use values, brought economic development, offered ecosystem services that reduce stresses on water infrastructure, and they have given river access, once blocked by industry, back to the community.

Jerry Willis, Director of the National Park Service field office in New York City, echoed this last outcome in his presentation covering community activism around the Harlem and Bronx Rivers. "Whole communities on these sites are overburdened and underserved," he said, citing a long list of environmental injustices like toxic dumps, trash incinerators and heavy truck traffic concentrated in select neighborhoods. "The expressway and railroads strangle off community access to the waterfront," said Mr. Willis.

For all intents and purposes, the Bronx and Harlem Rivers don't exist.

But efforts are underway to locally reclaim the riverfronts for environmental benefit. Abandoned industrial sites are being overturned and planted with phytoremediation projects. Local teenagers recently constructed a salt marsh as a natural



After

mechanism to filter stormwater.

A grant through the National Oceanic and Atmospheric Administration cited 26 locations prime for ecological restoration and community access projects. Though funding remains uncertain, the possibility of change is ideologically powerful. "We're getting the residents to imagine access to a waterfront that they haven't had access to for a whole lifetime," said Mr. Willis.

The UEC mixes lofty exposition of what could be, with the fundamentals of how to achieve it; what might be accomplished paired with what is being accomplished.

Looking over the city from the thirtieth floor there were perhaps one or two hundred rooftops visible. It was a rainy day presenting dramatic skyline. The tar-top roofs glistened with water, as did the shimmering glass of skyscraper windows. The water flowed in forking rivulets down these windows to the sidewalk, to the curb, to the sewers and into the river, carrying all that grime, and from the river it ascended again into the boat-like clouds. Surely, I thought, that process could be reimagined.

Among all those buildings, standing out like the glint of a mirror, was a single rooftop garden, green among the uneven ocean of gray.

Dylan Walsh graduated from Yale F&ES in the spring of 2011. He is the editor of the newsletter.

Hixon Fellows: Summer 2011

Six masters and PhD students from the Yale School of Forestry and Environmental Studies received Hixon Fellowships for research on urban systems this past summer. Presented below are five snapshots of student projects – narrow windows into the inextricability of city and nature.

Cultivating Community: Building Cohesion and Forging Identities in New Haven's Community Gardens

Amy Coplen, '12 (MEM)

The New Haven Land Trust manages 50 local community gardens that serve over 600 residents. These gardens provide food to populations with little access to fresh produce; they also offer outdoor recreation opportunities, build community cohesion and facilitate individual and cultural exchanges. The food that is grown in these gardens is a medium for shared experience.

Despite this, community gardens in New Haven face numerous challenges including limited access to water and land, contaminated soils, tenuous funding and development threats. Investment in beautifying abandoned lots often leads to their sale and repurposing. Unfortunately, the complex social and cultural benefits of community gardens provide little leverage in defense against these threats, largely because these benefits remain unmeasured. I performed ethnographic studies through interview, participant observation and photography to help expose how urban gardens build community cohesion, facilitate cross-cultural exchange, create knowledge networks and resource sharing, and establish new identities for immigrant and transplant populations.

These findings provide a substantive, explicit claim for “gardens as good,” and will hopefully help defend urban community gardens against competing land claims.

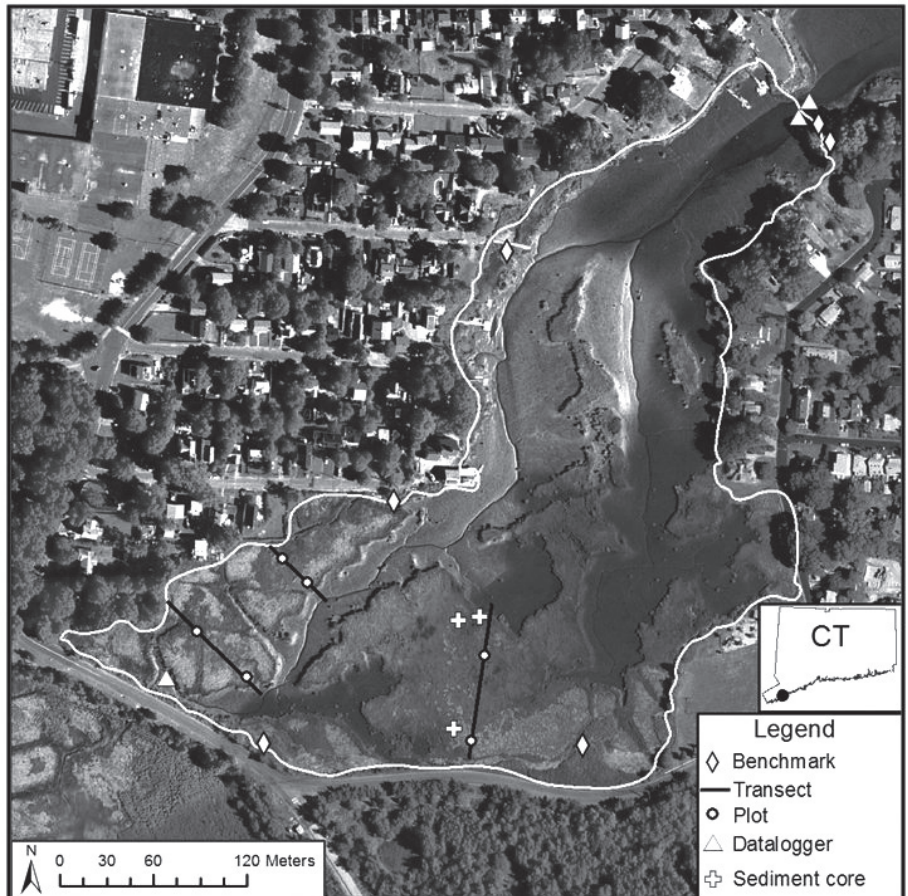


Figure 1. Harborview marsh in Norwalk, CT. Instrumentation and sampling plots are indicated.

Material Exchange between an Urban Salt Marsh and Long Island Sound

Troy Hill, '15 (PhD)

Salt marshes – the band of flora between land and salty or brackish waters – provide a broad range of ecological services. Among other benefits, they mitigate coastal erosion and serve as critical habitat for migrating birds and aquatic food webs.

In urban settings, marshes are typically smaller and serve more concentrated human populations, increasing the value of their ecological services. Predictably, urban salt marshes also face intense anthropogenic pressures. Coastal development often captures nearby land buffers. This limits opportunities for inland marsh development, and can

ultimately reduce sediment supply and stall the vertical accretion of the marsh – two critical mechanisms by which marshes accommodate rising sea levels.

Though the continued health of urban salt marshes depends on adequate sediment supply and deposition, current knowledge of material exchange between marshes and coastal waters is minimal, particularly in urban areas. Last summer, I measured and analyzed high-resolution data on the flux of water, salt, and sediment in an urban salt marsh in Norwalk, Connecticut. This work, through continuous monitoring of water discharge along Long Island Sound, provides detailed data on the basic processes of an urban salt marsh, a first step toward effective management practices.

Water-Energy Nexus: A Critical Review

Ranran Wang, '17 (PhD)

Interdependence of the world's water and energy resources is receiving growing attention, both within academia and the broader public discourse: the generation of energy requires water, the purification and distribution of water requires energy, and both of these sectors are under mounting stress. A comprehensive and in-depth understanding of the water-energy nexus is essential for the sustainable management of both resources.

This summer I reviewed the evolution of information, knowledge, research methodology and theory that have grown out of over 90 publications in this area from the past 40 years. I then built a water-energy nexus databank and graphed the development of knowledge over time. In the end, I designed a new methodological framework for research in this area, which is presently under-represented in the academic literature. I believe the ideal tools for research at this nexus are system dynamics and life cycle analysis; these simulate dynamic behaviors and assess environmental impacts of interrelated social, managerial, economic, and ecological systems.

Life Cycle Assessment of a Land Management Project: The PlaNYC Afforestation Initiative in the Kissena Corridor Park, New York

Chen Qian, '12 (MEM)

This summer I quantified the lifetime environmental impacts associated with afforestation of Kissena Corridor Park in Queens, New York. Kissena Corridor Park has been targeted by a broader afforestation initiative in the city, with approximately five thousand trees to be planted within the next few years.

Using life cycle analysis – a tool that attempts to quantify and compare the environmental benefits and damages of every system input, process, and output – I found that the afforestation project can produce significant results in



Time-series samples of stream water collected during Hurricane Irene.

saving energy, mitigating greenhouse gas emissions and improving water management. The total ecosystem benefits over a 100-year time horizon were calculated to be \$42.2 million.

Given these figures, it is critical to realize that payback for upfront environmental burdens (from tree cultivation to machinery used in tree transport and planting) ranges from ten years to several decades. The longevity of the parkland is therefore a fundamental determinant of whether positive impacts are ultimately realized. I also found that certain tree species generate larger benefits in the long run, suggesting that select tree species and their physical arrangement should be considered for optimizing future benefits to the urban landscape.

Impact of Storm Events and Urbanization on Drinking Water Quality

Bryan Yoon, '12 (MESC)

Rapidly changing climate and urbanization of watersheds are altering the transport dynamics of freshwater and dissolved organic matter. Precipitation plays a dominant role in controlling water quantity and quality, and storm intensity is predicted to grow throughout the Northeast as a result of climate change. Urban watersheds also export more polluted water, with higher concentrations of dissolved substances. It is therefore imperative

that we improve our understanding of how precipitation intensity, land cover change and seasonality affect the quality of our urban drinking water supplies.

This past summer I investigated the relationship between dissolved organic carbon and the potential formation of disinfection by-products (DBP), a known carcinogen, in two contrasting watersheds during 11 different storm events. The key questions under consideration were:

1. How do precipitation events affect dissolved organic carbon transport in a forested and an urban watershed?
2. Does urbanization of watersheds contribute to higher formation potential of DBP?
3. How will increasing precipitation intensity affect DBP formation?

I found that urban watersheds exhibit unique dynamics with regard to export of dissolved organic carbon, measuring much higher concentrations; in turn, this can lead to increased formation of disinfection by-products when this water is chlorinated for potable supplies. Given this, management of future water supplies will need a more thorough understanding of the interaction between storm events, dissolved organic carbon, and DBPs in urban watersheds.

The Follower Who is a Leader: Jody Kelly

by
Hilary
Faxon

Jody Kelly is quick to say she's not a leader. "I'm more of a really good follower," she insists. But while Jody may not have captained the initial push to transform the vacant lot at 93 Shepard Street into a Greenspace, for more than a decade she has been the site's most committed caretaker. If Jody is a follower, then she is one of New Haven's best.

The long, narrow lot is next to the house where she has lived for almost 25 years, first with her husband and son, now with her cat and two-year-old granddaughter. Jody was born and raised in New Haven. After a short stint in the suburbs, where she said she first learned to love natural places, Jody became a proud and permanent resident of the city. Given her combined passion for hometown and nature coupled with her proximity to the lot, Jody gradually took ownership of the Greenspace, assuming the brunt of its responsibilities while sharing its joy with all.

The woman Jody would tag as leader is Charlene Spruill, who spearheaded the community application for a URI grant in 1999. "She was blockwatch captain," Jody explains. "She lived down the street and was a receptionist for church. A very community-oriented person: always out there, always got involved." Jody also notes that, through the program, Charlene became one of her close friends. Even though Charlene moved to California a decade ago, the two frequently speak with each other.

Charlene started the Greenspace when the neighborhood was in a period of revitalization: the New Haven Land Trust had started a community garden across the street a few years earlier and people were eager to be involved in work days and neighborhood events. Since then, participation has dwindled and the demographics of Shepard Street have shifted. More renters have moved into homes vacated by the eager helpers who either moved away or passed away. Jody, though not rueful, is nostalgic for the old days of harvest and friends. She readily acknowledges those "who were there at the beginning." Despite age and illness, she says, these folks were out



Photo by Richard Press

Jody Kelly with some of her younger expert green thumbs.

to weed or cheer on. She is firm that they, not she, deserve the recognition.

Old friends gave way to new friends, younger friends: the neighborhood children. Every summer, Jody attracts a gang of young hands eager to help out as stewards. Year after year her photo albums fill with kids pulling weeds, digging in the dirt, and building walls, riding bikes and working with URI interns to learn about bugs and plants. She has always loved working with kids. While active recruitment and organization among adults was never her style, being a teacher comes naturally. Each season six to eight kids become primary caretakers of the Greenspace. When they grow up and move on, younger siblings, cousins, and new arrivals take their places.

While Jody values the human connections formed by work in the garden, it is the

natural environment itself that she most enjoys. "What I like about the Greenspace is – that's it, just a bit of green space instead of having houses all close to you," she said. "Having that piece of green is really nice for me. It's a long backyard, shady, nice; it looks like a park back there. I like that." Greenspace for Jody does not mean some big, chaotic crusade, but maintaining a little piece of green carved into the city and connecting with those – young or old, friend or stranger – who want to protect and enjoy it.

Hilary Faxon graduated from Yale College in the spring of 2011 with a focus on environmental studies. She is currently on fellowship at the Royal Society for the Protection of Nature in Bhutan. She will begin her masters degree at F&ES this fall.

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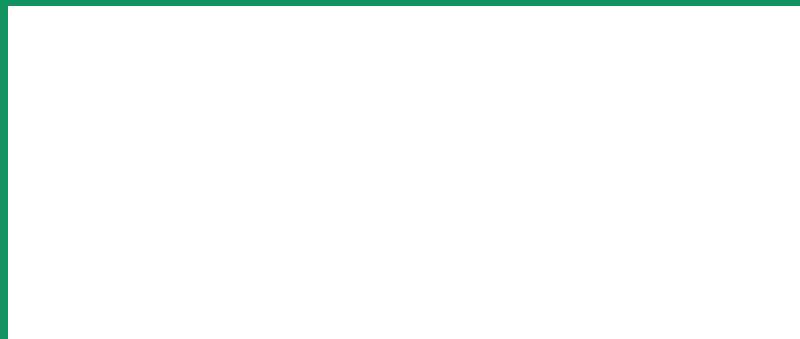


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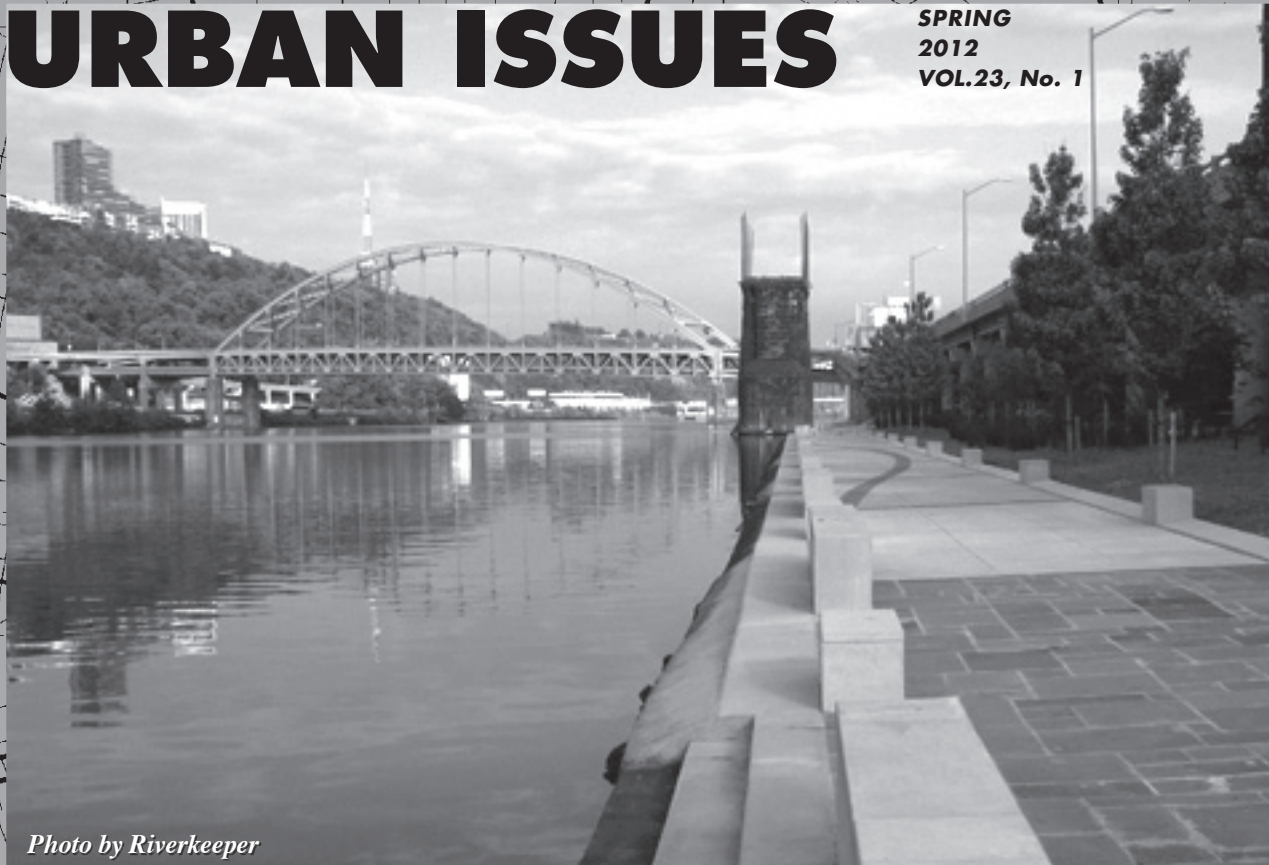


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