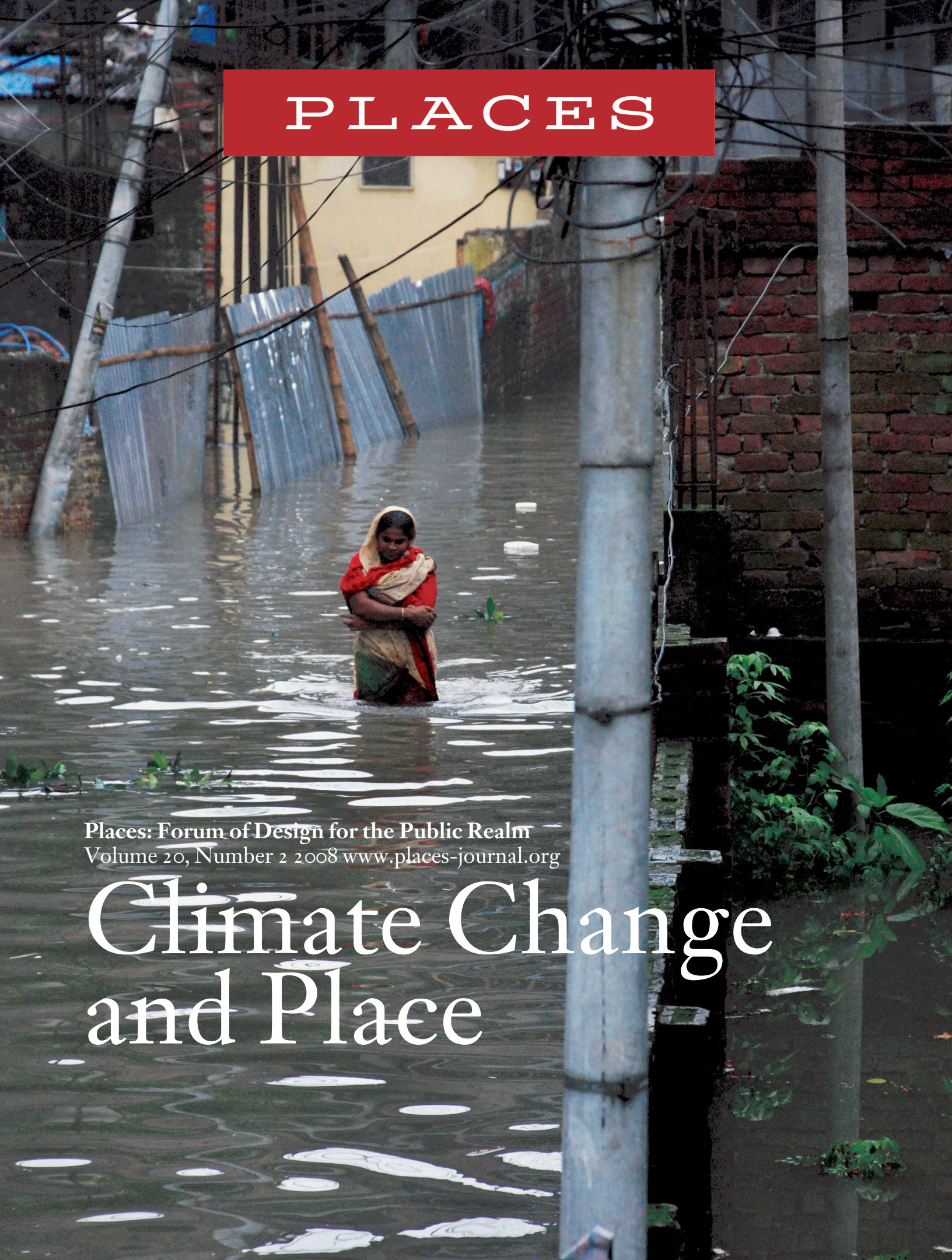


PLACES

Places: Forum of Design for the Public Realm
Volume 20, Number 2 2008 www.places-journal.org

Climate Change and Place



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Editorial Office
Donlyn Lyndon, Editor
David Moffat, Managing Editor
Lisa Sullivan, Publications Director

Places
Center for Environmental Design Research
Room 390, Wurster Hall
University of California
Berkeley, CA 94720-1839
Telephone (510) 642-1495
Facsimile (510) 643-5571
places@uclink.berkeley.edu

Advertising and Publishing Office
Richard C. Shepard, AIA, Publisher
P.O Box 84
South Dartmouth MA 02714
Telephone (508) 636-6284
Facsimile (508) 636-5126
rshepard@sqdesign.com

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Scott Starr, Business Manager
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Guest-edited by Nancy Rottle and Marina Alberti

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Growing Water

Martin Felsen and Sarah Dunn

The Growing Water project addresses a report from the United Nations that two out of three people in the world will face water shortages by 2025, a situation that will inevitably lead to global conflict. Access to clean water is fundamental to the lives of healthy human beings. While the United States is by and large considered to have adequate water resources, water scarcity and droughts occur regularly throughout the country. Water shortages are even routinely reported in cities adjacent to the Great Lakes, which hold 20 percent of the Earth's fresh water and 95 percent of the fresh water in the United States.

Global climate change as well as local environmental issues is an additional concern to those in charge of fresh water resources in Chicago and the Great Lakes basin. In April 2007, a United Nations climate panel gave notice that continued climate change "could diminish North American water supplies and trigger dispute between the United States and Canada over water reserves already stressed by industry and agriculture." Even in the comparatively water-rich Great Lakes region, global warming could create "more frequent droughts, urban flooding and a scramble for water from the Great Lakes, which border both the United States and Canada."

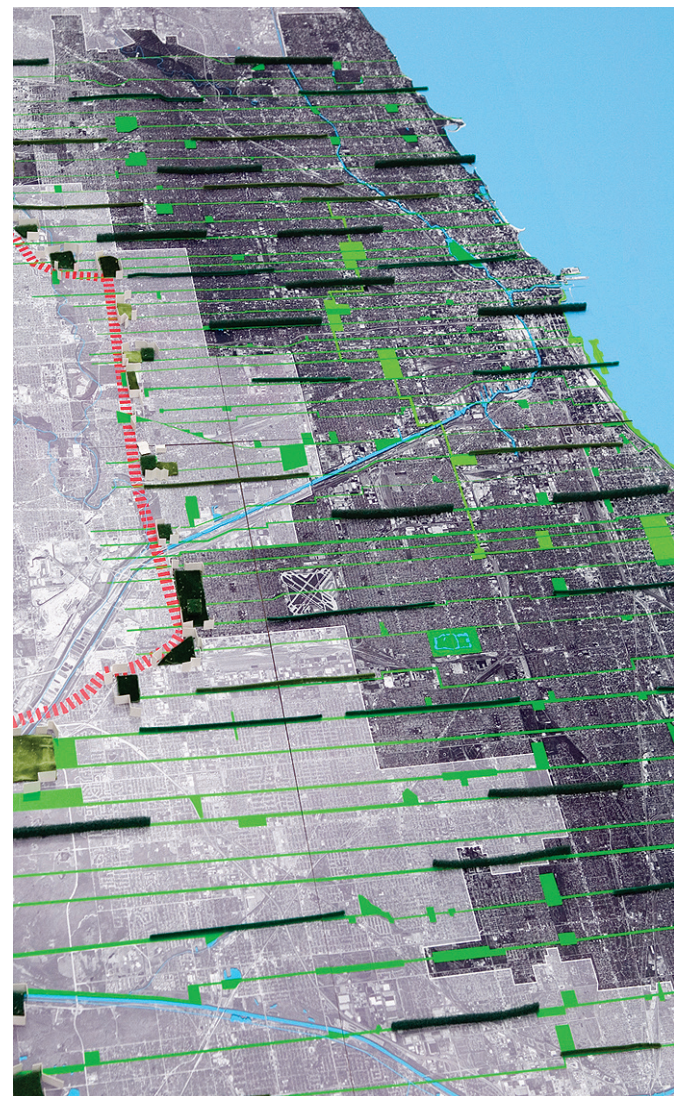
The Growing Water project conceptualizes unprecedented uses of local water relative to local land use and land conservation, and envisions ways that Chicago can become an model for addressing urban water scarcity and pollution. In the very near future, clean water will be both the Chicago region's, and the world's, most valuable resource: the new oil.

The Facts of Water in Chicago

A subcontinental ridge separates most of Chicago from its suburbs: all surface and groundwater east of the divide naturally flows into Lake Michigan; all surface and groundwater west of the divide flows toward the Mississippi River and ultimately the Gulf of Mexico. With this split in mind, the Growing Water project was inspired by three historic Chicago engineering feats: the reversal of the Chicago River, the Deep Tunnel, and the city's boulevards and parks.

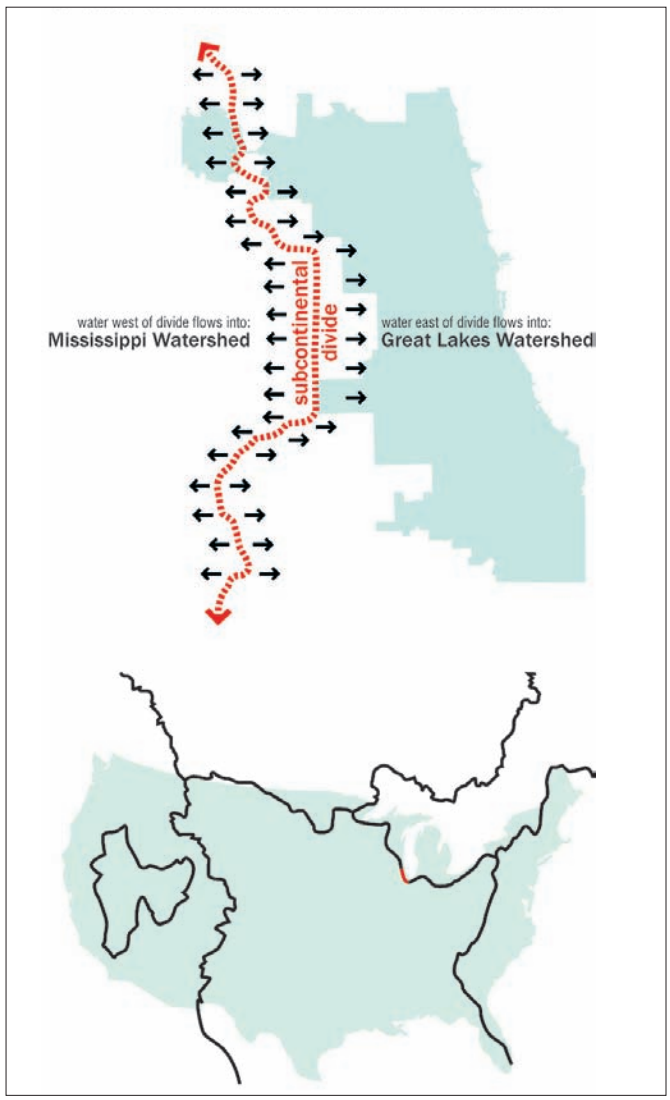
The Chicago River. In 1892, ground was broken for the 28-mile Chicago Drainage Canal (also known as the Sanitary and Ship Canal). At 25 feet in depth and 306 feet at it widest point, it was larger than the Suez Canal and the Panama Canal. New machines to move earth were invented to complete the project, establishing the "Chicago School of Earth Moving." On January 2, 1900, Chicagoans awoke to discover that the flow of the Chicago River had been permanently reversed, away from Lake Michigan, making the river the first to flow away from its mouth.[1]

The Deep Tunnel. In the 1970s, a team of engineers sought to solve the persistent problem of flooding and water pollution in Chicago. Their solution was one of the largest engineering schemes ever proposed: a 109-mile system of huge underground tunnels that would intercept combined sewer and stormwater overflow in the city and convey it to



Above: Montage showing the location of new eco-boulevards in the Chicago area. Photo by Michelle Litvin.

Opposite: Maps showing the location of the subcontinental divide to the west of Chicago and the major drainages of the continental U.S.



large storage reservoirs and treatment plants, from where it would be sent onward, over the subcontinental divide to the Mississippi drainage. Today, the Deep Tunnel has a holding capacity of 15.6 billion gallons of wastewater.

Boulevards and parks. In 1837, Chicago adopted the motto "Urbs in Horto," or "city set in garden"; however, the city's early growth was so rapid and widespread that little or no provision was made for public parks. In a later effort to fulfill the promise, several large public parks were built and connected to one another via green boulevards. In 1893, the system was dubbed the "Emerald Necklace." Similar boulevard systems were later developed in Boston, Kansas City, and Washington, D.C.

Eco-Boulevards in Chicago

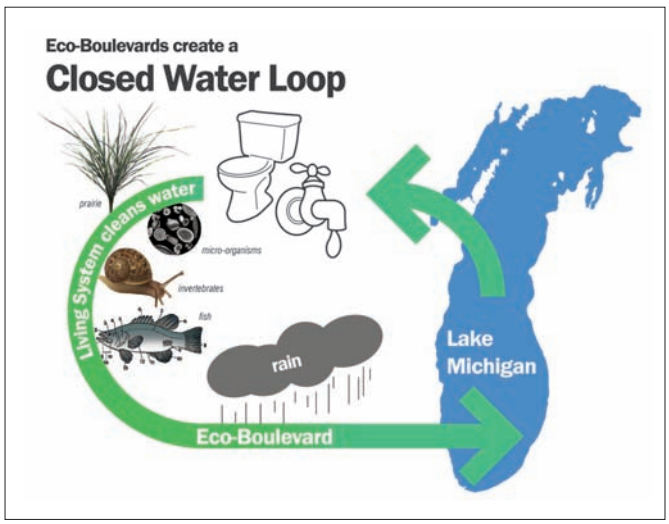
Chicagoans routinely discard, literally "flush down the drain," more than one billion gallons of fresh water (extracted from Lake Michigan) per day. This water never replenishes the Great Lakes basin. As if it had no value, it is sent (after treatment) via the reversed Chicago River into the Mississippi drainage and the Gulf of Mexico. To reclaim this precious resource, the Growing Water project envisions making Chicago a model for recycling, or increasing its water supply, by creating fifty "eco-boulevards" deployed democratically throughout the city.

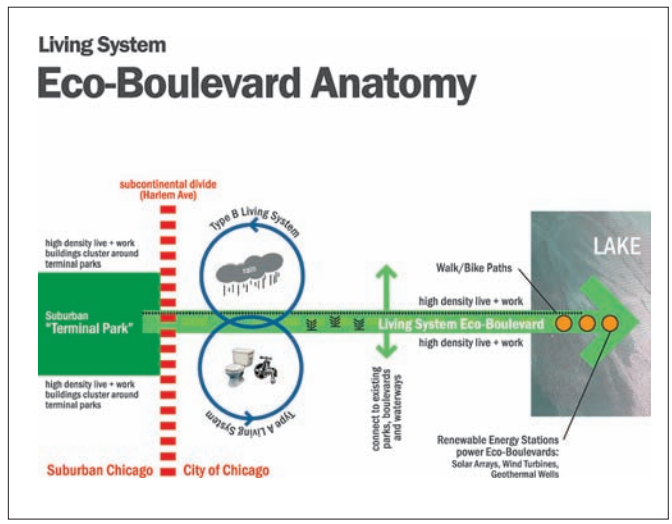
Essentially, the eco-boulevards would be long strips of publicly owned land transformed from gray infrastructure (roadways and sidewalks) to restored green infrastructure. Green infrastructure is any network of open spaces and conservation land—parks, wetlands, preserves, bioconduits, and native landscapes—that naturally manages stormwater and improves water quality. Proponents of green infrastructure encourage community engagement in the conceptualization, design, planting, and upkeep of greenway systems. In this case, the system of green-infrastructural eco-boulevards in Chicago would radically increase the environmental health of the city and the well-being of the Great Lakes ecosystem by returning the water extracted from it by the city.

Organized by UrbanLab, the Growing Water team proposes that over the next several years Chicago institute the eco-boulevard concept in order to enhance Chicago's grid of parks, green boulevards, and waterways to help the city save, recycle, and produce 100 percent of its own water. Eco-boulevards would function as a giant "living machine," naturally treating 100 percent of Chicago's wastewater and stormwater. Treated water would be harvested or returned to Lake Michigan to replenish Chicago's most vital natural resource. Eventually, the eco-boulevards would create a closed water loop within the city.

Living machines are ecological treatment systems that make use of natural bioremediation processes to remove contaminants from sewage, storm water, and other wastewater sources. At the scale of a city, a living machine can be thought of as green infrastructure.

In the Growing Water proposal, there would be two types of living machines. Type A would use aquatic and wetland ecological processes to treat wastewater naturally; these processes would be carried out in reactor tanks in indoor greenhouse conditions. Greenhouses would also contain stray odors from the processing of black water.[2] Type B would consist of marshes, wetlands, prairies, and forests that would use low-energy processes to biologically





filter stormwater. As a living machine, Chicago could use these processes to treat 100 percent of its wastewater and stormwater using micro-organisms, small invertebrates, fish, and native plants.[3]

According to the Growing Water plan, eco-boulevards would be arrayed across the city, replacing fifty east-west roads and sidewalks (also known in Chicago as the "public way"), and reaching from Lake Michigan to the subcontinental divide. The ten-mile-long, 66-foot-wide eco-boulevards would ultimately connect and expand Chicago's existing natural landscape. Spacing the thin green ribbons every half-mile assures they would be within a fifteen-minute walk of a majority of city residents. The eco-boulevards would also stitch together nearly every possible open space, natural land area, and public conservation zone. The vast majority of north-south vehicular, bicycle, and pedestrian pathways that cross the eco-boulevards would remain to provide the maximum number of connections within the Chicago grid system.

The design of each eco-boulevard would differ to meet the needs of its adjoining neighborhoods. For example, eco-boulevards could function as open hardscape plazas and public spaces when adjacent to commercial zones. And when next to residential neighborhoods, they could function as public parks and play, game, and leisure greenway surfaces. The Growing Water team anticipates that while several eco-boulevards would replace roads and sidewalks entirely with green infrastructure, others would contain a healthy balance of gray and green infrastructure (especially along commercial roadways, where vehicular mobility is vital). The eco-boulevards would remake the city in the image of its motto, "Urbs in Horto."

Left: The goal is to create a loop returning clean water to Lake Michigan.
Right: The functions of an eco-boulevard.

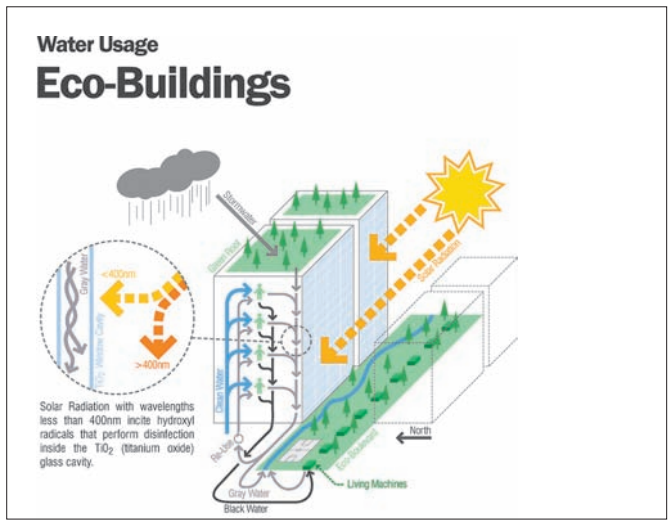
Additional Benefits of Eco-Boulevards

Social. The project would evenly spread the amenity of open green space throughout the city, stitching together historically divided ethnic and economic enclaves. The new public space would create additional space for socialization and play, such as walking or biking trails, sports fields, and fishing and swimming holes. Additionally, planting beds would be provided for city residents to micro-farm organic fruits, vegetables, and flowers.

Environmental. Beyond a sustainable water system and a healthy natural environment, the project would significantly reduce the urban heat-island effect, increase organic filtration of pollutants and carbon dioxide in the air, filter pollutants and heavy metals out of rainwater, and increase biodiversity by adding to insect, invertebrate, bird, and wildlife habitat.

Sustainable. Renewable energy stations would power the eco-boulevards. These would be prominently positioned within and at the ends of the eco-boulevards (on small peninsulas in Lake Michigan). Power could be harnessed from the sun, wind, water, solid biomass, and geothermal energy from the lake.

Economic. On a local level, the fingers of open space—the eco-boulevards—would raise adjacent land values significantly, especially in economically depressed areas.





A steady, sustainable, safe water supply would allow the city to achieve a level of economic growth that other, less water-endowed cities would be unable to match.

Regional. The eco-boulevards would become social and economic attractors: high-density spaces for living and working would develop along them, extending out from the city to the suburbs beyond. Eco-boulevards would typically extend beyond the western edge of Chicago, to the subcontinental divide, where they would be marked by "terminal parks." These large green spaces would be surrounded by residential and work complexes to accommodate suburbanites, who, as water becomes a more expensive and contested resource, would seek to move back to the east side of the subcontinental divide.

Phasing

The eco-boulevards would be cultivated in each neighborhood, one block at a time, and each would be built to complement its community. Density around the eco-boulevards would increase as new amenities attract development.

By mid-century, the eco-boulevards would start to connect to each other, as the density of new development increased and the development around them became integral to the growing water loop. At century's end, Chicago would become a holistic living system for harvesting and returning clean water to Lake Michigan.

Energy and Clean Water

Interconnectedness between the extraction, use, reuse, and cleaning of water from Lake Michigan would be vital to the closed-water-loop concept.

Water taken directly from the lake would be filtered in several stages before being sent to consumers. "Gray" water (from sinks, showers, etc.) would be disinfected and reused for appropriate purposes—such as irrigation—in its own loop. "Black" water (from toilets) would be cleansed in greenhouse living machines.

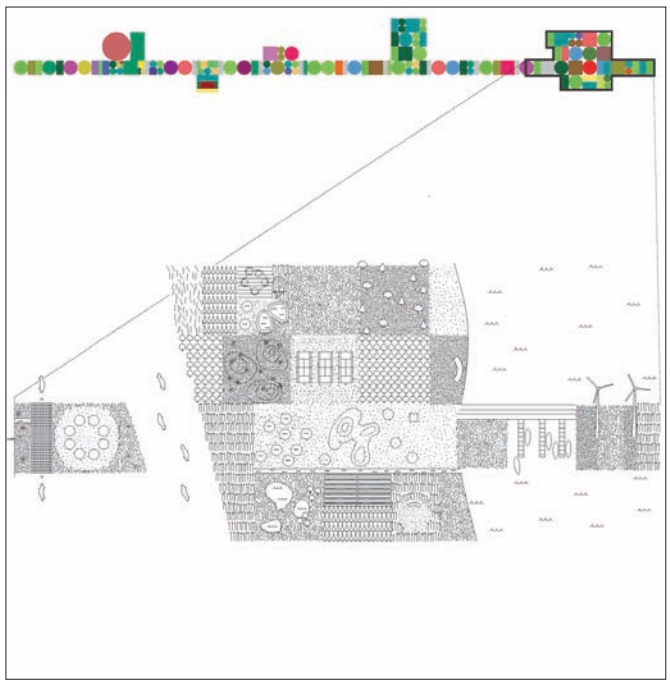
Microbial fuel cells in the living machines would harvest naturally occurring energy produced by bacteria during the cleaning process. After being cleaned in the living machines, water would be returned to Lake Michigan through a wetland flow process in the eco-boulevards.[4]

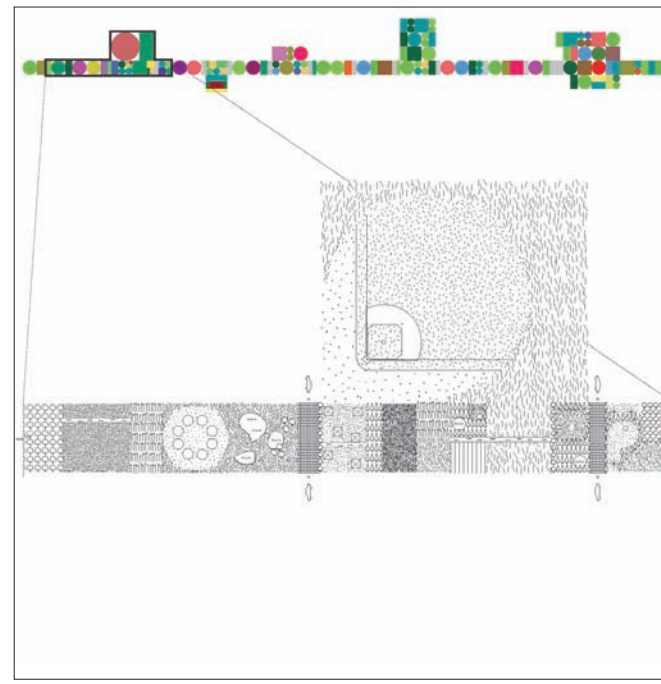
Growing Water Today

Currently, UrbanLab has partnered with the City of Chicago to further research, design, and develop aspects of the eco-boulevard project. With the Chicago Department of Transportation we are developing a series of best management practices (commonly referred to as "BMPs" by water management specialists).

BMPs are not really practices, performed by people; instead, they are physical green infrastructures that capture and biologically clean stormwater before it has a chance to enter the sewer system. Typical BMPs consist of vegetated native landscape swales, swells, channels, and fields that hold water for a specific period to remove contaminants that would otherwise pollute a healthy ecosystem. Benefits of BMPs include stormwater harvesting for landscape and species health, and surface water and aquifer recharge.

Above: Water-use principles in eco-buildings.





As green infrastructure, BMPs are often part of a plan to reduce reliance on conventional gray infrastructure, thereby reducing urban heat-island effects and increasing biodiversity and filtration of ground and air pollutants. BMPs also provide vital water resources for Chicago's flora and fauna, which are valid users of "our" ecosystem, and are often ignored, even though their well-being underlies the health of the Great Lakes region.

Reducing the quantity of water entering the sewer system will also reduce Chicago's carbon footprint. The Metropolitan Water Reclamation District, which runs the processing plants that treat sewer water, is Chicago's largest energy consumer. Therefore, employing BMPs will also contribute directly to reducing gaseous airborne pollutants (via the energy-generation process) responsible for climate change.

Simultaneously, as community pocket parks and larger recreational landscapes, BMPs will provide public open green space for neighborhoods throughout Chicago. The goal of BMPs is to create a resource for planners, designers, engineers, and contractors to use during all phases of infrastructural development.

Above: DNA plan segments for a new eco-boulevard.

Opposite: Rendering of uses along the 31st Street eco-boulevard.

Why Chicago?

Political will is vital to positive social and environmental change. Because Chicago's environmental health is tied to that of the Great Lakes, the water-based models developed in Chicago will likely stir political will in many other cities in the region. Each of the states and Canadian provinces adjacent to the Great Lakes recently signed a compact (soon to be ratified by United States and Canadian legislators) agreeing to cooperative stewardship (such as strict water withdrawal limits) of Great Lakes waters. But water stewardship on the scale of the Great Lakes is more than simply a matter of adopting basic environmental standards. Water-reliant activities in the Great Lakes states and provinces bolster one of the largest economies in the world.

Current calculations of climate change predict a shrinking of the amount of water in the Great Lakes and a higher likelihood that conflict will emerge with regard to its use and availability. Therefore, adopting planning strategies based on green-infrastructural best-practice models will be crucial to continued socioeconomic growth in the region. Global water resources become more contested each year. In order to maintain a recognized right of stewardship over a resource as vital as the Great Lakes, the region's states and provinces need to become urban models for addressing both local and global water scarcity (and pollution).



About the Project

The project resulted from a one-week ideas competition sponsored by the History Channel. The "Design and Engineering Challenge" asked a group of architects in Chicago, Los Angeles, and New York City to conceptualize the future of their respective cities. Each of the three one-week-long regional competitions culminated in a highly staged "reality-TV-style," all-day event in which the teams assembled their projects in front of the public, TV cameras, and competition juries. Three regional winners were named: UrbanLab, in Chicago, Eric Owen Moss, in Los Angeles, and Architecture Research Office, in New York.

Thereafter, a month-long online vote was conducted with the architect Daniel Libeskind as master of ceremonies. The public declared UrbanLab's Growing Water project the national winner of the History Channel's Design and Engineering Challenge.

Notes

UrbanLab is Sarah Dunn + Martin Felsen, with Lee Greenberg, Michael Kmak, Jeff Macias, Kazuya Katagiri, Jan Rehders, Dan Nagy, and Ellen Grimes.

1. Chicago Public Library: www.chipublib.org, 2006.
2. Living Designs Group: www.livingdesignsgroup.com, 2006.
3. Living Designs Group: www.livingdesignsgroup.com, 2006.
4. Diagram derived from work in 2006 at the University of Illinois by Christina Barnas, Peter Pascua, Sean Poust, and Cameron Talischi, with Professor David Lange as advisor.

All images are by UrbanLab except where otherwise noted.

Caring for Places: Looking to a Common Future

The rush to the new and the technologically driven has always been something that *Places* has resisted, especially when it requires the suppression of the familiar and the disenfranchisement of those not "with it"—not ready or able to disavow habits of mind and means of action differently formed from those in the flow.

Lately, the voices calling for imperative change have become more convincing, even as they have been compromised by a manufactured lust for media distraction.

The "RePlacing" advocated in our previous issue, as well as the review of our history prompted by the "Places 25" conference, held in May, affirm that the "new" need not be dismissive of the familiar, that technical abilities need not suppress human response or distract from human purpose: that "care" need not be abandoned as new places emerge in the physical and virtual worlds that surround and support us.

The editorial that opened Volume 6, Number 1, of *Places* (1989) stated a set of purposes for the journal. (For full text see www.places-journal.org.) I would like to borrow several sections here and re-place them in the context of our future.

"We shall always be interested in configuration."

"We shall always be interested in how places sustain attention over time."

"We shall always be interested in how people intersect with a place."

"We shall always be interested in how places come about."

We've done pretty well at staying with those editorial intentions, while searching out ways to give them fresh life and bring new and varied voices to the discussion. Now we must do more:

"We shall/must always account for the roles design and our expectations play in transforming nature—through what we build, cultivate, use, and care for."

This issue of the journal turns attention to changes that reach to the foundations of society and what citizens demand of themselves and each other. Our society's wish to suppress the constraints of place and the inconveniences of natural cycles has led to a vast consumption of energy. Wasteful transportation and building systems devour resources and degrade the environment. Willful disregard for and ignorance of long-term consequence have now brought us to the frontier of disruptive climate change.

The articles here bring with them awareness that the world we know is being changed by the global summation of what we build and how we behave. They remind that we need to do much more to change our habits of consumption and our expectations regarding travel and comfort. They also remind that there are many emerging intellectual resources for thinking more clearly about the multiple, intermingled, often contradictory outcomes of what we do.

In *Places* we have been committed to framing a discourse that is anthropocentric—not because we think the universe is centered on humans, but because it is we who can act with imagination and alter course.

Imaginative care carries us forward. The time to care is now.

—Donlyn Lyndon

UniverCity: Building a New Green Neighborhood

Cynthia Girling

If North American cities are to make the significant technological, physical, and social-cultural shifts necessary to reduce greenhouse gas emissions, urban form will have to change dramatically. Many urban regions are beginning to rise to this challenge, taking steps to control sprawl, air and water pollution, and the fragmentation of urban ecosystems. One region that has made notable progress is greater Vancouver, British Columbia.

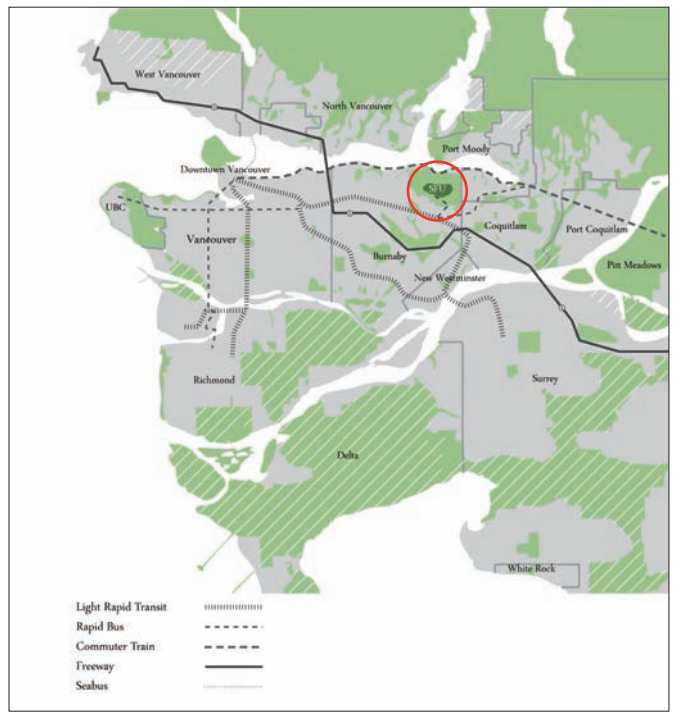
Since passage of Vancouver's Livable Region Strategic Plan in 1996, aggressive steps have been made to encourage more sustainable development patterns based on core goals: protect the region's Green Zone (agricultural and environmentally significant lands); build complete communities[1]; and achieve a compact metropolitan form that offers increased transportation choice. Under the plan, attempts are being made to direct regional growth inward toward nodes of density, connected by commuter train, passenger ferry, light-rail transit, rapid bus, and, in the case of Vancouver itself, local bus.

It has recently been shown that the reduction of greenhouse gas emissions from residential areas depends on several interrelated factors: the form and density of neighborhoods must enable easy access to shared public services; alternative modes of travel such as transit, walking, and biking must become viable as alternatives to private automobiles; and the general building stock must become more energy efficient.[2] To meet these objectives, proponents of Smart Growth have espoused including services and places of work within residential neighborhoods. Robert Cervero, a professor of city and regional planning at the University of California, Berkeley, among others, has demonstrated the equal importance of bringing housing to employment nodes.[3]

UniverCity, a new development adjacent to a major university campus, attempts both to address these general principles and implement Vancouver's regional sustainability goals. By bringing homes to jobs and building a compact, mixed-use neighborhood, it is creating a new community that integrates ecosystem preservation with a polycentric view of regional growth.

From Fringe to Center

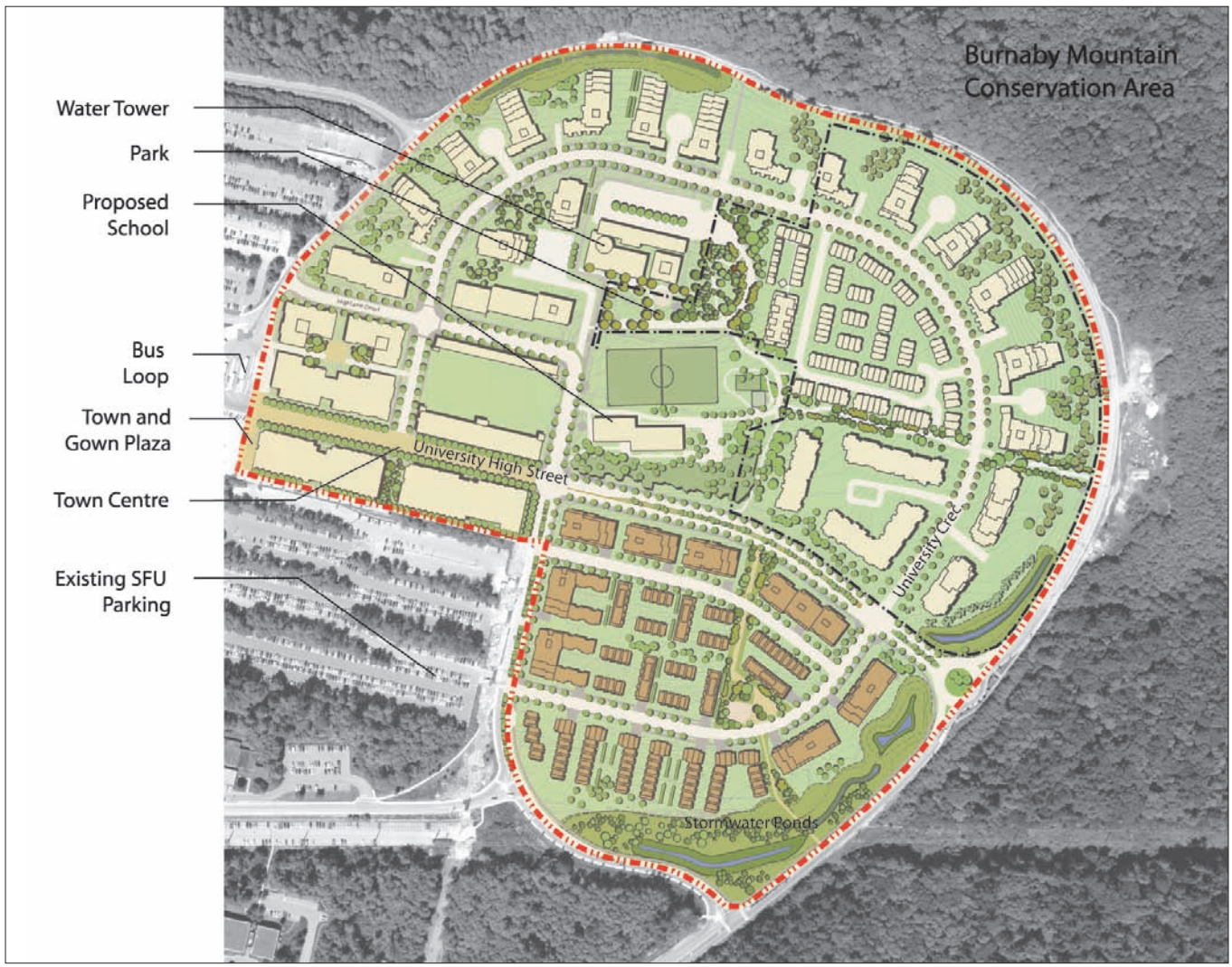
UniverCity is being built adjacent to Simon Fraser University (SFU), in Burnaby, one of twenty-one municipalities in the Vancouver region. Like many Canadian universities, when it was first developed in the 1960s, SFU was sited far from the central city—in its case atop locally prominent Burnaby Mountain. It was also endowed with extensive land for expansion. In 1995, the city of Burnaby granted permission to the SFU Community Trust (SFUCT) to develop 65 hectares (161 acres) of this endowment.[4] In exchange, SFU agreed to deed 332 hectares (820 acres), considered important habitat, to the city so these lands could become part of the region's permanent conservation zone.



On its portion of the land, SFUCT has committed to developing a dense, mixed-use community emphasizing alternatives to private automobile use. It has also promised to promote high standards of environmental protection, particularly regarding water resources and habitat. Now that the first phase of UniverCity's construction is complete, an initial evaluation can be made of it in relation to efforts to diminish the role of urban development in creating climate change.[5]

Layout and density. UniverCity will eventually embody two neighborhoods. As its name indicates, its East Neighborhood, currently under construction, borders the SFU campus to the east. East Neighborhood's plan emphasizes pedestrian linkage between campus and community, and at the juncture between the two are a public space (Town and Gown Plaza) and a mixed-use town center arrayed along a High Street. Close by are a neighborhood park and a site for an elementary school.

Residential construction will eventually completely enclose this town center to the east and northeast, offering



a mix of for-sale private townhouses, stacked townhouses, and apartments in low- and midrise buildings. One completed mixed-use building includes at-grade retail space and offices on its first two levels, with three levels of rental housing above. Offering more than sixteen shops, it provides a range of commercial services to the neighborhood. A second such building, due to open in 2009, will include a supermarket and pharmacy.

As of June 2008, the East Neighborhood was about 30 percent complete. More than 1,100 units, housing about two thousand residents, have been built. Some 36 percent of households include faculty, staff, or students of SFU. About two-thirds of households are adult-only; 20 percent include one to two children.[6]

At build-out, plans call for the East Neighborhood to include 3,475 dwellings on 29.5 hectares (73 acres) and a total of about ten thousand residents. The net density will be 194 units per residential hectare (78 units per acre), or about 258 persons per gross hectare (104 persons per acre).

By June 2008, progress was being made toward these goals. The net density was approximately 167 units per

Opposite: The greater Vancouver, B.C., region, is composed of twenty-one municipalities. Transit lines and the Green Zone are highlighted. Protected agricultural land is hatched.

Above: Illustrative plan of the East Neighborhood of UniverCity, spring 2008. Source: Hotson Bakker Boniface Haden architects + urbanistes.







residential hectare (68 units per acre), representing a gross density of 89 persons per hectare (36 persons per acre). This ratio already well surpasses the suggested minimum target density of 25 units per hectare for transit-oriented development, and it approaches the density of several highly walkable inner-Vancouver neighborhoods.[7]

Building practices. So far, green building practices have been encouraged, but not required at UniverCity. Three buildings have sought LEED silver or gold certification, but the balance are not particularly innovative, and there is room for significant improvement.

At the same time, attached forms of housing have been shown to be far more energy efficient than detached ones. A recent study in Toronto found that an apartment consumes only about 4.8 percent of the energy required by a single-family home.[8] It is therefore significant that UniverCity includes *no* single-family detached homes. Some 18 percent of its units are townhouses; 25 percent are apartments in lowrise structures; and 56 percent are apartments in midrise ones. In neighboring Burnaby, 45 percent of housing units are single-family detached homes; 9 percent are townhouses; 27 percent are apartments in lowrise buildings; and 19 percent are apartments in highrises.[9]

With all its housing as attached units, and 82 percent of the units being apartments, UniverCity will generate significantly fewer greenhouse gases than other residential areas of Burnaby, or the region. Moreover, guidelines for additional phases of the construction will require that new buildings perform 45 percent better than British Columbia codes in terms of energy efficiency.

Transportation. Plans for UniverCity have included an aggressive transportation strategy intended to reduce private automobile use. Transit service to SFU and UniverCity is excellent, with two stops in the neighborhood from which frequent express buses connect to a nearby regional rapid-transit station. Walkability and bicycling were also objectives of UniverCity's design, and a fine grid of streets and paths enhances the pedestrian experience. A survey of residents indicates that only 60 percent drive personal vehicles to work, while 34 percent take transit, and a significant 19 percent walk or bike.[10]

In neighboring areas of Burnaby, 69 percent of trips to work are made by vehicle, 25 percent are by transit, and 5 percent are by foot or bicycle. Thus, despite being 13 kilometers from Burnaby center and 17 kilometers from downtown Vancouver, fewer UniverCity households drive and more use alternative modes to get to work than in Burnaby where a regional rapid transit station is located.

The urban forest. A major objective of the UniverCity

plan has been to mitigate the impacts of urban development on the natural environment by establishing conservation areas, creating new habitat, eliminating typical stormwater impacts, using native plants, and planting new trees.

The role that forests play in mitigating air pollution is well known.[11] Trees absorb gaseous pollutants, intercept particulates, reduce ozone, and sequester carbon dioxide. To combat the effect of removing approximately 19 hectares (47 acres) of second-growth forest to build UniverCity, some 20 percent of the site (6 hectares) will eventually be preserved as conservation land, between built areas and the adjacent Burnaby Mountain Conservation Area.

Extensive tree planting is also occurring. At the conclusion of phase one, with approximately 24 percent of the site developed, more than 4,500 trees had been planted, 48 percent of them native to the region. Presently, the individual tree canopies are small, and cumulatively, they cover roughly only 3 hectares. But in two decades, when each tree has grown to produce an average 7.5-meter canopy, they may essentially replace the forest lost to construction.[12] What these trees will never be able to cover will be the rooftops of ten-story buildings. Presently, there is only one green roof in the project, but new guidelines will provide strong incentives for more.

Building Better Cities

UniverCity provides an instructive example of green neighborhood development, particularly one that brings residences to a somewhat remote, job-centric urban location. The decision to build adjacent to the relatively isolated SFU campus will significantly reduce household-vehicle miles traveled, one of the most significant contributors to greenhouse gas emissions.[13] UniverCity's compact building forms further mean that its residents will use less energy in occupying their homes, thus reducing their carbon footprint and the amount of greenhouse gases they produce.

UniverCity also exemplifies a Vancouver model of regional high-density smart growth that aggressively engages environmental protection. The initial decision to establish a five-to-one ratio of protected habitat area to allowable development is crucial to this effort. On the down side, much of this development is on a greenfield site, and it will take two decades to partially replace lost forest canopy and lost carbon sequestration.

This neighborhood and several others either under construction or on drawing boards in the greater Vancouver region clearly demonstrate that market-based development can reduce the greenhouse gases and carbon-dioxide wastes typically associated with cities.[14] Over the longer term, considering the shifts needed to control the impacts of climate change, this development is a small step in the right direction. However, if a new goal—to be carbon neutral within five years—is met, it may prove even more instructive.[15]

Notes

1. According to principles enunciated by the regional organization Metro Vancouver, "complete communities" support public desire for a wider range of opportunities for day-to-day life. These opportunities include more jobs closer to where people live and accessible by transit; shops and services near home; and a wider choice of housing types. See www.metrovancouver.org >Planning >Regional Development>Livable Region Strategic Plan.
2. See Reid Ewing, Keith Bartholomew, Steve Winkelman, Jerry Walters, and Don Chen, "Growing Cooler: The Evidence on Urban Development and Climate Change," Urban Land Institute, 2008.
3. Robert Cervero and Michael Duncan, "Which Reduces Vehicle Travel More: Jobs-Housing Balance or Retail-Housing Mix?" *Journal of the American Planning Association*, Vol. 72, No. 4 (2006).
4. SFU Community Trust is a nonprofit development arm of SFU, charged with developing UniverCity. Net earnings from the development go to the SFU Endowment.
5. The author obtained source information for this article directly from SFUCT, from the City of Burnaby, and from consultants to the developer: Hotson Bakker Boniface Haden architects + urbanistes; PWL Partnership Landscape Architects Inc.; Lanarc Consultants Ltd.; and CH2M HILL.
6. Mustel Group Market Research, "UniverCity Resident Survey," for SFU Community Trust, June 2007.
7. Smart Growth B.C.: www.smartgrowth.bc.ca.
8. Jonathan Norman, Heather L. MacLean, and Christopher A. Kennedy, "Comparing High and Low Residential Density: Life Cycle Analysis of Energy Use and Greenhouse Gas Emissions," *ACSE: Journal of Urban Planning and Development*, March 2006.
9. Statistics taken from the Canada 2006 census.
10. Mustel Group Market Research, "UniverCity Resident Survey." Mustel does not explain why these do not add up to 100 percent; likely it is because there are more than one worker per household.
11. For example, McPherson found that the large, mature tree canopy in older areas of Sacramento stores 2,343 kilograms of carbon per tree (approximately 172 tons per hectare). See E. G. McPherson, "Atmospheric Carbon Dioxide Reduction by Sacramento's Urban Forest," *Journal of Arboriculture*, Vol. 24, No. 4 (1998), pp. 215-23.
12. Derived from NRCS Plants database: plants.usda.gov.
13. Cervero and Duncan, "Which Reduces Vehicle Travel More?"
14. Southeast False Creek and East Fraserlands, in Vancouver, are the most advanced and most notable of these.
15. A neighborhood energy utility is planned in the next phase.

Opposite: View along University Crescent, phase one of East Neighborhood showing townhouses at grade, with ten-story apartment buildings above (top). Restaurants and shops at the Town Center (middle). The residential and university communities share lunch hour at Town and Gown Plaza (bottom). Photos courtesy of SFU Community Trust.

The New U.S. Embassy in Berlin

Donlyn Lyndon



On July 4, 2008, among fireworks and several thousand invited celebrants, the new American Embassy in Berlin was officially opened. The day was misty, the rhetoric congratulatory, and the music by the U.S. Air Force jazz band lively. How can a country properly announce completion of a building that represents its presence in another land (and which, indeed, has special legal status as part of its own territorial domain)? And how does a host country properly acknowledge such a presence within its borders?

On this day, proclamations by former U.S. President George H.W. Bush, German Chancellor Angela Merkel, and U.S. Ambassador William Temkin emphasized the historic importance of the embassy site. They noted its adjacency to the Brandenburg Gate and events that had taken place there, commented on the dedication to freedom the Gate symbolized, and stressed the nature of the cooperation the embassy's presence there signaled. Giant video screens displayed John F. Kennedy proclaiming "*Ich bin ein Berliner*"; veterans of the Berlin Airlift were honored; and the video screens showed Ronald Reagan uttering his famous challenge: "Mr. Gorbachev, open this gate; Mr. Gorbachev, tear down this wall."

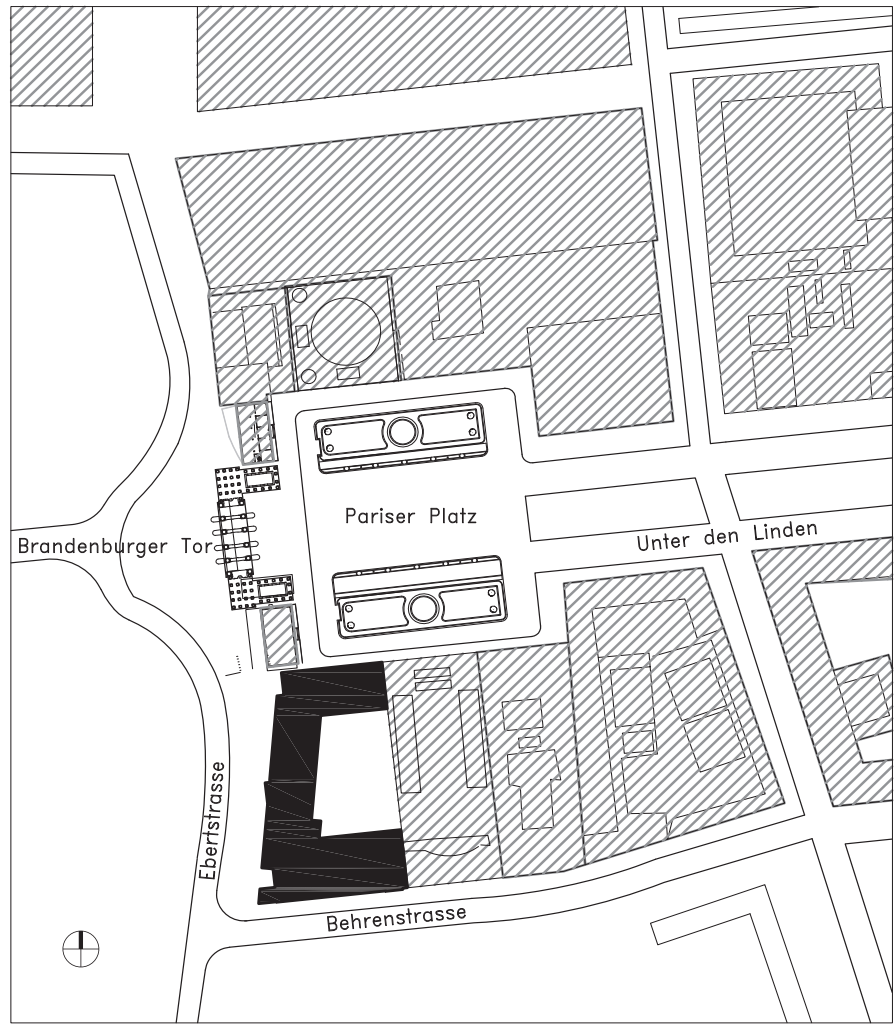
When Reagan issued that challenge, some twenty years earlier from a stage in front of the Brandenburg

Above: The new U.S. Embassy in Berlin, seen from the northwest. Photo by Werner Huthmacher.
Opposite: The site of the embassy between Pariser Platz and the Tiergarten. Courtesy of Moore Ruble Yudell.

Gate, the gate's base was obscured by the Berlin Wall. This most famous entry to the city, completed in 1791, had been isolated in 1961 by construction of the wall, and captured within a vacant "death zone" created by East Germany to prevent its citizens from escaping to the West. The choice of location for the new embassy seemed intended to emphasize the U.S. role in dispelling this era of disunity, discord, and oppression.

What may be less well known about the embassy site is that it was home to a previous American Embassy—though briefly. In 1932 the U.S. purchased a grandiloquent nineteenth-century palace there to house it. It was entered from the corner of Pariser Platz, a strictly formed and ceremonially important plaza just inside the gate, to the east, but its flank faced west across Ebertstrasse, bordering the great, wooded Tiergarten park. The building burned shortly afterwards, however, and following rebuilding, was open for only two years before being closed again by the gathering storm of World War II. During that conflict, the embassy, like most neighboring structures, was destroyed by Allied bombing.

Following the end of the Cold War, as the reunified Federal Republic of Germany moved its capital back to Berlin, the United States purchased back the property, which had remained empty.[1] At the same time, the German government set about building a new government center nearby, which now incorporates the long-abandoned, but historically important Reichstag building—transformed through the addition of a transparent dome.[2] Because the Brandenburg Gate is a celebrated emblem of reunification, the reconstruction of adjoining Pariser Platz became a priority for Berlin planners.



Fitted to Place

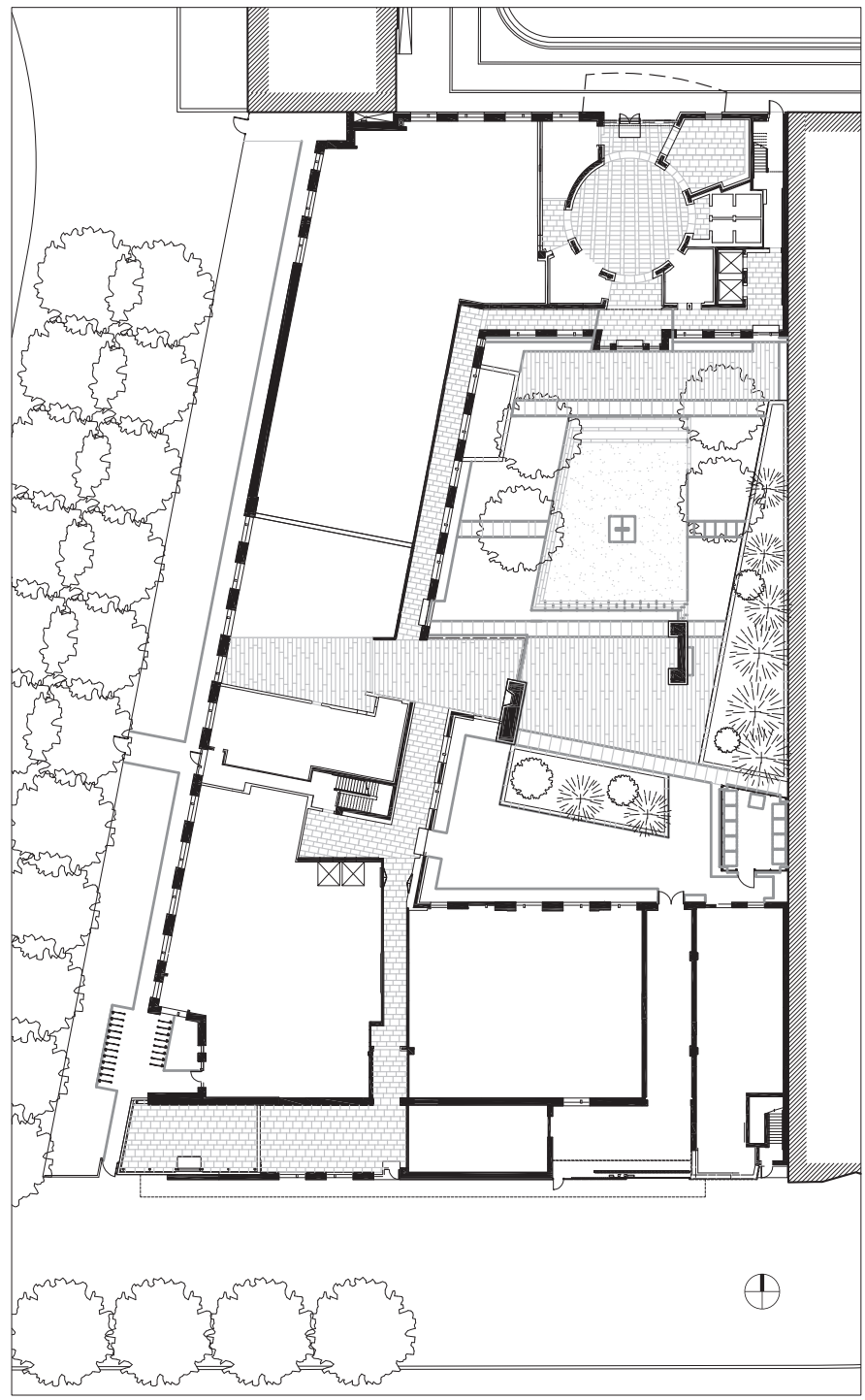
The embassy's architects, Moore Ruble Yudell, with Gruen Associates, have designed the new building to suit the significance of the site, skillfully fitting key program elements into forms that would become part of the place. The building has two important roles in this regard: join with neighboring buildings to restore a strict geometry for Pariser Platz; and create a suitable urban boundary to the west and south for the Tiergarten and for the recently completed Monument to the Murdered Jews of Europe.[3] Becoming an active and enlivening participant in achieving these larger urban goals was taken by the architects and the U.S. government to be of greater consequence than manifesting an independent formal identity.[4] In this spirit, the U.S. can be seen as continuing a stance first established under the postwar Marshall Plan: to foster revival and reconstruction of Germany's economy and urban structure.

Such goals were implicit within the program for a 1995 competition to select the building's architect.[5] They were also evident in the

winning team's response, which proposed to make "careful connections to the proportions and geometries of surrounding landmarks and urban fabric while establishing new landmark elements which are harmonious parts of a new urban focus." Within the boundaries of the site, the architects have set out to create distinct spaces that clarify and give identity to various aspects of the place: ceremonial entry, formal diplomatic meeting space, a large internal garden, and an inviting informal entry for employees and consular functions.

Achieving these goals, however, proved more complicated than first imagined. The interpretation of planning guidelines for Pariser Platz was contentious, pitching noted German architects and planners into heated debate. There also was little precedent for a building whose entry would be enveloped within a formal civic space but visually isolated from its more prominent public sides. As both representation of a country and a secured, enjoyable place of work, an embassy's design is in any case demanding, and its funding subject to political pressures. Most daunting of all, however, was the imposition during design of new and more stringent security requirements following the 1998 bombing of U.S. embassies in Tanzania and Kenya (reinforced by the attacks of 9/11). The new security requirements at first threatened the whole project with relocation to a suburban site. Then, when U.S. officials attempted to negotiate a realignment of Ebertstrasse into the Tiergarten to increase its distance from the building, they strained relations with local authorities.

In light of these newly increased security demands, the final project remains a remarkably intact embodiment of proposal that originally won



the 1995 competition, especially with respect to its ability to elegantly complete an interior corner within Pariser Platz. Where it differs most may be along the Tiergarten promenade, where its face no longer aligns with its neighbors, but is set back behind a securely fenced garden.



Entering from the Square

Along Pariser Platz the embassy completes an urban figure formed by other buildings built earlier. It provides a stately (yes, stately) contribution to this whole, closing the southwest corner with a limestone wall textured with striations and subtle color change. The regular pace of window openings is interrupted just once, by a canopy that emerges from a full-height recess. The canopy is arced, with a spirited twist at its end—a form that suggests both conventional shelter and something special behind. Indeed, beyond the facade is a cylinder carved from the building and open to the sky, which lights a rotunda, covered by the glass panes of the canopy as they extend into the building. The cylinder also molds the sunlight as it passes through the break in wall to create a shifting shaft of light in the dominant shade along the south edge of Pariser Platz.

Visitors entering the glass doors below the canopy pass through an airlock under a vigorous, three-dimensional eagle ensconced in the national seal. Made of segments of stainless steel and assembled with brio, this emblem seems nearly playful (though, associations being variable, some might call it "bristling"). Visitors then move easily into a side foyer, where bags are checked and security screening takes place, before entering the rotunda. This brightly lit and powerfully shaped space is faced with the same limestone as the Pariser Platz facade, but turned inward to form a ceremonial entry handsomely inscribed with the preamble to the constitution.

Referring to the focal rotundas of government buildings from the eighteenth and nineteenth centuries, the architects imagined this space as continuing the important Enlightenment traditions of clear shape and classical reference. These ideals, they argue, informed both the U.S. Founding Fathers and the Kingdom of Prussia, to which the U.S. sent John Quincy Adams as its first ambassador.[6] Whether or not visitors engage that full load of significance, this ample foyer does a great job of diverting attention from security-screening apparatus, which so frequently disfigures the entry to state buildings.

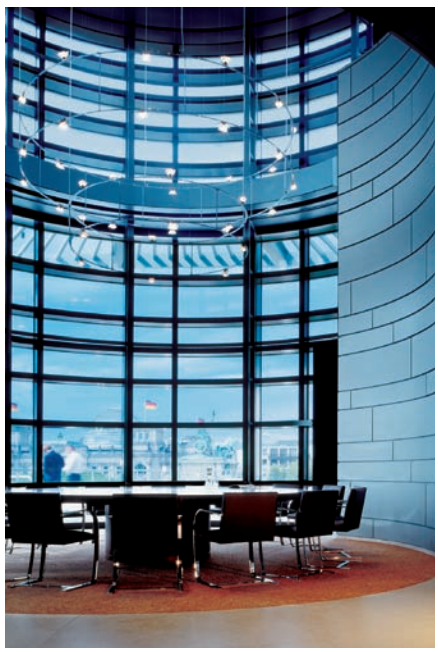
Urban Borders

If the embassy's design is clearly successful as it faces and completes the Pariser Platz, its effect along the Ebertstrasse, facing the Tiergarten, is harder to evaluate, because it will be supplemented by a canopy of trees along the public promenade and a parterre garden behind the bordering fence, neither of which has matured. Its lower floors here feature uneventfully spaced windows, and a line of frequently spaced high light fixtures adjoining the fence recalls, subtly, the originally intended building line.

The security fence here is presently dominant. It rises much higher than head height and bears the full weight of State Department anxiety. Made of thick metal stakes, rendered with patina and subtly twisted in a quietly varying pattern, it forms an undemanding green veil when seen from a distance. But seen in parallel, along the promenade, it is visually obtrusive and opaque, not unfairly

Opposite: Ground-level plan of the embassy. Courtesy of Moore Ruble Yudell.

Above: Embassy entrance on Pariser Platz. Photo by Donlyn Lyndon.





seen as hostile, even though there are many fenced compounds elsewhere in the city.

Functionally, the embassy's south facade, along the Behrenstrasse, must provide a service entrance and sally port, as well as a secondary entrance for consular services and employees. On this side it fronts the Monument to the Murdered Jews of Europe, a large, predominantly bleak, but intellectually provocative composition of dark slabs, which it faces impassively.

These extended public facades were conditioned by stringent rules regarding areas of glass. According to the architects, German daylighting requirements called for a minimum of 30 percent of walls to be glazed, while State Department security guidelines allowed a maximum of 30 percent and specified the largest allowable panes. The pattern eventually arrived at is an asymmetrical arrangement of panes within larger openings: the openings strike a beat of regularity while the panes provide a more detailed syncopation. Where they face south and west the windows are shaded by metal trellises, creating which create shifting stripes of shadow during the day.

Left: The embassy's State Room has a broad view over Tiergarten park to the glass dome of the Reichstag and the government center, and is on eye level with the Quadriga sculpture atop the Brandenberg Gate.
Right: Mural by Sol LeWitt in the embassy's consular lobby. Photos by Werner Huthmacher.

Organizing Landmarks

At its upper levels, the west facade is more distinctive, notched to give greater play to the building's most prominent feature, a cylinder clad in grey-blue zinc that houses the embassy's principal conference room. This form, rising from a roof garden, is nearly the inverse of the hollow rotunda marking the entry. Similarly, it is meant to serve an iconic and ceremonial purpose. Within the more loosely arranged bureaucratic spaces of the building this conference room creates a landmark, and from outside on the west it registers this status well. Rising above the building's roofline, it quietly echoes the color of the great Quadriga sculpture that caps the Brandenburg Gate at a similar level.

Creation of this grand room was motivated by the wish to have an especially fine place for diplomatic lunches and negotiations, and it presents an aura of certainty. To the northwest, tall horizontally banded windows offer a broad view toward the Brandenberg Gate and the transparent dome of the Reichstag. The room is also capped by a circular lantern with rings of small lights, centered on an elegantly designed round table bearing an inscribed compass. It is given a sense of ease and comfort by the rich, planar cherry-wood walls that complete the chamber. Officially labeled the State Room, it has become known informally as the Quadriga Room for its stunning eye-level view of the sculpture atop the Brandenberg Gate. There is no doubt where you are.

The building carries on the fenestration pattern of its west facade here, set back from the bounding street, but with a few major openings. At the Southwest corner of the site at street level, the tall, glass-walled consular lobby is vigorously enlivened by two Sol LeWitt murals—striking optical star patterns that fill the back walls, prominently visible from across the street. This high, clear room, third in the series of figurative spaces within the building, is outside the most stringent security boundary and sometimes used for public receptions.

The fourth focal point of the building's composition is a large internal courtyard, with landscaping designed, like the roof garden and side garden parterres, by Olin Partnership. In many ways most important to the organization and daily life of the complex, this element provides outlook and light for most of its public passages and many of its offices. It is distinguished by two large Colorado stone wall masses, loci for seating and barbeques, while the space between is covered by a soaring steel trellis awaiting the growth of vines.

The center of the courtyard is a simple lawn, edged with seating areas. Clusters of trees planted next to the tall blank party wall of the adjoining bank building are species that can be found in the U.S., part of a general strategy for making this courtyard reminiscent of domestic American landscapes. It might seem a rather noble Midwestern back yard, but for two elements that mark its place and purpose: a graffiti-encrusted segment of the Berlin Wall tucked to one side and a central shimmering steel stele by the artist Ellsworth Kelly. The latter, like the LeWitt murals in the consular lobby, was commissioned by FAPE, the Foundation for Art and Preservation in Embassies, the group also responsible for the many fine prints, drawings, and paintings displayed in the building.

Scope, Scale, and Site

Responding, as it does, to differing aspects of its site and vesting meaning in important internal points of interaction, this embassy offers neither universals, nor pyrotechnics. Rather, it posits an architecture that sets human measure to place.

The design parses the ways its differing parts may accommodate those who encounter them: a general public in some areas, visitors with focused purpose in others, regular inhabitants and visitors of state in others. Its walls form a respectful and spirited corner for Pariser Platz; they provide a quiet, measured edge where the city meets the green of the Tiergarten; and they offer a consistent background where the Monument to the Murdered Jews of Europe tenders its message of painful remembrance.

There have been controversies surrounding this embassy project since its inception. Many were enthusiastic about the competition scheme, but some were not happy that it would take such a prominent position; others were concerned about the role it might play in Pariser Platz. Others have been ready to pounce on characteristics that might be forged into a critique of the U.S. itself.

There have also been those who would enter it into an arbitrary line-up of buildings by star architects—finding it wanting as a "strong statement." Certainly, the architect's role is to bring to the city a special form of imagining, furnishing its streets with works of interest. But it doesn't follow that those works should vie with each other, devoid of concern for how they take their place. In an urban setting like that of the Berlin embassy, there should always be concern for what a building contributes to its immediate context and how it aligns with traditions, plans and agreements that have been drawn up, teased out, or sometimes imposed by public officials.

Strength of will is a necessary attribute in getting a large building constructed with any integrity of thought. But this strength should be measured not only in eccentricity, bravado, or disavowal of responsibility for all but also architectural authority. Restraint can also be a measure of will, especially when informed, as here, by respect and imaginative support for the embodied thoughts and plans already in place.

Moore Ruble Yudell's design for the Berlin Embassy is a vigorous statement of engagement with a place, the complexities of its development, and a heritage of investment in the public realm. The building presents the U.S. as a spirited good neighbor, caring for its own interests, yet supporting the civic intentions of its host country.

Notes

1. Berlin had been the capital of the Kingdom of Prussia, Imperial Germany, the Weimar Republic, and the Third Reich.
2. This new symbol of open government, designed by Norman Foster, reveals visitors spiraling up to an outlook directly over the national Chamber of Deputies.
3. Designed by Peter Eisenman.
4. The official client for the building is the Office of Foreign Building Operations of the U.S. Department of State.
5. The embassy was also to offer "a statement to passers-by and visitors on the spirit of the United States."
6. Adams reportedly also took up residence in Pariser Platz.

Places' 25th Anniversary: An Introduction

William L. Porter

This occasion is a wonderful celebration of this journal and its twenty-five years of extraordinary accomplishment. I was privileged to work with Don Appleyard, prior to his tragic death, on the founding of *Places*. My friend and colleague Don Lyndon gallantly stepped in to realize our early hopes. This symposium is a tribute to both Dons for their inspiration and vision. Appropriate also is the setting for this celebration, here at Berkeley, where so many have made such important contributions to *Places*: Mark Treib, Alice Wingwall, Allan Jacobs, Richard Bender, and many others. But Don Appleyard is missing.

Kevin Lynch's article in the first issue provided a wonderful tribute to Appleyard, to which I can only refer in these remarks; but I recommend it to you all. Appleyard's tragic death resulted from an automobile out of control, when, ironically, he had invested so much in the control of local traffic and in the livability of streets and neighborhoods. He also had a broad interest in the public realm. I was an urban designer on Ciudad Guayana in Venezuela when Don did his research on the diverse mental images of various populations there, and on how city form could be shaped to make the environment more responsive and satisfying. He knew that form and experience should be linked—as should the real and the imagined, the ordinary and the extraordinary. His commitment was to the public's right to shape the environment and to make it part of themselves.

His last project, on "Identity, Power and Place," saw symbolism as increasingly critical in a diverse and conflicted world. He knew that symbols are better thought about as constructed by people than as properties of the environment. He saw the past as a source of information and inspiration mediated through the thoughts and actions of many, not as formal precedents promulgated by an aesthetic elite. I was immensely pleased to hear from Bruce Appleyard, Don's son, who is here today, that he is carrying forward his father's work-in-progress, and that we shall all be able to see it one day in published form.But getting back to the origins of *Places*. Here are some excerpts from the editorial Don Lyndon and I wrote for the first issue. "Of what use are places, to whom, and when? Places as used, thought, felt, and remembered are essential to our conceptions of private self; public places secure the idea of civic self. *Places* is about caring about places."

We wanted to address the environmental professions, feeling that then-current journals were too specialized, not dedicated enough to the "continuing investment and stewardship" that places require "to yield their treasures." We wanted "many voices" to be heard: "all those who care can shed new light, supply metaphors, and suggest new directions for the notion of places and for ways in which they may be perceived and used." And we wanted to give "particular attention to public spaces in the service of shared and egalitarian ideals of society." The first issue, we wrote, "indeed the journal itself, owes its existence to the ideas and enthusiasm of Donald Appleyard and especially to his love for people and places."

J. B. Jackson wrote an article for our second issue. In it, he quoted from an article that had attracted his attention some twenty years before. According to its authors, "The architect's task is more than the manipulation of materials and molding of space, it is the definition and possession of place." Starting "with the user…the creative act of architecture abstracts intrinsic qualities of an existing natural environment, together with components of our mechanical world, synthesizes a new place, a harmony of human and natural systems." Jackson had been proud to publish this article, entitled "Toward Making Places," in his still-small journal, *Landscape*. Its authors were Donlyn Lyndon, Charles Moore, Patrick Quinn, and Sim van Der Ryn! In his *Places* article, Jackson went on to argue that the idea of place incorporates both natural and urban conditions; and that it is important to consider place simultaneously as a concept, as in *sense of place*, and as specific, concrete instances of physical form and experience. He charged the journal *Places* to address both.

That was then. What about now? Was *Places* originally conceived as a book to be written over time? It may have taken twenty-five years to say what needed to be said, but is it now complete? Or was it conceived as an unfolding story of deepening meaning and increasing complexity that could only be pursued, however breathlessly? Should we think of it as a continuing journey without end? Are there new vistas of thought and action now opening?

What are we to make, for example, of aspects of life-space yet not understood, let alone described? In 1962, Jackson reprinted in *Landscape* a speech by Dolf Steinberg, a professor of political science at Heidelberg, which spoke of the spaces of dwelling, work, and society as needing still another dimension, that of communication. When Steinberg originally gave the speech, in 1953, Europe was still suffering from homelessness and "enforced mobility"; but in 1962, Jackson thought Steinberg's critique offered "a way to interpret certain characteristics of the American landscape." The implication is that all spaces must be thought of separately,

New York City 2106: Back to the Future

Adam Yarinsky



Our firm, Architecture Research Office, was selected as the New York City winner of the History Channel's November 2006 "City of the Future" competition. The brief for this one-week design charrette was to create urban and architectural proposals for the island of Manhattan in the year 2106. We based our design on the assumption that sea levels will rise as a result of the loss of polar ice caps, the net effect of which will be a watermark increase of approximately 36 inches around New York City.[1]

In our proposal, we assumed that the elevated waters would interact with the island's topography in ways that mirrored Egbert Viele's Water Map of 1865. The Water Map, still used by geotechnical engineers to evaluate subsurface conditions, provides a record of Manhattan's wetlands and natural watercourses before they were concealed by its grid of streets and blocks. We assumed it could also be used to predict which of Manhattan's low-lying neighborhoods would be most prone to flooding. Rising water would once again cause land in the area of today's Canal Street, Turtle Bay, Spanish Harlem, West Village, and Upper East Side to become tidal zones.

This scenario led to the question: how can we reconcile the intrinsic qualities of a city defined by its grid of streets and blocks with such fluctuating circumstances? How can the urban character of Manhattan—its intensity, its diversity and mixture of programs and neighborhoods—be perpetuated? How can New York City engage this new relationship with the environment?

Above: Egbert Viele's Water Map of Manhattan from 1865.

Opposite left: Manhattan would be flooded in 2106 by a 36-inch rise in sea level.

Opposite right: Vanes could be used to establish a new pattern of infrastructure in the flooded areas. Detail of Canal Street at the Hudson River.

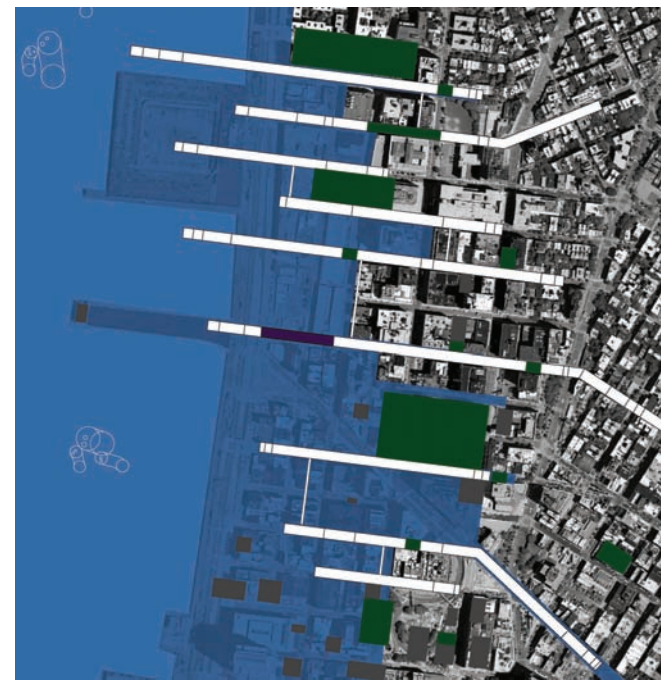
Vanes as Form and Process

The basic building block of our proposal is a new type of mixed-use structure, which we term a "vane" after the rib-like element that is part of the structure of a feather. Pier-like and elevated on columns, each vane would serve as the vertical and horizontal extrusion of a public street in the city's flooded areas. Vanes would be analogous to the organizational matrix of streets projected in the Commissioners' Plan of Manhattan of 1811, but they would be generated from and responsive to local exigencies.

Vanes would provide habitable, public infrastructure with a mixture of public and private uses. Constructed of reinforced concrete, each would contain multiple stories of durable, generously proportioned, and flexible interior space, with a thin cross section to promote daylight and natural ventilation. They would feather outward and upward, knitting flooded, vacant blocks in low-lying neighborhoods back into the city proper. Public access to the waterfront would also be an intrinsicattribute, and each vane would include circulation space for pedestrians and vehicles on multiple floors. A typical vane would be ten to fifteen stories tall; its length would vary from one to two thousand feet; and its structure would be engineered so that both its length and height might be increased over time.

Our proposal envisions two scenarios for the construction of vanes, both of which would involve reciprocity between a permanent public structure and provisional build-outs by the private sector.[2] In the first, the government would construct the vane's reinforced concrete frame in a manner similar to a street or other element of public infrastructure. Included in this scope would be designated public space and circulation, as well as exterior lighting and utilities. Subsequently, the cladding and fit-out of the frame would be implemented by private developers. In





the second scenario, the entire construction and fit-out of a vane would be done by a private entity such as a developer or business; however, the basic frame would still be considered public property. In either case, the specific dimensions of spaces, provisions for services, and public rights-of-way would be set by zoning regulations enacted by city government.

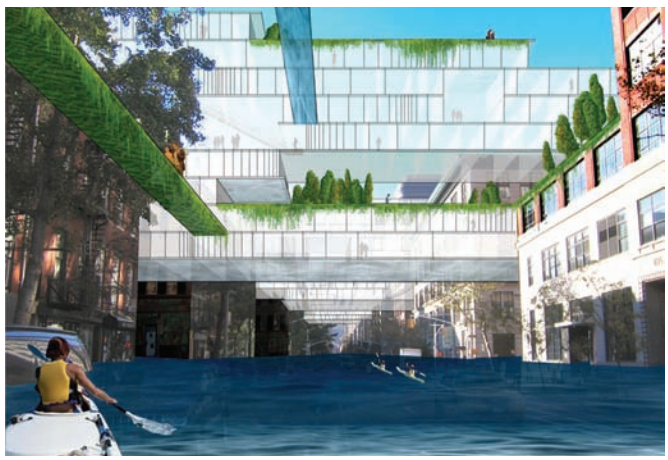
Vanes would represent the city's commitment to reinhabiting its perimeter. They would frame a process of urban development without prescribing a final outcome. The specific types and mixtures of programs in each vane would emerge in response to market forces and local conditions. Precedents for this process can be found in New York City and elsewhere in the adaptive reuse of existing structures. For example, office buildings in the financial district have been converted to residences, and warehouses have been converted to commercial spaces and living lofts. Our intent was that vanes might support a mixture of programs and densities, replicating successful neighborhoods across the city.

Vanes might create space for homes, offices, and shopping arcades, but also for public parks, gardens, and pedestrian and vehicular thoroughfares. A vane in Manhattan's West Village might differ from one in Red Hook, Brooklyn, in response to program needs, topography, street dimensions, and the scale of surrounding properties. Vanes might also provide continued access to existing structurally sound buildings whose lower levels are disabled by water. For example, one level of a vane could join with a rooftop to create parkland, as shown in our rendering. The configuration of a vane might also promote light, view, air, and access to the waterfront for greater numbers of people. The result would be a density and vitality equivalent to that along many New York streets.

A Capacity for Transformation

We consider our proposal to be transformational, not fantastical. It is not feasible or desirable to completely encircle Manhattan with new or higher sea walls. Rising water levels will inevitably require public discourse to decide which urban areas will be protected and which will be allowed to flood. An entirely new and beneficial relationship will be needed between the city and water, and we hope our proposals will inspire the public to perpetuate the city in the face of cataclysmic circumstances associated with climate change.

The reality is, most existing buildings in the flood zones will be condemned because their foundations will eventually be destroyed. However, the current New York City Uniform Land Use Review Procedure (ULURP) provides a mechanism that might facilitate the planning measures called for in our proposal (such as changes to the city map





and zoning ordinances). It might also involve community boards and other elected officials. Although the specific processes would need to be determined, development criteria may be set by the public over decades.

In addition to the new system of vanes, our design for New York, 2106, proposes that tall curvilinear "water towers" would populate the Hudson and East Rivers. These diaphanous tubes, which would expand on the vanes' renewed connection to the water, would be the most visible part of a new system to filter, cool, and pump water between the city and the harbor. Functional emblems of the city's intersection with nature, the towers would translate New York's tradition of tall buildings from an expression of private property to a symbol of civic identity. The vanes would seek to maintain the street, the towers to carry on the city's characteristic verticality—familiar figures in a changed cityscape.

Collapsing Scale and Experience

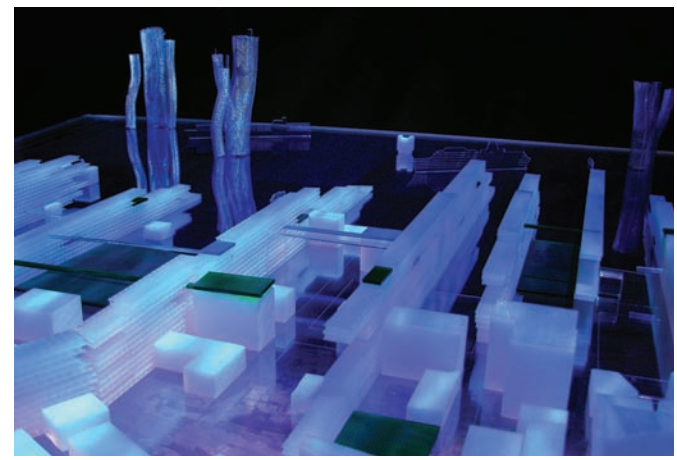
The City of the Future competition was an opportunity to distinguish the ways architects—as opposed to scholars, urban planners, and politicians—understand, envision, and make places. Our connection to a particular place is grounded in its *character*. This intangible quality can be defined as the specific, interrelated aspects of form, space, and material perceived bypeople. To the extent that architecture simultaneously engages multiple scales of experience, architects shape the character of the physical environment. The character of an unbuilt project, however, is difficult to depict. It transcends the diagram and the plan, the model and the rendering—all of which convey data, but not experience.

If architects are to guide the public response to climate change as it pertains to the built environment, it is vital that new forms of urbanism be evoked by a realism that combines both informational and experiential qualities. Through the spectacle of the History Channel competition—and its culmination in a public presentation in Grand Central Station's Vanderbilt Hall with a required physical model and accompanying computer animation—we sought to make our ideas broadly accessible and engaging.

Representing the regional, urban, and local impact of climate change within the prescribed maximum volume of four by four by seven feet, our model stacked three separate levels of parallel four by four-foot sheets of one-inch clear acrylic, each mapping New York, 2106, at a different scale. A satellite photograph of the city in 2006, printed at the appropriate scale on transparent acetate, lay flat across the thick sheet of acrylic on each level. Overlaying the photo was a second acetate print of estimated 2106 sea levels shown in blue. The topmost level of the model, at one inch equals one hundred feet—the same scale as the Panorama of New York created for the 1964 World's Fair—focused on Greenwich Village and SoHo to detail the city's future waterline.

Bathing the model in a trembling, spectral light was a video of sunlight on the fluctuating surface of the Hudson River. This luminous moving image visually collapsed the model's layers and rendered palpable the overlap between land and water. Echoing the model's collage of existing and future urban conditions, our two-minute animation included a series of digitally altered images of familiar sights as well as renderings of our project. To further the impact of the model and animation, we wrote a project description from the perspective of a future inhabitant, which was issued in advance to the jury and posted on a





sign beside the model.[3] Through these diverse means of presentation, we sought to convey the character of New York City, 2106.

Vision of a New Urbanism

One of the competition's jurors, the architect Billie Tsien, asked: "Is your design meant to be optimistic or elegiac?" The answer is both. Even as we envision a vital urban future, the temporality of New York's relationship to the water forces us to confront the transitory quality of our place within it. Simultaneously, we recognize that New York City has always been a feat of becoming. Flourishing in the coming century of climate change will require urban structures more responsive than those we know today. This is an unprecedented opportunity to shift our conception of urbanism from permanent, static boundaries overlaid upon nature to processes of growth attuned to natural conditions. Vanes—as form and process—might sustain New York City's distinct urban character. As described in our competition narrative:

Catastrophes possess the unlikely power of revelation: we have learned that an act of destruction more often than not exposes that which is most essential about a thing. In this way, the vanes built in response to the twenty-first century's changing sea levels have revealed that which is most intrinsic to our city.

Notes

1. Vivien Gornitz, Stephen Couch, and Ellen K. Hartig, "Impacts of Sea Level Rise in the New York City Metropolitan Area," in *Global and Planetary Changes*, 32 (2002), pp. 61–88. The following quote is from the abstract: "Projections of sea level rise based on a suite of climate change scenarios suggest that sea levels will rise by 18–60 cm by the 2050s, and 24–108 cm by the 2080s over late 20th century levels."
2. I would like to thank one of the peer reviewers of this article for bringing to my attention N. John Habraken's *Supports: An Alternative to Mass Housing*. Although we had not been aware of this text in developing our competition proposal, our intentions for a vane are in many ways analogous to Habraken's concept of a support, which he describes as providing a permanent, multilevel public armature incorporating access and services for individual residential development.
3. This one-thousand-word narrative is available online at www.aro.net.

All images © Architecture Research Office (ARO). Stephen Cassell, Adam Yarinsky (Principals); Jeff Jordan, Jennifer Park (Project Managers); Matt Azen, Henrik Bisp, Scott Geiger, Keith Greenwald, and Vanessa Valladares (Project Team).

Opposite left: Vanes would provide new multilevel connections in flooded areas. View south on Hudson Street in Greenwich Village.
Opposite right: Water towers would create new symbols of civic identity. View south on the East River toward 42 Street. Vanes are in the background.
Above left: Eventually, flooding will create an underwater world of submerged foundations in the tidal zone. Still from ARO's animation.
Above right: The City of the Future competition model, seen at 1":100'

Climate Change and Place Roundtable Discussion

Climate change has already started to transform the physical, ecological, and social configuration of places around the world. The meanings and experiences of place are also certain to change significantly. Given the acceleration of this issue in our day-to-day practices, Places *convened a "virtual" roundtable to explore the changing reciprocity of climate and place from different disciplinary perspectives. In soliciting contributions from leading thinkers on this subject, we especially seek to understand how the design of places might help communities reduce and adapt to the predicted impacts of climate change. We offer the following comments as part of our continuing analysis of the importance of place.*

—The Editors

Ecological Design and the Role of Nature

Think about where you're sitting. How would it be different if the sea were twenty meters higher? If rainfall dropped to a tenth of what's normal? If rainfall doubled? If the summer started in the spring and lasted through the autumn? Think about what runaway climate change would mean where you live.

Imagine your life in a carbon-neutral society. Imagine burning no fossil fuels, and getting your electricity from wind, solar, hydro, and wave energy. Imagine living in a superinsulated house in a walkable community. Imagine eating less meat and more locally grown vegetables. Imagine throwing nothing away, but recycling everything.

Imagine failure, and imagine success. And imagine them right where you are now.

Alex Steffen
World Changing
Seattle, WA

Climate change is global in scale and consequence, and any solution will require sustained international political cooperation. Climate change will influence every human endeavor, and solutions will also require individual engagement and action played out at a local scale. Mitigation strategies to temper the extent of future climate change and adaptation strategies to address changes already initiated will profoundly influence where, what, and how we build.

Climate change has intensified political and public interest in environmental performance targets. "Net-zero-energy" and "carbon-neutral" buildings require radical reductions in energy demand, the use of passive strategies, and greater deployment of onsite renewable energy collection—all of which are geographic and climate dependent.

Climate change has also caused a reevaluation of more fundamental approaches to community and building design and their relationship to natural systems. Beyond the current emphasis on greater energy self-reliance at the individual building level, there are opportunities for creative synergies with adjacent buildings and surrounding natural systems. Moreover, after a managed restoration of degraded ecosystems, permitting natural systems freedom to mature toward greater diversity and resilience according to the constraints and opportunities afforded by place is the basis of regenerative design. Within this local context, regenerative design seeks the considered co-evolution of human and natural systems, and the act of building initiates this process. A fully matured global information system will likely enable participation in a global culture in tandem with this re-establishment of regional identity and place-specific building practices.

Raymond J. Cole, Ph.D.
Professor and Director, School of Architecture and Landscape Architecture
University of British Columbia
Vancouver, B.C.

Climate change challenges the human spirit. How do we act in a world in which our very presence has created threats to our existence and that of all species? Can we summon the will to change our behavior? Perhaps most importantly, do we possess the wisdom to know what to do?

Ecology tells us that everything is connected. Ecological design renders these connections visible, reminding us of our rightful place in kinship with the natural world. Ecological designers are mindful of the impacts of our designs, looking both upstream and downstream, and considering effects over time. Ecological designers also take their cues from nature, creating artifacts and places powered by the sun, composed of safe and healthy materials in closed cycles, celebrating what we learn from nature by mirroring its wondrous diversity.

Our buildings and places can be celebrations of our reconnection to the natural world. We can imagine productive structures that create their own energy, clean their own water, create habitat for various species, and sequester carbon. We can envision buildings constructed within a coherent biological and technical framework, whose materials may eventually return safely to the soil, or be recycled. And we can imagine a building's life extended by the very flexibility and adaptability of its structure and form, allowing it to serve a variety of uses over time.

Kevin Burke, AIA
Partner, Director of Practice
William McDonough + Partners
Charlottesville, VA, and San Francisco, CA

Climate change implies the loss of something valuable. Detached from nature and ecology, our valuation of place is too often based on economics and styles of artificial complexity or simplicity. Our goals, objectives, and criteria in planning and design are skewed. Our landscapes are often ugly and ecologically dangerous. We are unable to foster healthy communities in part because we are for hire; we offer conflicting information and values, and we do not collectively own a critical mass of land, money, political clout, or other powerful resources.

Landscape is not the space left over after the construction of our infrastructures and buildings. It is the sum of the coherent, recognizable elements of the biosphere that gives us life. The planning and design professions need to reorient themselves to framing *all* questions as environmental questions, the answers to which cannot be about failure, half measures, or rhetoric. Professionals from diverse disciplines must work together to integrate narrower realms of expertise into sums better than their parts.

In the past, design schools have offered common academic stems to planning and design students. With a collective understanding of ecology, competencies, philosophical frameworks, and the sense of mission could be better shared among planners and designers and more clearly communicated to the public and our political leaders.

Framing questions and intentions in terms of the impact of our actions should be fundamental to the way we sustain life in this most rare of locations—Earth. If we can do that, we can find beauty in the complexities of ecological functions, appreciate our human roles in abetting those functions, and see genuine beauty in the rhythmic and arrhythmic changes in our biosphere.

Emanuel Carter
Associate Professor, Department of Landscape Architecture
SUNY College of Environmental Science and Forestry
Syracuse, NY

Ecologists now agree that steady-state ecosystems are more the exception than the norm. Disruption is common and instrumental in the evolution of resilient ecosystems, from fire-based forest ecologies to our carbon-based atmosphere. Disruption is productive for resilient systems, but human economies reliant on fossil fuels are not resilient.

Indeed, fossil-fuel based economies have allowed us to momentarily exceed the carrying capacities of local environments to support human life, while irrevocably altering life-affirming biogeochemical processes that sustain healthy ecosystems. Our imprint is everywhere. The greatest challenge to planning is the design of place within human-dominated ecosystems. Successful place-building efforts have to address the delivery of ecological services beyond the urban services by which projects are conventionally judged.

Consider the architect N. John Habraken's assertion that modern design traditions removed the designer from an organic union of culture, city, and landscape that had evolved over time.

> *…the entirety of the ordinary built field where form, inhabitant and maker are functionally integrated and semantically joined—has remained obscure or self-evident. This has inevitably led to the emancipation—and the isolation—of an entire professional culture from the integrated field of form and people.*

Regardless of bioregion, the path to resiliency will involve localization of food supply chains, intermodal transportation systems, closed-loop energy systems, and recombinant urban ecosystem planning. The design professions must recoup the visions, policies, and scalar design grammars inherent in the language of context-production, different from the discrete thinking surrounding the project that dominates our current methodologies.

Stephen Luoni
Steven L. Anderson Chair in Architecture and Urban Studies
Director, Community Design Center
University of Arkansas
Fayetteville, AR

Urban and Cultural Impacts

Undoubtedly, the most profound implication of climate change for place is the geographic distribution of impacts. Today, clear evidence of warming in polar regions is perhaps the most widely recognized physical manifestation of a rapidly changing climate, an observation made ever more apparent this year by the projected disappearance of polar ice in northern latitudes. Other significant dichotomies of place and climate change are those between coastal and inland zones and between the most and least economically advantaged societies.

Yet, perhaps the most significant spatial dimension of climate change is revealing itself along the continuum of rural to urban. Today, most large cities around the globe experience temperatures many degrees higher than proximate rural areas. A product of the urban-heat-island phenomenon, increased urban temperatures result from the displacement of natural land covers by the materials of urban construction, as well as from waste heat emissions from buildings and urban fuel combustion. While the global greenhouse effect is increasing temperatures in both rural and urbanized zones, the urban heat island effect is further amplifying this warming trend in cities alone. A recent study of fifty of the most populous cities in the United States found the rate of warming in the majority of these cities to be more than twice that of proximate rural areas.[1] The continuation of this trend will subject urban populations—now the majority of the global population—to significantly higher temperatures than those experienced by rural populations, with troubling implications for public health and urban infrastructure. As a result, the dichotomy of urban and rural places will become a defining dimension of the global climate problem.

Brian Stone
Associate Professor of City and Regional Planning
Georgia Tech
Atlanta, GA

The high cost of carbon fuels and the rapid depletion of finite natural resources suggest that drawing less on these resources is a good idea. On the other hand, solar "fuel" costs more than oil, and while decreased consumption is a desirable environmental goal, decreased consumer spending may contribute to economic collapse.

How can an architect design places for people in anticipation of climate change and limited access to resources?

- Improve, repair, infill or extend an existing place.
- Provide shelters that efficiently keep out rain, that are warm in winter and cool in summer.
- Maintain access to landscapes and daylight.
- Welcome and celebrate human interaction.
- Provide flexibility to encourage occupant control of the environment.
- Minimize dependence on machines and computers.
- Build places to last.

The rules for coping with global warming may thus be much the same as the rules for addressing global cooling.

Frances Halsband, FAIA
Kliment Halsband Architects
New York, NY

The design challenges of climate change are enormous. If hydrologic patterns change as predicted, producing less frequent but more intense rains, more than one hundred U.S. cities, already struggling to manage combined sewer systems, will see increased flooding and pollution problems associated with infrastructure. If sea levels rise three feet by 2100 or sooner—and continue to rise thereafter—most of the cities along the Gulf and Atlantic coastlines will need major upgrades in their transportation and sewer systems. Hundreds of thousands of people may need to be relocated. Cities will need new hurricane evacuation strategies. Massive flood barriers like those already in place in Europe may be built to protect downtown areas.

How will we support low-income families and elderly citizens who have the least ability to relocate? How will we maintain coastal ecosystems that provide us with our healthiest food sources?

The practical and political challenges of these hydrologic climate change trends will be significant, and will need to be addressed quickly once new patterns begin to emerge. How will we pay for design solutions? Who will bear the brunt of the costs and risks? Will we continue to value biodiversity, or will we simply give it up? These ethical and strategic design questions will be more difficult to resolve when decisions must be made quickly, unless we study them carefully today and make a commitment to act with equity tomorrow.

Kristina Hill, Ph.D.
Associate Professor and Director, Dept. of Landscape Architecture
University of Virginia
Charlottesville, VA



New Approaches

Understanding how to design places and communities to reduce the impacts of climate change—as well as adapt to them—will take nothing less than a renaissance in town planning. While profound new urban forms are likely to result, the substance of this renaissance is about bringing an integrated systems-based approach to the planning and design of places, neighborhoods, and cities.

We can look at the transformation of the practice of architecture over the past decade for a model of change. Sustainable design has refocused attention beyond aesthetics to a building's performance and impacts on the environment. This approach requires collaboration between designers and engineers from the onset, so that systems—energy, water, waste, and materials—inform the design of buildings from the earliest stages of conceptualization.

The good news is that the town-planning renaissance is dawning as this systems approach is being linked to larger planning initiatives. Recent collaborations by integrated planning teams demonstrate a willingness to allow site systems to inform the organization of communities. We are equally excited by the growing appreciation of Cradle-to-Cradle design approaches. This is all new, and there are no easy answers. There is a great deal of work to do to ensure this rebirth takes place. [mixed metaphor otherwise]

Diane M. Dale, ASLA, JD
Director of Community Design
William McDonough + Partners
Charlottesville, VA, and San Francisco, CA

Climate helps define place: San Francisco's fog, Seattle's rain, Phoenix's heat, Minneapolis's winter, Chicago's wind, and Buffalo's snow. Our built environments provide shelter from the elements. Through central heating and air-conditioning, we have become more effective in shielding ourselves from the daily fluctuations in weather. In the process, our society largely overlooked the value of designing with climate.

Above: A pathway within a conservation area on the site of UniverCity (see article pp. 26-29). The community is characterized by an urban "front" and a natural "back," particularly where it meets the Burnaby Mountain Conservation Area. Photo by Cynthia Girling.

The bill for divorce from nature is now coming due. We are increasingly aware of how much energy our buildings and transportation systems consume and the amounts of greenhouse gases we produce in the process. As a result, we need to relearn how to build in ways compatible with local climate. The past and vernacular building techniques provide many lessons. But we must also go beyond history and local cultures to sculpt new forms of environmentally sustainable built environment for our time and for the future.

If we think globally and act locally, we might start with parking lots. Black asphalt contributes much to urban heat islands because it absorbs and stores warmth. We can cool cities simply by changing the material and color of pavement and creating more shade through trees and structures. Parking lots illustrate that climate is but one environmental phenomenon that needs to be considered in the renewed design of our built environment. The hydrological cycle is also interrupted by impervious surfaces, which increase run-off and hamper groundwater recharge. Pollutants that collect on paved surfaces also affect water quality. If we completely reconsider parking lot design, then we can mitigate climate extremes while improving water quality and quantity and create more pleasant places in the process. Parking lots are but one component of the built environment that must be rethought and redesigned with climate and nature in mind. The future of the planet requires such consideration and transformation.

Fritz Steiner, Ph.D.
Dean, School of Architecture and Henry M. Rockwell Chair in Architecture
The University of Texas at Austin
Austin, TX

Remember the brothers George and Harry in the film *It's a Wonderful Life*? Harry escaped provincial Bedford Falls and became a celebrated war hero while George got stuck at home taking care of the family business. We admire George's commitment to family and community. But in this culture of greener pastures and quick fortunes, his commitment to place was a quaint anachronism, and it almost killed him.

We get teary when the townsfolk come to George's rescue in the final scene…but we see ourselves in Harry, high-tailing it for something bigger and better.

We're a country full of Harrys. We're the ones who got fed up or kicked out or underwhelmed with the old country and its stodgy limits. We are the ones who left.

To reduce the causes of climate disruption and deal with its effects, we'll need to rediscover George. We'll need to run less and invest more, finding greater satisfaction in dwelling than fleeing freely.

I once read a defense of the space program based on the theory that sooner or later we're going to destroy this planet, so we need to find a "Planet B." This is about the spot in our movie where we could really use old George. Our challenge, as climate disruption accelerates, is to get better attached to "Planet A."

K. C. Golden
Policy Director, Climate Solutions
Seattle, WA

Smart-growth strategies have been used by communities for years to protect open space, use infrastructure more efficiently, reduce air pollution, improve water quality, and enhance quality of life. However, growing public concern over climate change and rising energy prices have focused new attention on such strategies. Several studies have confirmed that smart growth development produces lower greenhouse gas emissions and reduces household transportation costs. Critical policy questions are:

- How significant are the reductions that can be achieved?
- What are the costs of achieving them?
- What other benefits do such strategies produce?

The research report "Growing Cooler" provides an answer to the first question. The study reviewed existing research and concluded that if 60 percent of future growth were accommodated through more compact development, carbon dioxide could be reduced by 7 to 10 percent by 2050, roughly equivalent to raising average fuel economy to 32 miles per gallon.[2]

Smart growth approaches may achieve emissions reductions more cost effectively than some other reduction strategies under consideration. Key policy elements of smarter growth, including flexible regulations and expedited development review, cost local governments little, leverage private sector money, and can generate new revenue.

Smart growth techniques produce other climate-related benefits. Convenient transportation choices allow communities to be resilient in the face of uncertain energy prices. Smart growth strategies can help communities re-evaluate where to build given the changes in sea level, precipitation, floods, and storm surges that climate scientists conclude are likely even if we reduce emissions.

Megan M. Susman and John V. Thomas, Ph.D.
Policy Analysts
U.S. Environmental Protection Agency
Development, Community, and Environment Division
Washington, D.C.

New Tools for American Cities

American cities, suffering the silent disease of economic decline and de-settlement, produced sprawl and increased carbon footprints in response.

In the dawn of a growing awakening to issues of climate and environment, energy, housing stability, and an unanswered hunger for community, cities are poised to benefit from the growing demand for affordable urban housing. The land of opportunity now comprises abandoned parcels and blocks in urban neighborhoods.

Kansas City, Missouri, has suffered through fifty years of measurable urban erosion. Every important indicator of urban community health and prosperity suffered. Population density declined by two-thirds, public rail transit disappeared, the major urban school district shrank, retail stores and jobs moved away, and the urban tax base eroded.

Beautiful streets lined with mature trees and stately homes have been abandoned. Once blight, now opportunity; what remains is the foundation for a new Kansas City. Initiatives are under way for the renaissance. Integrated transit planning will likely lead to light rail in a few years. A massive plan for storm and sanitary sewer replacement utilizing green technologies is imminent. A new development code embracing green principles is before the City Council. Various education initiatives are seeking better education options for the inner city.

We are at a crossroads. It is not a time to rationalize or be overly scientific. Families need affordable neighborhoods, the best schools, and good-quality housing. The car is becoming unaffordable. The city requires a sustainable economy. People and the planet demand a reduced carbon diet. It is a time to pioneer real new urbanism based on the triple bottom line, economics, environment, and social equity. It is time to resettle.

Steve McDowell, FAIA, LEED AP
Principal
BNIM Architects
Kansas City, MO

Consider a draft legislative proposal that would support the planning and reward the development of climate-friendly urbanism—cool places that are compact, complete, and connected. The Climate Benefit District (CBD) would do just that: spur implementation and capture synergies made possible by the integration of high-performing buildings with district-level power and green infrastructure in walkable, transit-focused communities. A low per-capita carbon footprint would be but one of many benefits of this urban condition, not the least of which includes creating market value in a future that is monetized according to effects on the carbon cycle. The CBD also describes an intentional set of future-proofing policies, aligned public and private investments, and creation of "safe harbors" as we begin adapting cities to climate change, energy, water, food, and other resource price shocks and supply constraints.

Working with municipal and land-use attorneys, Seattle architects have been testing this idea in association with representatives of various environmental, development, green-energy, and local-government organizations in response to opportunities presented by the Washington governor's Climate Action Team. We are addressing intervention at the neighborhood scale by developing qualifying criteria and identifying locations, statutory and regulatory hurdles, market-based and public-private partnerships, and incentives for climate-friendly development and redevelopment. The first—and dauntingly opaque—design challenge this initiative faces is authorizing a new institutional construct to initiate, finance, plan, execute, and manage these integrated neighborhood-scale systems. The Climate Benefit District would be just such an innovation.

Stephen Antupit
Senior Associate, Mithun
Seattle, WA

Notes

1. Brian Stone, Jr., "Urban and Rural Temperature Trends in Proximity to Large U.S. Cities: 1951-2000," *International Journal of Climatology*, 27 (2007), pp. 1801-07.
2. The Urban Land Institute, Smart Growth America, the Center for Clean Air Policy, and the National Center for Smart Growth Research and Education, "Growing Cooler: The Evidence of Urban Development and Climate Change," 2007. The full report is available from the Urban Land Institute bookstore (Washington, D.C.); www.uli.org.

Observations on the Concepts of Place in Post-Risk Societies

Kiel Moe

> *The frailty of everything revealed at last.*
> *Old and troubling issues resolved into nothingness and night.*[1]
>
> —*Cormac McCarthy*, The Road

Climate change is one among many global hazards taken up by recent literary and cinematic narratives. This attention is due to the fact that we live and work in a society characterized by technical and ecological systems of mounting hazard, a sport of networked limits and contested resources.

The German sociologist Ulrich Beck calls this "the Risk Society."[2] The Risk Society is a phase of modernity differentiated as much by the proliferation of bads (tyranny, pollution, and catastrophe) as by goods (emancipating ideas, ideals, and materials goods). In our current context, the sources, sites, and effects of the bads at their worst—low-probability, high-consequence hazards—operate at the continental and the global scale. The ongoing globalization of modernity begets the globalization of risk. As risk becomes increasingly systemic and jumps scale, it becomes ever less predictable and ever less subject to individual expertise, control, and culpability. Risk at this scale is also indifferent to distinctions such as class and race or the developed and developing worlds. Risk now leaves no life, and no aspect of life, untouched.

Post-Risk Scenarios in Fiction

Recent post-Risk fictional narratives present what-if scenarios, in which contemporary canonical hazards such as climate change, genetic modification, and nuclear disaster escape management with sufficient velocity to fundamentally alter local, continental, and global settings. In each of these scenarios, individuals attempt to survive barely habitable, eschatological ecologies where all systems of life have either radically mutated or disappeared altogether. Familiar systems and infrastructures are chronically ruptured. Minor technologies (a shopping cart, a can of beans) become major advantages, and major technologies (boats, trucks) become minor possibilities of hope. In each case, characters are transformed from survivors of cataclysmic events into mere survivors of place.

In the film *The Day After Tomorrow* (Roland Emmerich, 2004), rapidly melting polar ice caps disrupt ocean current flows that trigger immediate and calamitous weather events around the globe. Monster waves inundate New York City, which is then instantly frozen by descending, super-cooled tropospheric air. The prescient protagonist and paternalistic savior of this plot is, needless to say, an underappreciated climatologist. Despite its Hollywood hyperbole and dubious science, the film visualizes many recurrent aspects of post-Risk place-making: mass evacuations and population displacement, surprise ecologies, survival by foraging, and the archetypal trek to safety, recovery, and salvation.

In Cormac McCarthy's novel *The Road*, our country's nearly four-million-mile transportation infrastructure appears as an endless, horizontal monument to the technics and hubris of the twentieth century.[3] McCarthy offers readers a disquieting account of human life barely able to plod through its dim, apocalyptic habitat—an ashy, scorched, post-nuclear landscape devoid of living systems or light. The only thing more cold, hostile, and dark than the novel's interminable setting is the people its protagonists encounter along their way to nowhere:

> *How long have you been on the road?*
> *I was always on the road. You can't stay in one place.*
> *How do you live?*
> *I just keep going. I knew this was coming.*
> *You knew it was coming?*
> *Yeah. This or something like it. I always believed in it.*
> *Did you try to get ready for it?*
> *No. What would you do?*
> *I don't know.*
> *People were always getting ready for tomorrow. I didn't believe in that. Tomorrow wasn't getting ready for them. It didn't even know they were there.*[4]

In the films *I Am Legend* (Francis Lawrence, 2007, adapted from the 1954 novel by Richard Matheson), *28 Days Later* (Danny Boyle, 2002), and *Children of Men* (Alfonso Cuarón, 2006), set designs and art direction aim to depict worlds driven by genetic accidents that trigger pandemic infections and rapid social devolution. *I Am Legend* is set in post-Risk Manhattan, a ghost city overrun by vegetation and wild animals, emptied of human inhabitants by a genetic cancer therapy gone horribly wrong. Nocturnal flesh-eating zombies run amok and terrorize the sole protagonist, a military microbiologist on whose immunity, wit, physical prowess, and research the future of humanity depends. In *28 Days Later*, the protagonist awakes from a coma twenty-eight days after eco-terrorists have released monkeys infected with Rage, a bloodthirsty communicable disease that quickly drives the world into riots and chaos. He leaves his hospital on a post-Risk dérive through an empty London, attempting to understand what has come to pass. *Children of Men* imagines a world where

human beings have ceased to reproduce. It visualizes a pre-apocalyptic London and English countryside amidst unnerving chaos, as an increasingly totalitarian state clings to power over the collapsing social and political order.

These recent evocations of post-Risk place exhibit some important differences from earlier speculations about the future. For example, in both the film *Blade Runner* (Ridley Scott, 1982, based on Philip K. Dick's novel *Do Androids Dream of Electric Sleep?*) and William Gibson's novel *Neuromancer*, individuals with resources simply leave Earth behind for other utopias, manifesting the extraterrestrial flight Hannah Arendt described in her prologue to *The Human Condition*. In their futuristic mise-en-scenes, accelerating technologies and genetic science drive both life and plot. In the post-Risk narrative, however, there is no such escape. Protagonists must remain and adapt to life within the new milieu. Premodern technics and archaic modalities surface alongside the hulk of twentieth-century technics to collectively give the new place its shape and character.

Post-Risk fictional scenarios incorporate a vast range of popular imagination and scientific speculation, from the sober to the absurd. More often than not, narratives exploit the ethical extremities of science, blended with generous quantities of pop journalism and eschatology. As entertainment inspired by science, the evocations of place in these films and novels employ varying levels of realism in scenarios that are driven as much by plot as by probability. Yet, science itself ultimately strains against both nature and culture as the last best hope of enlightened rationality and solutions to its own bads. In fiction and in life, science, by itself, is insufficient to master or even contain the mutations of the real. Its authority alone no longer offers a guarantee. Thus, the places of recent, real post-Risk spectacle—Chernobyl, or the central Gulf Coast after Hurricane Katrina—emerge precisely when the certitude of scientific calculations and risk assessment fail. For Beck, the perpetual expansion of interconnected practices that are just less than catastrophic is a prime characteristic of the Risk Society. Eventually such practices fail, triggering a contagion of post-Risk places.

Post-Risk Scenarios in Reality

With respect to real places, what is perhaps most significant about the aforementioned scenarios is that they occur primarily in film and literature rather than in the fiduciary speculations of architecture, landscape architecture, and planning. Although environmental designers routinely consider life-safety issues such as structural failure, fire, and flooding, using standard risk-mitigating protocols, these large-scale risks occupy little if any of our disciplinary attention and imagination. At minimum, our professions ought to engage the possibility of current and future post-Risk environments and conceptualize a response.

The British Sociologist Anthony Giddens has identified four "adaptive reactions" to our current phase of modernity, which hovers on the cusp of a post-Risk world: *pragmatic acceptance*, *sustained optimism*, *cynical pessimism*, and *radical engagement*.[5]

Pragmatic acceptance is characterized by acquiescence today and mere survival tomorrow; a blunt cocktail of accepted futility, maintenance, and limited efficacy. *Sustained optimism* is the blind extension of an Enlightenment faith in technical transcendence and scientific calculation to solve any problem at hand in post-Risk environments, a utopian scale of gambling with technology's escalating capabilities and culpabilities. *Cynical pessimism* is a kind of post-Risk noir utilitarianism that makes do and is alternately humorous and humane, depressing and doomed.

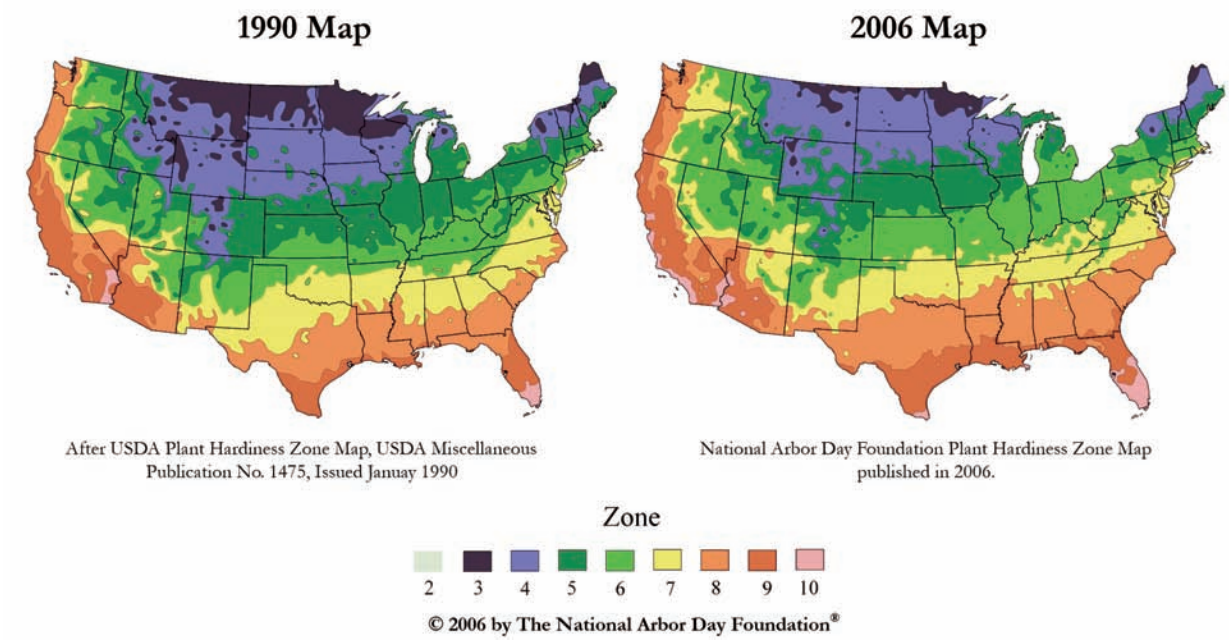
Radical Engagement holds the most promising path for designers. It is characterized by a contingent recognition of the risks and "contestory action" to confront and mitigate, if not transcend, them. As Giddens states, "its prime vehicle is the social movement."[6] If the risks and their resultant environments are perceived as real, planning and design professionals might choose to engage in low-stakes scenario planning, a minor discourse on post-catastrophe planning, other forms of "contestory action," or nothing at all. We choose at some risk: in the end, as these fictional narratives all routinely demonstrate, plan A is only as good as plan B.

Notes

1. Cormac McCarthy, *The Road* (New York: Vintage Books, 2006), p. 28.
2. Ulrich Beck, *The Risk Society: Towards a New Modernity* (London: SAGE Publications, 1992). The first chapter (pp. 19-50), "On the Logic of Wealth and Risk Distribution," is of particular interest here.
3. Richard T. T. Forman, *Road Ecology: Science and Solutions* (Washington, D.C.: Island Press, 2003), p. 43.
4. McCarthy, *The Road*, pp. 168-69.
5. Anthony Giddens, *The Consequences of Modernity* (Stanford, CA: Stanford University Press, 1990), pp. 134-37.
6. Ibid., p. 137.

Managing Sense of Place in Transition: Coping with Climate Change

Mary Carol R. Hunter



For city people, sense of place owes much to familiarity with the organizational schemes and architectural themes of the urban-suburban milieu. But it also arises from hints and clues about the wildness the city once held. Place-making in every settlement, from high-pack ultra urban to forgotten semi-rural, owes much to the plants that frame and embrace the built environment.

I remember the cathedral sense of my old Detroit neighborhood when the American elm reigned. Here winter's end was signaled by robins poking at front lawns, and blue cornflowers and Queen Anne's lace littered summer roadsides and empty lots. Now, these bits of urban nature are gone or are threatened. The elms fell victim to a fungus-carrying beetle; the robins today bug-grub in drought-stricken lawns growing on contaminated soils; and the wildflowers have been outlawed for their heritage as exotic, invasive species.

Above: Comparison of plant cold-hardiness zones in 1990 (USDA) and 2006 (National Arborday Foundation) indicate a warming climate.

Opposite: This hypothetical comparison showing roadside vegetation with and without a native red-flowering species (beebalm, *Monarda didyma*) illustrates how visual cues provided by a single species can establish and support sense of place. Images by author

These losses derive from changes in culture and technology. They will pale in comparison to the impacts of climate change.

Climate Change and Plant Communities

As climate change adjusts weather patterns worldwide, plant-growth zones have already begun to shift.[1] In southeast Michigan, for example, minimum winter lows have risen by ten degrees Fahrenheit in less than a generation, from an average of minus twenty to minus ten in 1990, to minus ten to zero in 2006. The rise in winter temperatures suggests that the assemblage of local plants will also eventually change; and, indeed, this is beginning to happen.[2]

Equally critical aspects of climate change are increasing fluctuations in temperature, rainfall, and regional weather patterns. At a local level, this amplified variation in microclimate will be translated directly into changes in the vigor of individual plant species. Species will also be indirectly affected by changes in exposure to pollinators and disease agents. A sustained disruption of business as usual within urban ecological communities may result in places that will not look or feel the same.

Let's consider how this form of ecological instability might influence sense of place. Personal associations with

place arise from typically encountered scenes. Imagine the following scenario invoked by a climate-induced change in phenology.[3] An atypically warm winter causes a common species to bloom earlier than usual—at a time when the plant's chief pollinator is absent because it relies on photoperiod rather than temperature to gauge time of season. When the pollinator does arrive, the flowers are nearly gone. Some seed is set that year, but by early summer the next year, the asynchrony between plant and pollinator has resulted in the near absence of a previously ubiquitous color and texture. Some of us will notice and consciously miss the old friend. Some will not know why it doesn't feel right. Others won't notice until a multitude of comparable changes have occurred.

As plant zones continue to shift northward—particularly if this occurs at the same pace as between 1990 and 2006—it is important that we develop a plan to protect our sense of place. The adaptation strategy described here offers an approach to the maintenance of aesthetic continuity, local biodiversity, and ecosystem health.





Ecological Considerations for Adaptive Design

If we hope to sustain a sense of place in the face of climate change, we should keep several ecological realities in focus.

First, the success of plant species undergoing a change in geographical range will depend on the availability of suitable habitat in an already fragmented landscape.[4] This need for habitat means it is essential to conserve existing natural areas and create new open space and linkage corridors within and around metropolitan areas.

Second, climate change will affect the timing and magnitude of interactions among community members.[5] Within a local plant community, climate change can shift encounter rates with beneficial species such as pollinators, mycorrhizae (symbiotic, nutrient-gathering fungi that live on or next to plant roots), and seed-dispersal agents such as birds and mammals. Climate change can also alter the presence and activity of detrimental species such as competitors, predators, parasites (a.k.a. herbivores), and agents of disease. All these effects can change the aesthetically familiar composition of a local plant community.

Third, climate change may disrupt the ability of familiar species to grow and reproduce. Each species occupies a niche within a web of local ecosystem processes, and each contributes to overall ecosystem maintenance by doing jobs like pollinating, providing food and shelter, mediating moisture conditions, and recycling nutrients. When a perturbation like climate change adjusts the availability of plants to their associates, each species suffers unless alternative partnerships are available. If more than one species can provide the required partnership, it is more likely the job will get done. An efficient way to achieve such "ecological redundancy" is to provide a diverse palette of plants whose functions overlap.[6]

To understand redundancy, one must recognize that functional roles are defined by many criteria. The most common are based on structure and temporal features (e.g., annuals, herbaceous perennials, woody shrubs, and trees). But functional groups can also be based in physiological traits, such as the drought tolerance among C4 grasses and CAM (crassulacean acid metabolism) plants or the nitrogen-fixing ability of legumes.[7] When the goal is to stabilize a disturbed ecosystem, success is most likely when biodiversity is partitioned among many functional groups. When both functional diversity and redundancy are present, the urban ecosystem will be more productive, efficient, and better able to withstand disturbance.

Finally, at a time of climate change, it is important to understand that some plant species can go with the flow, adjusting to short-term environmental change with little trouble. This ability, called phenotypic plasticity, involves adaptation through physiology or morphology rather than by means of natural selection or the intervention



of alternative community partners. For example, black chokecherry is able to fare well during both extended drought and extended wet periods. As such, it is very plastic compared to its structural and aesthetic equivalent, silky dogwood, which occurs only along stream edges in the wild, and which has much greater water needs when planted in a garden.

Greater plasticity is often associated with a broader niche, a broader geographic range, and greater capacity to succeed with less cultivation (irrigating, weeding, fertilizing). Phenotypic plasticity is an excellent trait for planting designs intended to accommodate the uncertain outcome of climate change.[8]

Above: A city-wide loss of street trees in Ann Arbor, Michigan, caused community distress, leading some people to adapt by installing street-side plantings.
Opposite: Shrubby cinquefoil, *Potentilla fruticosa*, demonstrates several adaptive design principles: it is a rich nectar source for pollinators (ecological and aesthetic match); it extends resources for pollinators (redundancy); and it is drought tolerant (greater phenotypic plasticity). Photos by author.

Cultural Considerations for Adaptive Design

Although we are a highly plastic species, we often become distressed when we lose our sense of place. Negative human responses to major perturbations such as a hurricanes, fires, or the destruction of a neighborhood for a freeway are well known. Negative human responses to more subtle perturbations—replacement of oak by maple in a nearby woodland after a gypsy moth outbreak, or loss of a bus route that serves too few people—are much less well understood.

My own research suggests that even subtle change at the ecosystem scale can have dramatic effects on individual experience, and can lead to shifts in behavior. For example, after a massive loss of street trees in Ann Arbor on account of the emerald ash borer, some residents adapted by installing small curbside gardens in the easement area where the trees once stood.

Unlike the overnight loss of street trees, climate change offers only subtle evidence of change. Consequently, there is no emerging imperative that fires up action to protect sense of place for the future. However, the accompanying guidelines offer a plan for protecting urban sense of place



under climate change in a way that is congruent with other ecological goals: support of urban biodiversity, protection of air and water quality, and reconstitution of corridors for species movement.

A Practical Approach for Protecting Sense of Place in Transition

Protecting sense of place in enduring human settlements requires that we manage the change of scene as other species move on, move in, or die off. Protecting urban ecosystem health further requires that we support and even facilitate the movement of species.[9] Both goals can be addressed with sensitive design and land management.

Conservation of natural areas around or through cities can provide a continuous habitat for the movement of species. For example, the city of Toronto put a plan in place several decades ago to conserve and restore the riparian corridors that line its branched river system.[10] The plan provides both linked habitat for wild species and restorative destinations for city dwellers, and it contributes to a sense of place by helping residents witness the natural interactions that contribute to the city's aesthetic identity. It is serendipitous that this plan will also serve the city well with respect to climate change.

In urban settings adaptation can also be approached through the active creation of habitats that support ecosystem processes which may falter under the duress of climate change. On a large scale, cities can allow the naturalization of public open spaces and manage them as safe havens for local native species and species in transition.[11] But private gardens of all sizes, repeated across the metropolis, can also be designed or retrofitted with a plant palette that supports biodiversity and targets species with phenotypic plasticity and aesthetic characteristics reminiscent of existing but more fragile plant communities.

The accompanying planting design guidelines may be used to support the development of this plant palette. They offer a proactive, experimental path for adapting to circumstances we understand only in generalities. They can be applied in most settings as long as ecological context and sense of place are honestly accommodated.

We are a long way from being able to predict local climatic response to a changing global climate. However, predictive models can guide us to generalities that indi-

cate ways to adapt the built environment for a favorable outcome in the face of uncertainty.

Subscribing to all the design criteria presented here is a daunting task even for the committed and botanically literate. But they offer a place to start. Information on meeting aesthetic and ecological goals can then be integrated by scientific and community efforts. Participation programs, data exchange on websites, and expert advice by professionals can lead to planting recommendations for specific locations and design goals that can be adopted by anyone.

Regardless of the action (or nonaction) we choose, community adaptation to climate change will be enhanced by education programs that help us understand the nature in our midst and its impact on our sense of place. With real knowledge and professional guidance we may accept the change or, where desirable, make informed adjustments.

Notes

1. National Arbor Day Foundation (2006) www.arborday.org/media/zones.cfm. The Arbor Day Foundation has recently completed an extensive updating of U.S. hardiness zones based upon data from five thousand National Climatic Data Center cooperative stations across the continental United States.

2. There is mounting evidence of latitudinal and altitudinal range shifts for a variety of organisms, including plants and pollinators, in response to temperature rise. A meta-analysis of 44 studies shows that more than 400 species of plants and animals have shifted their ranges or changed behaviors such as the timing of egg-laying. C. Parmesan and G. Yohe, "A Globally Coherent Fingerprint of Climate Change Impacts across Natural Systems," *Nature*, 421 (6918) (2003), pp. 37-42.

3. Phenology is the study of periodic plant and animal life-cycle events that are influenced by environmental changes.

4. G. T. McInerny and C. Dytham, "Range Shifting on a Fragmented Landscape," *Ecological Informatics*, Vol. 2, No. 1 (2007), pp. 1-8.

5. M. E. Visser and C. Both, "Shifts in Phenology Due to Global Climate Change: The Need for a Yardstick," *Proceedings of the Royal Society B*, 272 (2005), pp. 2561-69.

6. D. Tilman, J. Knops, D. Wedin, P. Reich, M. Ritchie, and E. Siemann, "Influence

Design Guidelines for Selecting Plant Species

The following guidelines can be used to help preserve sense of place and support urban ecosystem function in the face of unpredictable weather. The guidelines do not, of course, address other critical design criteria, such as spatial form. The examples offered are specific to the southeastern Michigan, which is part of the central hardwood region of the U.S.[12]

1. Identify plants that are "of place." To begin, amass a list of commercially available plant species in the target area. Confine the list to native species or noninvasive naturalized species that are already part of the local ecosystem. For each species, note ecological and aesthetic characteristics on a spreadsheet. Beyond descriptors of form, color, texture, and requirements for soil, moisture, and light, include spring emergence time, flowering period, natural community affiliation, wildlife value, drought and pollution tolerance, and restorative value for ecosystems and human well-being.

2. Identify the aesthetic and sensory characteristics most constituative of sense of place.[13] While individual designers are usually at liberty to make this call, a community survey may also help people become aware of what is at stake and engage their support for future efforts. Information on sense of place can also be captured in sketches or photographs depicting signature plant species —the combination of plants that is particularly memorable and identifies a particular place.[14]

3. Identify ecological design goals for plant selection. These may include creation of habitat for specific pollinators or wildlife species, stormwater-quality, erosion control, carbon storage, or air-quality improvements.

4. In light of the design goals, use the following criteria to select plant species from the spreadsheet database. Wherever possible, choose plants that accommodate ecological and aesthetic goals simultaneously.

A: Select plants with the greatest chance of withstanding weather fluctuations (extreme drought, rainfall, or temperature change). Begin by considering plants with plasticity. For example, select species with broader hardiness-zone ranges (e.g., zone 2-9, American mountain ash, *Sorbus americana*), or species known to withstand both drought and flooding (e.g., white swamp oak, *Quercus bicolor*).

B: Plasticity is not a universal salve. For greater community stability in the face of uncertainty, support niche diversification by including plant species with different stress tolerances. For example, select shrub species that

of Functional Diversity and Composition on Ecosystem Processes," *Science*, 277 (1997), pp. 1300-02.

7. C4 plant metabolism, found in about half of all grass species worldwide, allows efficient photosynthesis under conditions of high heat by avoiding photorespiration. Plants with CAM metabolism can also photosynthesize under conditions of severe drought by using a two-stage process that involves carbon dioxide uptake at night when water loss is at a minimum. Less than 10 percent of all flowering plants can do this. Legumes house microbial partners capable of taking nitrogen from the atmosphere and making it available to other community members.

8. The value of phenotypic plasticity in the face of climate change is taken up in S. L. Chown, S. Slabber, M. A. McGeoch, C. Janion and H.P. Leinaas, "Phenotypic Plasticity Mediates Climate Change Responses among Invasive and Indigenous Arthropods," *Proceedings of the Royal Society B*, 274 (2007), pp. 2531-37; and in A. Charmantier, R. H. McCleery, L. R. Cole, C. Perrins, L. E. B. Kruuk, and B. C. Sheldon, "Adaptive Phenotypic Plasticity in Response to Climate Change in a Wild Bird Population," *Science*, 320 (2008), pp. 800-03.

9. M. C. Hunter and M. D. Hunter, "Designing for Conservation of Insects in the Built Environment," *Insect Conservation and Diversity* (2008, in press), and online http://www3.interscience.wiley.com/journal/121355925/abstract.

10. J. Taylor, C. Paine and J. Fitzgibbon, "From Greenbelt to Greenways: Four Canadian Case-Studies," *Landscape and Urban Planning*, 33 (11-3) (1995), pp. 47-64.

11. J. Pöyry and H. Toivonen, "Climate Change Adaptation and Biological Diversity," FINADAPT Working Paper 3, Finnish Environment Institute Mimeographs, No. 333, Helsinki (2005), p. 46.

12. See J. Diekelmann and R. Schuster, *Natural Landscaping: Designing with Native Plant Communities* (Madison: University of Wisconsin Press, 2nd edition, 2002).

13. J. Woodward, "Signature-Based Landscape Design," in G. F. Thompson and F. R. Steiner, eds., *Ecological Design and Planning* (New York: John Wiley, 1997), pp. 210-15.

14. N. Robinson, "Place and Plant Design: Plant Signatures," *The Landscape*, 53 (1993), pp. 26-28.

15. C. J. Frost and M. D. Hunter, "Herbivore-Induced Shifts in Carbon and Nitrogen Allocation in Red Oak Seedlings," *New Phytologist*, Vol. 178, No. 4 (2008), pp. 835-45.

16. E. Marris, "A Garden for All Climates," *Nature*, Vol. 450, No. 13 (2007), pp. 937-39.

express a range of responses to water availability, from tolerance of drought (mapleleaf viburnum, *Viburnum acerifolium*), to flooding (redosier dogwood, *Cornus sericea*), to a capacity to handle either (shrubby cinquefoil, *Potentilla fruticosa*).

C: Include plants that match the aesthetic characteristics of the signature species in the area but which have a broader ecological range (e.g., choose white oak, *Quercus alba*, in lieu of American beech, *Fagus grandifolia*), or that prefer a slightly warmer climate. In lieu of American basswood, *Tilia americana*, and eastern hemlock, *Tsuga canadensis*, choose White Basswood, *T. heterophylla*, and Carolina hemlock, *T. caroliniana*, both of which naturally occur in warmer areas of central and eastern U.S. hardwood forests.

D: Maximize the number of functional groups to accomplish valuable ecological tasks. For example, create habitat structural diversity by modifying monocultural turf areas. Enlarge their borders to include deciduous trees, broad-leaf evergreen shrubs, and flowering groundcovers that better support birds through all seasons.

E: Establish ecological redundancy for important ecosystem functions. For example, select a set of flowering species that collectively ensure continuous blooms for pollinators under early springs (serviceberry, *Amelanchier arbore*) and extended falls (smooth aster, *Aster laevis*), and long-flowering species for a range of rainfall conditions from dry (e.g., sundrops, *Oenothera fruticosa*) to wet (e.g., cut-leaved coneflower, *Rudbeckia laciniata*, and Joe-Pye weed, *Eupatorium maculatum*).

F: Avoid highly opportunistic plant species that can easily outcompete and dominate under stressful conditions (e.g., for goldenrod, *Solidago spp*., substitute the naturalized *Achillea x Coronation Gold*, an aesthetic equivalent).

G: Manage ecosystem functions to better support the work of unseen community members with a critical role in nutrient recycling —the decomposers. Allow fallen plant bits to remain in place rather than tidying, and allow herbivory, because plant-eating animals facilitate nutrient recycling by offering soil microbes smaller packets.[15] For elevated nutrient production by soil microbes, select nitrogen-fixing species (e.g., speckled alder, *Alnus rugosa*).

5. Test. Sustainability requires a long-term commitment. Also let community participation inform adaptation efforts. Conservation programs worldwide are enlisting adults and schoolchildren to gather data on the timing of budburst and bloom periods to better protect pollinators. Engage local gardening organizations whose members can offer feedback on the success of planting designs for adaptation. The life of the gardener is one of continuous experimentation.[16]

Changing Landscape, Changing Climate: Bangkok and the Chao Phraya River Delta

Danai Thaitakoo and Brian McGrath



As ecologists and urban designers, our research suggests that climate change will require a radical shift within design practice from the solid-state view of landscape urbanism to the more dynamic, liquid-state view of waterscape urbanism. More than a change in language, this shift will require a new way of thinking about place. Instead of embodying permanence, stasis, solidity, and longevity, liquid perception will emphasize change, adaptation, and the continuous reproduction of locality as a cultural practice.

New forms of waterscape urbanism may be inspired both by the philosophical concept of liquid perception and by the emerging ecological practice of monitoring urban systems through watershed frameworks. This article examines greater Bangkok, Thailand, as a critical case study of this position. Bangkok is currently one of the most at-risk cities in the world in the face of rapid and unpredictable climate change, and it has already begun to experience severe effects.

Bangkok and its environs originally grew in harmony with the predictable cycles of monsoon rain and wet rice cultivation. But for the last fifty years it has developed in ways that have largely contradicted such a water-based urbanism. Though currently degraded, Bangkok nevertheless remains a potentially vibrant model of the ways in which resilient new forms of water-based urbanism might emerge.







Contemporary Ecosystem Science

The science of ecology began by examining the relationship between individual species and landscapes; in particular, ecologists sought to understand the workings of island ecosystems, preferably ones far removed from disturbances by invasive or migratory species.

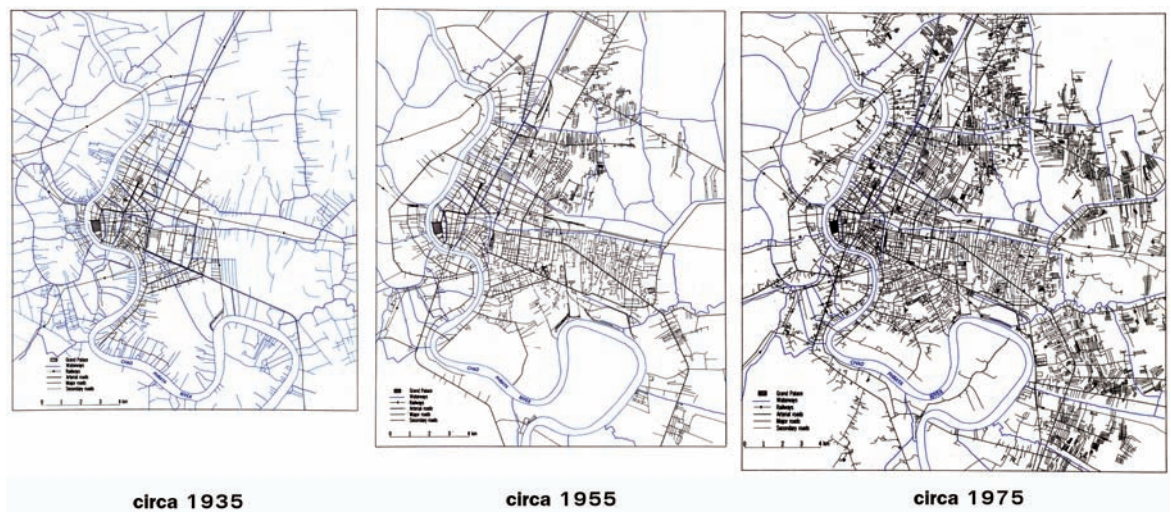
Contemporary ecosystem studies, by comparison, frequently seek out more diverse sites, where complex interrelationships can be monitored and modeled. Such work began at the Hubbard Brook Experimental Forest, in New Hampshire, where for more than fifty years small streams have been continuously monitored to understand the impact of larger changes in air quality, land cover, temperature, and species diversity on local water biochemistry.[1] Recently, researchers have been able to scale up results from such small subcatchments to begin to understand the ecological dynamics of larger regional watersheds.

Ecological studies of species and landscape interrelations have also attempted recently to include the presence of humans and cities. Thus, novel landcover and social-ecology factors have been incorporated in efforts like the Baltimore Ecosystem Study (BES). The goal of such work is to integrate research in the biophysical and social sciences with urban design.[2] BES has, for example, discovered that accepted urban management practices such as buffering riparian systems are inadequate in controlling the capture and release of nitrogen. This discovery has led to proposed new urban design and management regimes

Opposite: The lower Chao Phraya River delta and the city of Bangkok. Watery Bangkok sprawls over an urban agricultural market landscape dominated by fruit orchards to the west, rice fields to the east, shrimp farms along the coast, and fish farms in the lowlands.

Top: Old and new water-based urbanism in Bangkok. The Chao Phraya River is lined with both traditional dwellings, markets and monastery complexes, as well as luxury hotels and condominiums.

Bottom: Under an expressway flyover, a new public beach has formed at the entrance to Khlong Bangkok Noi (left). Historic canals *(khlongs)* now face the backs of buildings, instead of serving as the face of the city (right).







and the evaluation of area residents' preferences relative to their effect on nitrogen retention.[3]

The advantage of studies like BES is that, like the scaling up of research findings at Hubbard Brook, they open the possibility that small design changes, applied broadly, can positively affect an entire ecosystem. For example, one aim of the BES nitrogen research is the revitalization of Chesapeake Bay, because excessive releases from sources such as sewage and fertilizer, unmitigated by the dynamics of urban streams, are a significant source of eutrophication in coastal waters.[4]

In urban areas, however, one of the frequent challenges to such an approach is perception. To appreciate how small changes can have large effects, homeowners need to be encouraged to trade their "solid-state" perceptions of home and neighborhood for a more multiscalar, liquid perception. Urban designers can make a significant contribution to shifting perceptions toward such a watershed awareness.

The difference between liquid and solid perception is certain to also have a direct affect on the work of architects, landscape architects, and urban designers. For example, landscape urbanism has to date based its proposals for the sustainable redevelopment of postindustrial North American cities on the creation of large parks as ecological islands.[5] The watershed view suggests a more integrated

approach that emphasizes smaller private actions applied more systematically.

Watershed science and its implied liquid-state view challenge normative ideas about place. Instead of being discretely bounded, situated, and local, sites are caught in larger systems of flows, the complexity of which we are just beginning to recognize. Moreover, climate change is beginning to demonstrate that even the most local of sites is vulnerable to global as well as regional processes and events.

Liquid Perception

The French philosopher Gilles Deleuze has described the filming of water in the pre-World War II French school of cinema as offering a new state of perception, one which allows the solid, material world to dissolve to matter-flux. Citing the work of filmmakers Jean Renoir and Jean Vigo, Deleuze wrote:

> *(W)hat the French school found in water was the promise or implication of another state of perception: a more than human perception, a perception not tailored to solids, which no longer had the solid as object, as condition as milieu. A more delicate and vaster perception a molecular perception, peculiar to a "cine-eye."*[6]

Our research in Bangkok has uncovered evidence of a long history of such liquid perception. It has influenced both the way we see and document the city in the present and how we understand its history of water-based urbanism. Such liquid urbanism was present for hundreds of years, before new forms of land-based urbanism came to dominance during the last half of the twentieth century.[7]

Bangkok is situated on a slight rise in the predominantly flat terrain of the lower Chao Phraya River delta. The area was developed during the Ayutthaya period (from the fourteenth to the eighteenth centuries) as a vast, productive landscape of mixed fruit orchards.[8] Small delta settlements supported an elaborate network of market towns joined by natural and constructed waterways, which also connected to the great Siamese capital and international entrepôt of Ayutthaya.[9]

During this period, settlements along the banks of rivers and canals *(klongs)* and on flood plains were subject to seasonal surpluses and deficits of water without serious problems. Excess water was a part of life, and it was considered benevolent and nourishing. People adapted to the rhythms of the monsoon by directing water through small capillaries, which fed the orchards and flooded the rice fields that served as efficient retention basins.[10]

The traditional water-based urbanism of the lower Chao Phraya delta first saw change and modernization at the end of the nineteenth century. At first, this transformation relied on new canals that functioned as highways, radiating outward and providing access both to the new capital of Bangkok and to outlying market towns.[11] Legislation enacted in 1880 granted rice-growing land to private companies which constructed canals; beginning with Rangsit, a vast planned area of irrigated rice fields developed by the Siam Land, Canals and Irrigation Company, this policy transformed a locally managed system of subsistence rice farming and created a new class of citizen merchants. During the twentieth century it also enabled the Chao Phraya delta to become one of the great rice-producing and—exporting areas of the world.

It is important today to recognize that this early modernization was achieved not by encouraging road building, but by providing incentives to private developers to expand upon centuries-old water-based practices. By contrast, Bangkok's rapid urbanization and population boom since World War II has been predicated on new forms of building and land-based infrastructure at the expense of cultivated land and its former hydrological matrix.[12] In particular, the swift expansion of industry and suburban development in the late 1960s and 1970s caused the city to sprawl eastward into former paddy fields.[13]

Rapid urbanization seriously damaged greater Bangkok's canal network, which was quickly eclipsed as a means of transportation by paved roads.[14] Many canals were filled in for development or paved over as roads, while others became stagnant, non-navigable drainage ditches or sewers. Even though these changes created great hardship for remaining farmers, the ecological services provided by the older waterscape were not widely appreciated in the face of the demand for modern landscape-based urbanism.

Opposite top: Since 1950, road building has far out-paced the canal digging which was the dominant transportation infrastructure for the previous centuries of delta inhabitation (adapted from Sternstein 1982). The result is a two-level transportation network where the land-based infrastructure dominates and comprises the ability of the hydrological network to operate. In rainy season, the opposite is often the case as annual floods slow and stop traffic in much of Bangkok.

Opposite bottom: Active canal with waterfront shophouses on the urban fringe (left). Remnant drainage canal in a central commercial area (right).

Solid and Liquid Perceptions and Practices

Faced with seasonal monsoon rains and daily tidal fluctuations, greater Bangkok now faces the threat of catastrophic flooding each year. From May to October the combination of elevated river flow from the Chao Phraya basin and rapid local runoff often puts many sections of the city and its environs under water. And when a high tide slows the flow of the river, it is impossible to drain the city without the help of floodwalls and pumping stations. River flow, tidal surge, and sudden torrential rain have prompted some to refer to Bangkok as "the city of three waters."[15]

With the example of post-Katrina New Orleans in mind, the question Bangkok faces is, which form of urbanism can better equip it to confront the uncertainty of climate change: solid or liquid? Our analysis, presented in the accompanying table, suggests that a liquid perception will provide a better basis for resilience and adaptation than hard solutions based on protective engineered systems. It will ultimately be futile for the city to fill in lowlands and refuse to adjust to changes of water level. Being part of the water and adjusting to its fluctuations provides a more reasonable approach.

Solid Perception	Liquid Perception
Rigid flood-protection structures inhibit the natural flow of water.	Flexible and open traditional structures allow the natural flow of water.
Life behind flood barriers is ecologically static and stagnant. Manmade structures separate daily life from the dynamics of water flow.	Cultural and social life is tied to the dynamics of water. Social and economic patterns are adjusted to it.
Resists any change of water level or quantity.	Resilience and adaptation evolve through time with the seasonal level change of water.
Incoherence between land and water.	Coherence between land and water.
Water is a hazard that needs to be eliminated/mitigated.	Water is a part of vulnerability and it is manageable.
Disjointed—separation among land-water-human.	Joined, linked, connected land-water-human.

It is important to recognize that such a view does not imply a return to a premodern, locally controlled model—only restoration of a functioning canal network and hydrological matrix. Dynamic local flow management using locks and adjustable check dams and water gates can interact with a system of small polders to create an effective system of watershed management.

According to this model, not all parts of the city would need to be transformed; it would be necessary to maintain or restore waterscape or waterscape urbanism only in existing lowlands and canalways. Therefore, certain areas of the city could be flooded periodically, in areas where housing would continue to be built, but on raised platforms rather than landfill. This change would allow space both for overflow during the wet season and water storage during the dry season. As in the BES example, water-catchment mapping, monitoring, and modeling can build a new perception of the city as a waterscape rather than a landscape.

By contrast, contemporary landscape urbanism, which relies on solid-state perception, will never work in Bangkok. Combined with the effects of climate change, the amount of rainfall the city receives in short periods, the amount of water that flows through it from upriver areas of the Chao Phraya basin, and the effect of high tides will eventually overwhelm any rigid, engineered defense the city may erect.

A Radical Shift

Rapid climate change will further complicate the already complex relationship between Bangkok and the ecosystem of the lower Chao Phraya delta. Predictions for Bangkok's near future include more hot days, longer summers, higher rain intensity, more rainwater, and sea-level rise.[16] These effects will compound existing problems such as an increasing urban heat-island effect, flooding during the rainy season, drought during the dry season, loss of land due to coastal erosion, and land subsidence due to groundwater withdrawal.

The delta and the city will continue to threaten each other if natural hydrological processes are not respected and if the lessons of older, indigenous ways of living in concert with the cycle of seasons are ignored. As older forms of waterscape urbanism continue to vanish and new forms of landscape urbanism come to dominate popular images of inhabitation, the perception of natural processes will continue to change, causing further dislocation between expectation and reality.

We suggest a radical shift of emphasis in greater Bangkok away from a "solid-state" view of landscape urbanism. As a new model for urban design, waterscape urbanism could be combined with the concept of liquid perception and ecological monitoring to promote a more resilient urban ecosystem in the long-term.

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All photos are by the authors unless otherwise noted.

Above: A comparison between solid-state perception and liquid-state perception in Thailand. The house on the left was raised on a platform of rubble and soil to provide a defense against high water, but this stability is illusory, and would be self-defeating as a general policy. By contrast, the house on the right has been adapted for changing water levels by allowing natural flow and providing space for temporary high water volumes. While the house on the left is braced for flood, it creates a new environment, land-scape instead of water-scape. There is always vulnerability and risk in relation to water in the Chao Phraya delta, but excess water is manageable as a part of life in the house on the right.

Casualties of Climate Change: Identity and Livelihood in California's Central Valley

Virginia Matzek and Peter Kareiva



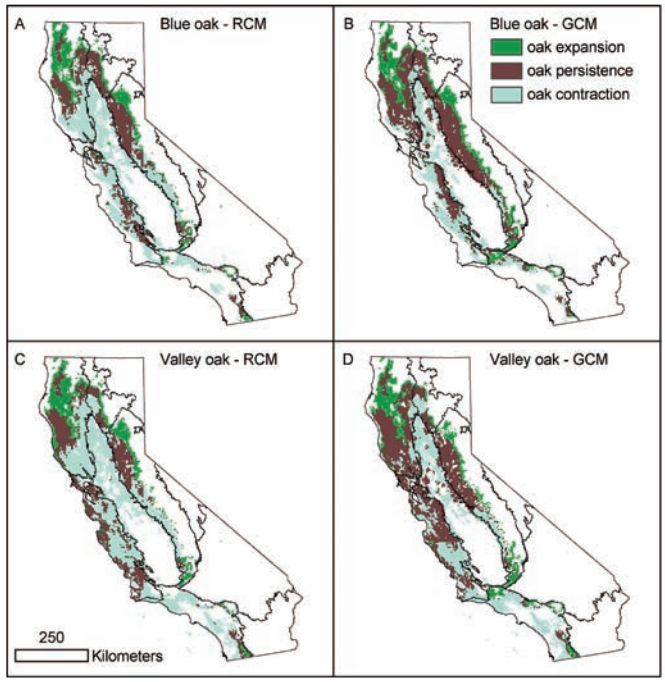
Oakdale, California, is a small city of eighteen thousand people in the vast flatlands of California's Central Valley. Its economy is mostly agricultural—almond and peach orchards, dairies, and row crops; and it is the kickoff point for the spring rodeo circuit. Like many Central Valley towns, its parks and riverbanks are also dotted with majestic oaks. As tall as a hundred feet, with trunks wider than the span of a man's arms and branches spreading to a crown 150 feet wide, valley oaks (*Quercus lobata*) frequently provide what appears to be the Central Valley's only topography. Blue oaks (*Quercus douglasii*) shade streets and riverbanks with their distinctive blue-tinged foliage. Though much of their habitat has been destroyed by the plow, remnant oaks are still seen in some fields, where tractor furrows detour around them, presumably because the farmers have been unable to bring themselves to destroy such beautiful specimens.

On a hot day in the Central Valley, when the air is still and every living thing seems to be seeking either shade or air-conditioning, it is easy to imagine Oakdale's founders choosing a town site beneath the spreading oaks, and gratefully making the town their namesake. City fathers of a later era, like those in many other California cities named for oaks (Oakland, Thousand Oaks, Live Oak, and Paso Robles, to name only a few), made the image of an oak the city's official seal.

Above: Oaks dot a foothill behind almond orchards outside Oakdale. Photo by Virginia Matzek

But the oaks' days in Oakdale may be numbered. A team of University of California, Santa Cruz, scientists recently reported that climate change threatens the continued persistence of blue oak and valley oak in the Central Valley.[1] The researchers mapped several factors expected to limit the distribution of the two oak species, including soil characteristics and climate variables like temperature and summer rainfall. Then, using a fine-scale regional model, they applied future climate scenarios to predict how the mapped variables would change. They found that by the end of this century, the total area suitable for blue and valley oaks in California is likely to shrink by more than 40 percent.

The trees can survive in the Central Valley because its deep clayey soils hold just enough water for them to survive the hot, dry summers. With climate change, though, even hotter and drier summers are on the horizon, and the area range of the two species is expected to shift almost entirely out of the Central Valley, toward moister coastal regions. In the future, valley oaks may be nearly absent from the Central Valley, and Oakdale could be oak-free—along with the towns of Oak Grove, Fair Oaks, and Live Oak.



Homeless Species, Nameless Places

California oaks are already under threat from a number of directions: by disease[2]; by land-use change[3]; and, in the case of valley oak and blue oak, by a puzzling failure to produce new seedlings and saplings.[4] On top of these stress factors, a rapidly shifting habitat is not good news, especially for a species that disperses slowly (an acorn is much less mobile than, say, a coyote). In California, urbanization and agriculture are also certain to throw up significant barriers to the migration of oak woodlands to moister areas of the state. Because these manmade barriers were not included in the U.C. Santa Cruz map analysis, the shrinkage in total oak range will certainly be more than 40 percent.

Prior to climate change, those who loved oaks (or any other endangered plant or animal) could establish parks and nature reserves for them. Sadly, climate change will play a cruel joke on these plans, too. The same climate model that signals trouble for Central Valley oaks also shows that half of California's current oak preserves will no longer be suitable as habitat by 2100.

The oak story—rising temperatures and altered ranges—has been echoed in numerous scientific reports on other species: Mexican butterflies[5]; Eastern U.S. trees[6]; Pacific Northwest Chinook salmon[7]; European birds[8]; and Argentine ants.[9] Several of these analyses describe species running out of places to live. Either suitable climate will no longer overlap protected areas and the species cannot move to new homes fast enough or there is simply nowhere else to go. For example, on the island of Hawaii, native birds thrive in cool, high-elevation forests because they can escape mosquitoes carrying deadly avian malaria. If Earth's temperature rises two degrees Celsius, mosquitoes will breed at higher elevations, and Hawai'i will run out of mountaintop refuges.[10]

More symbolically, Oakdale is also not the only place that could lose the basis for its name. Al Gore has referred to Glacier National Park, which has seen its glaciers shrink in area by one-third since 1850, as the Park Formerly Known as Glacier.[11] Likewise, Gulf Islands National Seashore could lose 40 percent of its namesake islands, as storm intensity increases and sea levels rise.[12] And Joshua trees are expected to entirely vanish from Joshua Tree National Park.[13]

Just as suburban sprawl has turned hills and dales and forests and glens into housing tracts called Hillsdale or Forest Glen, climate change will make memorials out of many of our place names.

Identity and Livelihood

What will it mean to Oakdale, and to Central Valley towns like it, to lose their oak trees? An anachronistic town name might not matter much in the long run, especially since no one these days expects much in ecological terms from a place named the Valley Oak Shopping Center. Because oaks are long-lived, and some established individual trees will likely persist for decades despite climate change, Central Valley towns will probably be spared the sudden fate of cities from New Haven to Minneapolis when Dutch elm disease laid waste to their street trees. The disappearance of oaks may be subtle and slow, outpaced by rapid urbanization and other forces of change. And, of course, the inhabitants of Oakdale—unlike their Native American predecessors, the Miwok, whose diet was based around the acorn—don't *use* oaks for much. Shade, yes; firewood, sometimes; beauty, undeniably; but other species may replace all these functions.

Oakdale and other towns in the Central Valley will be less able, though, to ignore some of the other profound

Above: Maps showing expected shifts in the range of blue oak and valley oak in California due to climate change. Effects are more dramatic in the regional model (RCM) than the global model (GCM), but in both cases the Central Valley becomes almost devoid of the two species by the end of the century. Map images copyright 2005, National Academy of Sciences.

impacts of climate disruption. Models that consider critical ecological processes suggest that Oakdale stands to lose considerably more than just the tree on the town logo. Indeed, the same warming trends that threaten the persistence of oaks may hit the people of the Central Valley squarely in the pocketbook, disrupting livelihoods that are dependent on cool temperatures and a stable supply of meltwater from the Sierra Nevada range.

The term "ecosystem services" describes the way that the natural functioning of intact ecosystems provides valuable free services that we would otherwise have to pay for. Everyone is familiar with the idea that we can extract *goods* from natural ecosystems: timber, food, fiber, clean water, etc. But intact ecosystems also provide *services* like pest control, pollination, erosion control, and nutrient cycling. For example, when bats eat mosquitoes, they offset some of our need to spray pesticides on wetlands or pay for medical treatment of mosquito-borne diseases. These offset costs can be measured, indicating how expensive species extinction or habitat degradation can be.

For Central Valley agricultural towns like Oakdale, the principal ecosystem service loss may come in the form of a diminished Sierra Nevada snowpack. In California, most precipitation falls in the winter, and a complex system of reservoirs and aqueducts collects, stores, and distributes it for summer usage. Some reservoirs are kept partly empty in winter to capture overflowing storm waters and prevent flooding at lower elevations; in summer, they are allowed to fill to capacity as they receive melting snow, storing the maximum amount of water for irrigation and drinking. Historically, these two goals—flood control and water storage—could be met simultaneously. As the climate warms and the snowpack melts earlier, they will increasingly be at odds with each other.

Projecting climate change impacts on water is difficult, because attempts must not only account for the uncertainty around future climate scenarios, but also the complexity of surface and groundwater hydrology and a byzantine system of water rights.[14] Scientists are confident that more precipitation will fall as rain and less as snow, and that warm rainstorms will begin falling in winter, melting the snowpack earlier than usual. The greater the flooding risk from these warm storms, the more space needs to be left in reservoirs as flood insurance, which will create water scarcity during the summers. This scarcity is predicted at the same time that agricultural and municipal users must accommodate an increasing population and hotter irrigation seasons.

Decreases in snowpack and resulting water flows will hurt a community like Oakdale in more ways than one. After agriculture, tourism is the town's second-biggest industry. River rafting and water sports are an important component of summer revenues, and skiers driving toward Badger Pass and Dodge Ridge provide a major source of winter income. One projection of climate-change impacts on the California ski industry has predicted that by the end of this century at the latest, the ski season will be shorter by two to three months and open three to four weeks later, potentially missing the lucrative Christmas holiday season.[15]

Regardless of what happens to water, warmer temperatures alone also have potential to hurt the economy. For example, milk is the most important agricultural commodity in Stanislaus County, where Oakdale sits, with a value of about half a billion dollars annually.[16] Studies indicate that for every degree rise above thirty-two degrees centigrade, a Holstein cow's daily milk output declines by more than a liter. Assuming that measurable declines in production start at 25 degrees centigrade and that statewide trends are typical, local dairies should expect to see a 7 to 22 percent decrease in milk output in the coming century.

Oakdale's almonds, peaches, and apricots also need cold weather. Like many other orchard crops, they require a certain number of winter "chilling hours"—prolonged periods when the temperature drops below forty-five degrees Fahrenheit and the trees go dormant—in order to blossom and set fruit in the spring. At present, the Central Valley's mild climate is sufficiently chilled by winter fog to meet this requirement. But climate projections suggest that by the end of the century, Central Valley orchards may experience as little as five hundred hours of winter chill, a figure at or below the required threshold for many lucrative tree crops.[17]

Responding to Climate Change

Oakdale is pretty typical of rural Central Valley towns, and about a million other Californians live in places like it. In fact, what makes Oakdale a good example of the impact of climate change is not its uniqueness but its ordinariness. What happens to Oakdale will, in large part, happen to other places, too.

But it is also essential to point out that the impacts predicted here are by no means inevitabilities. For one thing, although all of the models agree that warming will continue in the Central Valley, they differ in their predictions about the speed and magnitude of climate change. More important, the predictions presume that we do nothing to plan for them.

In addition to weaning society off fossil fuels, our best defense against climate change may be a good offense. This

will mean taking a hard look at the places that we design, manage, and protect, from drinking water reservoirs to nature reserves, to see if they will meet the test of climate change. Some strategies that will be necessary are:

Providing migration corridors by purchasing land outright or buying conservation easements and making sure escape routes for species are not entirely blocked by dense housing projects.

Implementing restoration projects for degraded agricultural lands in suitable climate zones to provide new habitat for species pushed out by climate change.

Designing buildings and systems that can cope with warmer, drier climate trends with efficiency and innovation (drip irrigation, solar-power-cooled dairies, low-chill varieties of orchard crops, etc.).

Incorporating into public planning—and public discourse—an understanding of how climate change will affect ecosystem services, the natural life-support system that economies and human well-being depend on.

Another hopeful sign is that many organizations have stopped waiting for guidance and started providing it. The Nature Conservancy, for one, has initiated fine-scale ecological studies in New Mexico to identify conservation sites expected to be most vulnerable to climate change. And in California it has acquired forestlands in the Garcia River area to be used to sequester atmospheric carbon dioxide.

Government is also getting involved. In California several agencies are now required to report on climate change impacts, and a bill currently in the state legislature would require climate change and greenhouse gas impacts to be considered in feasibility studies for water resources. And at the federal level, the EPA has released a report to Congress that identifies "adaptation strategies" for vulnerable ecosystems.[18] One proven strategy it mentions is to reduce other forms of stress on ecosystems (such as pollution) to enhance the ability of species to adapt to climate stress. The EPA report even offered the optimistic note that climate change may lead federal agencies to cooperate in unprecedented ways, with many side benefits.

We have seen that the urgency of climate change is encouraging partnerships between scientists and policymakers to plan for, mitigate, reduce, and cope with the effects of climate change. It might not be enough to keep the oaks in Oakdale, but perhaps it can help the people who remain once they are gone.

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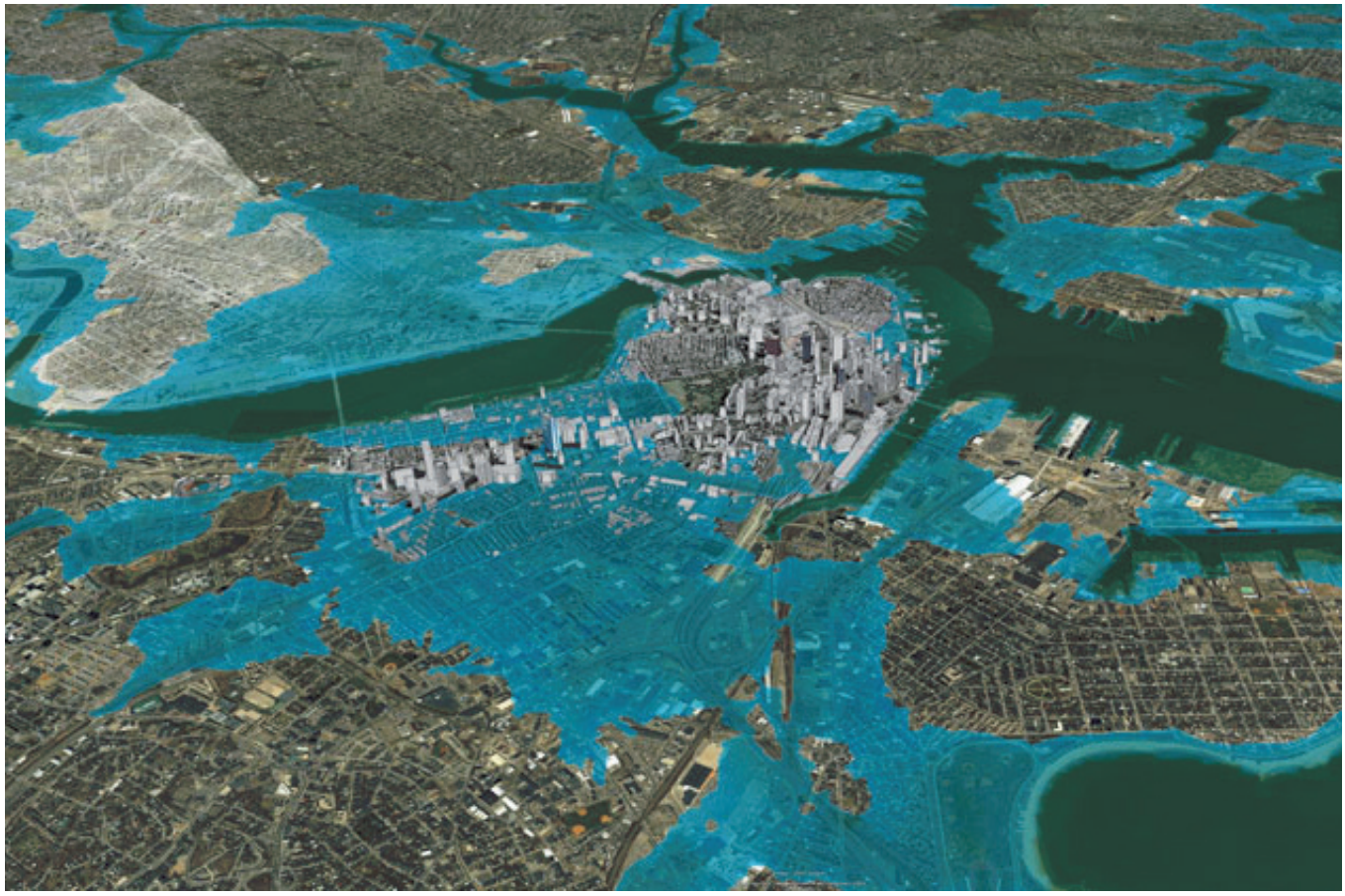
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Climate Change and Place

Nancy Rottle and Marina Alberti



Climate change has been called the defining issue of the twenty-first century, and it is undoubtedly one of the supreme challenges for environmental designers. A multitude of scientific studies now report that its disruptive effects will be felt worldwide in terms of both dramatic weather events and more gradual shifts in rainfall, temperature, and species habitat.

Most acute among its effects—already tragically felt in some places—will be the displacement of human communities by more frequent and intense storms and prolonged droughts. But gradual shifts will also be powerful agents of social change. Rising sea levels may flood coastal settlements and infrastructure; water shortages and higher temperatures will endanger agriculture and public health.

As populations are displaced, global economic and political destabilization may result, catapulting environmental concern from a perceived luxury of the rich to a vital concern for all. The impacts of climate change will be felt everywhere: by those inland and on the coasts, in urban as well as rural areas, and in the developed and developing worlds. But it will be the poorest populations, in both rural and urban areas, who will be most at risk. This disparity raises important concerns for social equity and responsibility, because the effects of climate change have been largely brought about by the greenhouse gas-emitting actions of wealthy nations.

What responsibility does the developed world have to the developing world? How might planners and designers help address this inequity?

The effects of climate change will also be felt soonest at the extremes and on the edges. In the far northern and southern latitudes dramatically warmer winter temperatures are already melting glaciers and ice sheets. In Earth's driest and wettest regions, changes in precipitation are altering conditions of survival for sensitive species. And at higher elevations rare, endemic species are being threatened with extinction.

Historic patterns and practices are no longer reli-

The Scientific Consensus

Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level. And most of the warming is very likely due to anthropogenic emissions of greenhouse gases.

— IPCC, 2007

The Intergovernmental Panel on Climate Change (IPCC) provides a powerful synthesis of research on both current and long-term climate changes. The following are some findings from its recent report AR4 WG I SPM 2007.

Scientists agree that greenhouse gas emissions will continue to increase over the next few decades. The temperature, too, will increase, in the next two decades at about two-tenths of a degree centigrade per decade, with expected higher than average warming in North America. Even if concentrations of greenhouse gases were maintained constant at year-2000 levels, a further warming of about one-tenth of a degree centigrade per decade would be expected because of carbon dioxide that will remain in the atmosphere.

Sea level has been estimated to rise between 0.59 and 1.8 meters depending on various emission scenarios. These, however, exclude uncertain climate-carbon cycle feedbacks and the effects of rapid changes in ice-sheet flows. Average mean precipitation is very likely to increase in high latitudes and likely to decrease in most subtropical land regions. Snow cover is also expected to contract. Climate extremes, particularly high temperatures, heat waves, and heavy precipitation events, are expected to increase. Tropical cyclone intensity is also expected to increase.

Climate changes are expected to affect environmental and human health in different ways. Major effects on ecosystems include species extinctions and increasing species range shifts and wildfire. Climate changes will also affect water availability and deprive hundreds of millions of people of water. Food security will also be threatened because of reduced yields and damage to crops.

Significant changes to coastal cities and communities are expected as a result of increasing floods and storms. Losses of land, buildings, and infrastructure due to sea level rise are also expected to disrupt the activities of city residents. Human health will be further affected by malnutrition; by diarrheal, cardio-respiratory, and infectious diseases; and by increased morbidity and mortality caused by heat waves, floods, and droughts.

able informants of possible remedies. Permanent loss of species—predicted to be 20 to 30 percent worldwide, at an accelerated rate far exceeding the norm during Earth's history—will remove potential resources for human benefit and erase organisms that have taken millions of years to evolve. Within human societies, these same organisms are often crucial to establishing place-identity, through either their rarity or commonness.

Challenge and Opportunity

A new challenge is presenting itself to environmental designers. Our professions are predicated on being able to control to a certain extent the shape and nature of future environments. How do we respond to a course of change that, we are told, is past the point of control? And yet, precisely because we have developed the skills and awareness to envision the future, we may be in the best position to offer solutions. How do we cope with this new set of problems, still largely invisible?

The emerging responses—mitigation through reducing emissions of greenhouse gases and adaptation to minimize effects on human settlements—call for planners and designers to lead the scientific and policy communities toward solutions that avoid the worst-impact scenarios.

Most research and practice so far has focused on developing mitigation strategies. A range of initiatives, from the scale of individual buildings to regions, have been proposed (and some undertaken) to reduce the human carbon footprint. But it is also clear that even if greenhouse gas emissions were to be maintained at year-2000 levels, the climate would continue to change because of lag effects related to slow changes in ocean temperature. Adaptation to changes in temperature, sea level, precipitation, and the frequency of extreme weather events will be inevitable, and

Opposite: Computer rendering of the effect of a three-meter rise in sea level on Boston and surrounding cities. Image courtesy of Architecture 2030.



will require creative solutions and new approaches.

Climate change is simultaneously a challenge and an opportunity for designers and planners. It demands that we abandon the old equilibrium paradigm—the assumption that, after perturbations, the system will eventually return to a steady state. And it challenges our disciplines to understand that urban environments are multi-equilibria systems. What are the implications of designing structures and formulating policies with such an awareness?

Designers and planners will need to fully acknowledge that environmental variability and uncertainty are intrinsic, and cannot be eliminated without driving the system to collapse. Designing for uncertainty requires a paradigm shift and calls for new principles. It requires appreciation that design and construction are only part of what drives our sense of built function and performance. Both these qualities emerge as the result of interaction between structures and natural processes. What role then will designers and planners need to play?

Multiple Perspectives

Envisioning Radical Futures. The severity of climate-change impacts are sure to mandate profound changes to design thinking. The first group of articles in this theme section of *Places* imagines bold changes in to respond to future conditions. First, Guy Nordenson's Latrobe Prize team considers the problems of rising water around New York. To address storm surge, the team proposes replacing the hardened coastal structures of the New York-New Jersey Upper Bay with soft, resilient shorelines, changing its underlying bathymetrics and creating protective island archipelagos. Next, Architectural Research Office's prize-winning proposal offers a typological response to an anticipated 36-inch rise in the waters around Manhattan by the end of the century based on a new infrastructure of "vanes" and water-circulation towers. A third article, by Kiel Moe, steps back to discuss how contemporary fictional narratives present scenarios of post-Risk Societies, and suggests that we adopt a philosophy of radical engagement.

Adaptation, Mitigation, and Uncertainty. To stem the severity of impacts, it will be necessary to arrive at solutions and advance ways to build that will reduce greenhouse gas emissions in the short term. The shaping of metropolitan regions will be key, with overall population impacts and carbon footprints typically smaller in dense cities. But, cities may be where climate change impacts are felt most dramatically—through heat-island effects, coastal flooding, and food and water shortages. Cities will need to be more socially and physically resilient, better able to survive hotter, wetter, and colder weather, and better equipped to provide adequate supplies of food and water.

Cities, and the places within them, are also part of larger patterns, and we must strive to create distributed infrastructures that solve multiple problems simultaneously. Might we also be able to build in ways that go even further to regenerate natural systems and resources?

The second group of articles discusses adaptive urban planning and design solutions. Cynthia Girling documents the case of a dense Vancouver community planned to be carbon neutral within five years. Taking into account the importance of vegetation to community and individual sense of place, the ecologist and landscape architect Mary Carol Hunter offers detailed guidelines for resilient plant palettes. Using Bangkok as an example of low-lying cities worldwide, Danai Thaitakoo and Brian McGrath propose a shift of perception that embraces new forms of water-based urbanism. Finally, the award-winning project by Chicago Urban Lab illustrates a multifunctional, regenerative approach to "growing water" in Chicago through urban green infrastructure.

Loss of Cherished Places. The sense of public and private loss caused by climate change is already upon us.

The third set of articles expresses manifestations of this dismay, particularly in terms of endemic, defining qualities of place. David Myers reflects upon change in his home state, Maryland, as evident at its margins in changes to the treasured natural environments that help define a common middle. Virginia Matzek and Peter Kareiva make a similar point in their article about the impact of climate change on Central California's majestic oaks, whose loss signals profound changes in the identity of and livelihoods in com-

munities there. In another study, Ray Green documents the perceptions of residents in settlements along the Great Ocean Road in southern Australia, where change from rising sea levels is compounded by the tide of inappropriate development.

Calls to Action. A sense of urgency is beginning to enter design discourse, but a further upwelling of awareness, concern, and creativity will be needed to frame a new era of policy, planning, and design. Existing initiatives include the commitments of more than eight hundred U.S. mayors, who have signed the Mayors' Climate Agreement; Ed Mazria and Architecture 2030's "2010 Imperative" and "2030 Challenge"; the U.S. Green Building Council's "Living Building and Living Infrastructure Challenge"; and the Brookings Institution's mandate for federal policy in support of compact communities, transit choices, and location-efficient decisions. Al Gore has proposed that the United States convert to 100 percent carbon-free fuels in the next decade, a challenge he equates to landing a human on the moon.

In the fourth section we augment these appeals. The first article, by David Matthews, is a fictional retrospect praising the future actions of Seattle residents. Harrison Fraker then reports on a recent workshop of scientists, which called for mobilization of national resources on a scale not seen since World War II, and he appeals for designers to adopt a new whole-systems approach and support ACSA's proposal for a National Academy for Environmental Planning and Design. In Britain, the Commission on Architecture and the Built Environment is working with municipalities to strengthen the mandate for climate-responsive planning, and Paula Vandergert reports on the first of a series of climate-change festivals, which took place this past summer.

The section concludes with a more sober presentation of climate-related disaster planning and reconstruction, by Pablo Suarez and several other representatives of humanitarian agencies. They offer a set of principles and opportunities for planners and designers to collaborate with service organizations to reduce the heart-wrenching consequences of the carbon society's destabilization of the the global climate.

Sharpening the Debate

A common emotional response to climate change might be one of helplessness—despair over the inevitable loss of cherished places and environments, coupled with a sense of bewilderment: what can we, as design and planning practitioners, do? With climate-change scientists continually revising their estimates of impacts upward, can we make a difference? Can we stave off such crises as the inundation of low-lying cities? What will it take to cope and adapt?



Currently, uncertainty permeates our thinking and sets our heads spinning. Without a body of literature to inform interventions, let alone serve as a basis for testing and evaluating them—or offer some sense of future processes or conditions—we will have difficulty proceeding with confidence. How do we work in the space between predictability and uncertainty? How might we be guided to respond to the idiosyncrasies of places and the climate impacts particular to them, so that their richness and diversity will be perpetuated rather than diluted?

We hope the views expressed here will establish a forum for continued discourse on these issues. We hope they will shape a clearer perspective and lead to principles that provide firmer ground for the design community as we engage this era-defining challenge.

Opposite: As Pablo Suarez and his fellow contributors report, adaptive strategies to climate change may require only imagination. For example, some Bangladeshi women have adopted a simple, clever way to deal with the death of poultry from the increased frequency of flooding: replace chickens with ducks. Photo by Angie Dazé/CARE.
Above: As Virginia Matzek and Peter Kareiva report, the oaks that provide relief in the flat, agricultural valleys of central California are doomed in current climate change scenarios. Photo by Virginia Matzek.

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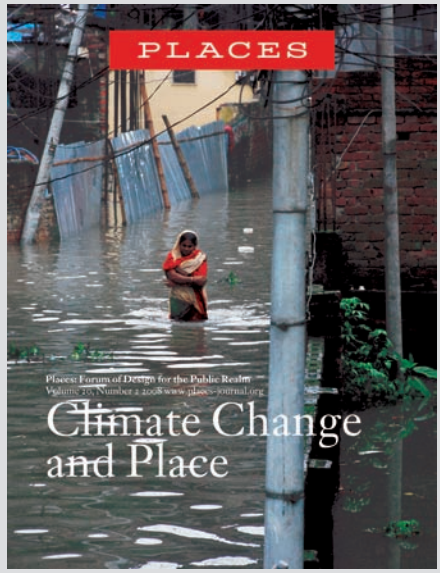
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On the Covers

Front cover: Flooding as a result of the increased intensity of tropical cyclones and sea level rise presents a hazard to low-lying Asian cities such as Dhaka, Bangladesh. What responsibilities do designers and planners have to address such issues, which are at least partially the result of patterns of energy consumption in the developed world? Photo by Sumaiya Ahmed.

Back cover: Diagrams showing proposed new eco-boulevards in Chicago as strips of a new urban DNA designed to promote a healthier environment. Each color and shape corresponds to a future land use related to the ecological recycling of water. For a blow-up of uses along a typical DNA strip see image on p.41. Image by Urban Lab.

Place Character and Climate Change along Australia's Great Ocean Road

Ray Green

The pace of physical change in Australian coastal towns has increased dramatically in the last decade, particularly near the major metropolitan centers of Sydney, Melbourne, Brisbane, and Perth. This increase can be attributed primarily to what, in Australia, has been termed the "sea change phenomenon"—a migration of urbanites to small coastal communities in search of a relaxed lifestyle in natural and scenic surroundings.[1] One unfortunate consequence of this migration, however, has been a perceived loss of distinctive place character.[2] Local residents and visitors alike now consider these towns and their surroundings at risk of transformation toward global uniformity.[3]

In many instances in these settings, the same features instrumental to place character are vulnerable to climate change. Low-lying areas may be inundated; existing coastal infrastructure, such as piers, may be damaged; and natural habitat may be disturbed, leading to loss of biodiversity.[4] A range of interventions will be needed to counter these effects. Among these, hardscape elements, such as dykes and levees, may help protect against coastal flooding. Softscape initiatives may include the creation of low-lying parklands, the preservation of wetlands, and the stabilization of soils through revegetation.

This article argues that in adapting coastal towns to climate change, features integral to expressions of place—already threatened by increased development—will require special consideration. But this will require a better understanding of cognitive and affective links between the population and local landscape features so that attempts can be made to maintain the most significant of them. Such an action paradigm will demand greater involvement by local residents. Future design and development decisions should not be based solely on professional opinion.

Studies along the Great Ocean Road

The research discussed here derives from an extensive project undertaken to document community perceptions of place along Australia's Great Ocean Road.[5] The road, in the state of Victoria, winds its way along 250 kilometers of highly scenic and biologically diverse coastline. It also connects a number of small communities—Torquay, Anglesea, Aireys Inlet, Lorne, Apollo Bay, Port Campbell, and Port Fairy—all of which have recently experienced influxes of so-called "sea changers." Residents of these communities, both long-term and newly arrived, are already complaining that this migration has caused "inappropriate development" that is degrading the local environment. Objectionable impacts include new structures that are incompatible with existing town character and the loss of valued landscape features.

The initial basis of this study was a questionnaire administered by mail in 2004 and 2005 to every household in each of seven Great Ocean Road towns. These towns range in population from as few as 260 (Port Campbell) to as many as 8,000 (Torquay). The questionnaire asked residents of these communities to identify on a map the features and places they felt most strongly conveyed desirable expressions of local character, and to indicate vantage points from which photographs of them could be taken.

The study team then photographed the most frequently identified features from the suggested viewpoints and used these images as stimuli in a series of community photo-rating workshops. In total, 1,344 completed questionnaires were collected, and 324 people participated in the workshops. Participants were asked to rate the compatibility of the depicted features with local character using a seven-point scale. Following the workshops, aggregate mean ratings and standard-deviation values were calculated for each of the depicted features and places, values that allowed an assessment of their degree of perceived compatibility with local character.

Participant groups for both the surveys and the photo-rating workshops were broadly representative of the towns studied. In terms of gender mix and age, the groups reflected community composition as determined by comparison with 2001 census data—with the exception that fewer young people responded. Participants also varied in terms of the length of time they had lived in the towns, but this too was reflective of the general community profile.

Overall, the study found a high degree of consensus with respect to environmental assessment in the towns. Slight variations were found in the responses of participants who had grown up in urban environments versus rural areas, and between those who had lived longer in the towns versus newer arrivals. Those who had a rural background or had lived in the towns longer were somewhat more critical of "out-of-character" features than newer residents and those who had an urban background. Otherwise, the direction of assessment was remarkably consistent.

Generally, features that were rated highest for compatibility with local character were associated with a range of specific physical attributes. For example, smaller houses that had a moderate degree of surface articulation or were screened by indigenous vegetation, regardless of their age, were rated as more compatible with local character than large houses that lacked surface articulation, were boxy in appearance, and/or were not screened by vegetation.









Responding to Climate Change

The second part of the study involved examining the highest-rated place-compatibility features in terms of vulnerability to climate change. Rising sea levels were used as the assessment criterion, assuming an 80 mm rise or greater by the year 2100.[6] A number of highly compatible features were found to be particularly vulnerable to the threat of rising sea levels and storm surges.

Wetlands were one feature that immediately stood out. Local perceptions indicated that wetland conservation will be particularly important to retaining place character. But wetlands are also valuable for their ability to absorb floodwaters, and they are extremely important in terms of biodiversity. Despite the value of these fragile environments, however, wetlands are poorly protected by planning authorities in Australia. As coastal land for development becomes increasingly scarce, they are continually being encroached upon.[7]

A prime example from the town of Apollo Bay is a proposal to build 537 houses, an eighteen-hole golf course, and a conference center on a wetland area at the mouth of the town's main river.[8] Local perceptions identified this area as strongly supportive of local character; it may also provide a valuable barrier to storm surges and rising seas. Yet, despite

Top left: The ability of wetlands to absorb stormwater will be critical to mitigating the impacts of climate change. This one, in the town of Port Fairy, provides habitat for a variety of birds, which were also found to contribute to place character.
Top right: The top of this dune at Port Fairy was leveled so that new houses would have ocean views. Boulders have had to be placed at the base to stop erosion; such impacts will only be exacerbated by climate change.
Bottom left: Wetland site of a proposed development for 537 houses, an eighteen-hole golf course, and a conference center at the mouth of the Braham River in Apollo Bay.
Bottom right: This sand dune at Port Fairy has been left in a natural state. This scene was rated as highly compatible with the town's character.





broad opposition by both new and long-term residents, this development may be granted planning approval. Such unsustainable land use needs to be prevented, and where development has already occurred in such areas, adaptive solutions should be considered. Among these may be retrofitting existing structures (e.g., raising them above predicted water levels), relocating them, or abandoning them.

Sand dunes were another natural feature rated highly in terms of place character, and with regard to which land-uses are frequently unsustainable. In particular, new residences are being built on top of coastal dunes, as in the town of Port Fairy. The motivation, of course, is to obtain views of the sea, but in the process the dunes are frequently leveled and their vegetation disturbed. In the future, intact dune systems may provide important protection to coastal communities as they face rising seas and more intense and frequent storm surges. The study also determined that certain geologic features are of great importance to local perceptions of place. Notable among these were the dramatic coastal rock formations at Port Campbell. Such outcrops are continually changed by the force of the sea, and these changes will certainly accelerate in the face of rising seas and more intense and frequent storms. It is unlikely any action can be taken to protect their present form.

Another important geological feature identified by the survey was Henty Reef in the town of Apollo Bay. The reef, which presently hosts a colony of fur seals, will likely be submerged by rising seas, which will in turn lead to the loss of a significant contributor to place character. In this case one solution might be to construct an artificial reef at a higher elevation as the sea level rises. The appropriateness of such a management activity would need to be seriously considered. As an alteration of nature, it would need to be driven as much by concern for biotic habitat as by the desire to retain a valued attribute of place. In this case, the seals might be better off if they simply moved elsewhere. But such an action does represent the type of response to climate change that might be considered.

Action with regard to a range of manmade structures that were also ranked highly as contributors to place character may also be needed as sea level rises. The docks and boardwalks in the harbor at Port Fairy are one example. Sited where the town's principal river meets the sea, they were built only slightly above existing sea level. The docks and boardwalks can be rebuilt at a higher level, but the way this is done will be critical to community conceptualizations of place character. One approach might be to use similar forms and materials in their redesign.

Recently, a historic pier in the town of Lorne was torn down and rebuilt well above predicted sea-level rise. However, in this case no attempt was made to mirror the design attributes of the original, despite its being identified as important to town character. In Lorne, as in other coastal towns, an integral experience of place involves the darkness one sees looking out to sea at night. Unlike the old pier, the new Lorne pier features a strip of bright lights running its length, which give it the look and feel of an airport landing strip. Such an example gives a good sense of what should not be done in response to climate change.

Left: Dramatic coastal rock formations are integral to local perceptions of place in the small hamlet of Port Campbell. These formations are slowly crumbling into the sea. Although this erosion is natural, it will only be accelerated by rising sea levels and more intense and frequent storm surges.

Right: Sea level rise is likely to submerge Henty Reef and its seal colony at Apollo Bay, an important feature of the town's character.





The Challenge Ahead

As the impacts of climate change become more evident, the towns of Australia's Great Ocean Road will have to balance existing place-based community values against the pressure to accommodate an increasing population of migrants. Such conflict becomes most pronounced when it involves developers, many of them aiming to reap immediate economic gain through environmentally ill-considered projects and property speculation. Their projects frequently conflict with the desires of both longer-term and newer residents seeking to conserve valued local place character.

If such coastal towns are to be sustained as desirable places to live, key landscape features, integral to desirable expressions of place, need to be identified. Impacts of climate change then need to be anticipated so that appropriate planning and design can help preserve them at the same time they are protected from the ongoing impacts of 'sea change' migration.

Notes

1. Ian Burnley and Peter Murphy, *Sea Change: Movement from Metropolitan to Arcadian Australia* (Sydney: University of New South Wales Press, 2004).
2. See, in particular, the report by Nicole Gurran, Caroline Squires, and Ed Blakely, "Meeting the Sea Change Challenge: Best Practice Models of Local and Regional Planning for Sea Change Communities," National Sea Change Taskforce at the Planning Research Centre, The University of Sydney, 2005.
3. For past research and discussion of community perceptions of place character in Australian coastal towns, see Ray Green, "Form and Meaning in Community Perception of Town Character," *Journal of Environmental Psychology*, Vol. 19 (1999), pp. 311-31; and "Notions of Town Character: A Coastal Community Responds to Change," *Australian Planner*, Vol. 37, No. 2 (2000), pp. 76-86.
4. See the Victorian Coastal Strategy (The State of Victoria, Victorian Coastal Council, 2002).
5. The larger study provides the basis of a forthcoming book by the author, *Coastal Towns in Transition: Local Perceptions of Landscape Change* (Dortrect, The Netherlands: Springer, expected 2009). That project was funded through an Australian Research Council "Discovery" Grant (2003-2005).
6. Intergovernmental Panel on Climate Change, "Climate Change 2007: Impacts, Adaptation and Vulnerability: Working Group II Contribution to the Intergovernmental Panel on Climate Change," Brussels, IPCC, April 2007.
7. Natasha Vasey-Ellis, "Planning for Climate Change in Coastal Victoria," Master of Urban Planning Thesis, Faculty of Architecture, Building and Planning, The University of Melbourne, 2007.
8. Cited in a recent newspaper article by Royce Millar, "Erosion, Flooding…the High Price of Sea Views," (*The Melbourne Age*, February 16, 2008).

All photos are by the author.

Left: The docks and boardwalks at Port Fairy are likely to be submerged by sea level rise.
Right: The old pier at Lorne, identified by local residents as important to town character, before it was torn down and replaced.

Seattle 2220: Our Ancestors' Planning Legacy

David J. Matthews

The following essay reflects on Seattle's present and past. It was written by an architect living in the year 2220.

From my vantage, atop the newly restored, expanded Bell Harbor International Convention Center, I find it difficult to imagine that much of the activity and prosperity before me might not exist without the convictions and actions of past generations.

Early in the twenty-first century, as worldwide energy and drinking-water shortages and catastrophic weather events first crept into the news, the rising ocean seemed far from Seattle residents' minds. At the time, the city was confronting other climate change issues, especially greenhouse gas reductions. Largely on account of citizen interest, Seattle achieved carbon neutrality in 2050, twenty years later than its original 2030 target, but a decade before America's other then-largest cities. Perhaps it was pride in this accomplishment mixed with visionary thinking that spurred city leaders to plan for ever-rising seawater.

The decision did not come easily. Lengthy debate focused on prioritizing the city's needs and concerns. As the world's atmospheric carbon dioxide exceeded 500 parts per million, global average temperatures increased to four degrees above year-2000 levels. Despite advances in alternative fuels and energy sources, the world's remaining coal-fired power plants pumped out more than enough carbon dioxide to compensate. After summer pack ice first disappeared from the Arctic in 2009, and then permanently in 2020, scientists predicted that melting glaciers would eventually cause sea levels to rise higher and faster than earlier forecasts. The rate would eventually double, bringing an increase of nearly seven meters over year-2000 sea levels by 2200.

Across the United States cities took different approaches to the challenge. New Orleans elected to retreat, and its population was gradually evacuated and dispersed. Cities around the Chesapeake Bay mostly chose to raise ever-higher seawalls against storm surges. Like Seattle, San Francisco elected to stay and adapt; outside its old downtown, many of its neighborhoods remained above high-water lines.

The crisis has been global. Pacific islands have been inundated, and coastal cities everywhere have had to choose from the same list of options: defend, retreat, or adapt. In the early decades of the twenty-first century Seattle had to weigh its options: defend itself with seawalls that would periodically need to be raised; retreat to higher ground and let the ocean progressively reclaim low-lying neighborhoods; or adapt and devise ways to accept rising water as a challenge, not a catastrophe.

Opposite: Seattle's Pioneer Square in 2220. Image by studio/216.

Our Choices

In hindsight, it is clear how right the city's decision has been. A seawall would have had to be constructed above the waterfront, and then it would have had to be raised over time. The city's piers would also have had to be raised or abandoned. These steps presented cultural as well as technical problems. The waterfront was a significant place, a center of land and water-based activity; a seawall would have cut off views of it and severed the city's connection with Puget Sound.

One proposal envisioned broadening the seawall to include a public park and boulevard that would connect to the new piers. But this plan would have required millions of yards of fill. While it was being built, tourism dollars would have dwindled, and it would have meant demolishing many buildings in the Pioneer Square Historic District. Seattle also had to deal not only with Puget Sound but with the Duwamish River, a topological circumstance which prevented a simple ocean-barrier solution.

A progressive retreat from the water was likewise considered. But this implied reactionary planning, devalued properties, and costly emergency measures. Leaders correctly foresaw that this option would threaten insurance companies, public coffers, and the long-term viability of our commercial waterfront.

As debate dragged on, storms began flooding the shops and businesses along the city's piers, hastening calls for action. The sense of urgency was heightened when federal emergency-flood-assistance programs were terminated shortly before New Orleans was evacuated, and when state assistance disappeared after the first insurance crisis.

Some argued that the city could lose its economic base entirely, and should be evacuated before the losses proved catastrophic. However, supporters of adaptation countered that economic restructuring could be based on activities that would survive rising waters. Faced with so many cities retreating or evacuating entirely, Washington State also needed a viable urban center to support its economy.

Advocates further argued that adaptation presented an opportunity to plan with the ocean as a friend rather than an enemy. This was the path Seattle selected after much debate.



Sea Level Rise in Puget Sound

Greenhouse gas emissions are increasing. Atmospheric carbon dioxide levels are approximately 383 ppm and rising. If this level reaches 450 ppm or higher, as predicted, our planet's temperature could rise more than two or three degrees centigrade above preindustrial levels. Current research suggests this increase could create a global "tipping point" followed by cataclysmic climate change.

The use of coal-fired power plants worldwide will negate mitigation efforts designed to forestall or prevent the rise in carbon dioxide.[1] China alone, each week, currently produces emissions equivalent to the yearly output of two five-hundred-megawatt coal-fired power plants.[2] The ice on Greenland and Antarctica is melting at record rates because of a combination of forces including increased air temperatures, warmer sea water, and moulins and cracks that allow surface water to reach underlying rock, lubricating the advance of glaciers. If these mammoth glaciers reach the sea as large masses rather than through gradual melt, sudden sea-level rise is possible.[3]

Mitigation measures such as sustainable construction materials and alternative fuels will not prevent waters from rising. The Puget Sound region must plan now to avoid insurmountable impacts later. Proactive planning is under way for estuaries and other coastal habitats.[4] The regional discussion continues in scientific journals, waiting for consensus on the modeling methods to be used in assessing impacts to Puget Sound's developed coastal areas. I must echo Nicholas Stern: "The benefits of strong and early action far outweigh the economic costs of not acting."[5]

Our Accomplishment

We can be proud of the things we have done. The first may have been the decision, in 2020, to enact a program of zoning that moved setbacks and building heights back from the sea every twenty years. The strategy laid the groundwork for converting at-risk buildings into a series of terraces and parks connected by pedestrian bridges.

Eventually, officials rezoned every structure whose ground elevation was within twenty meters of the year-2000 sea level. Such forward thinking allowed owners of businesses and residences to adapt as properties changed hands, or to seek new locations away from the rising flood zone. Land conservancies and tax incentives offered further opportunities for threatened property owners to relocate to higher ground in return for new parklands. Gradually, it also produced today's stepped building forms that echo the city's hills.

Along the city's edge, in the later decades of the century, piers were converted to float like docks, rising on poles and connected by floating bridges to the landscaped terraces at the shore edge. City infrastructure for sewer, water, and power was also relocated concurrent with the demolition of the old viaduct. As a result of these measures, no reaction time was needed when the waters surged a full meter over the old seawall in 2100.

As water rose in the last century to a continuous level above the old wall and Alaska Way, it had minimal impact on the commercial area. In Pioneer Square, now flooded, businesses remain determined to maintain the historic district. Lower floors are sealed off when they become uninhabitable, and water and power are supplied from floating pedestrian bridges. Connected by bridges and small watercraft, the district's reinforced brick walls support the rooftop parks and restaurants we all enjoy, while the flooded levels have become fish habitat.

South Seattle, of course, has been a different story. Faced with the impossibility of building a seawall across the Duwamish basin, the river's banks had to be armored with dikes. The impact on adjoining residential and industrial areas was huge. Businesses largely evacuated to higher ground and better city access. But the area's residents are a resilient lot, and consider neighborhoods in the "Walled City" special on account of their large population of artists.

Outside the Duwamish dikes, Seattle's seaport has adapted to rising water with floating docks and cranes on adjustable stilts. The electric-powered trains that serve it run silently beneath the city, nearly parallel with the old Metro tunnel, and emerge onto a connecting causeway.

Mass transit has also adapted. In 2100 monorail service was extended to connect the city with its piers; it now brings tourists and services to the city's floating businesses. Pedestrian bridges, including the one beneath my feet, link the piers and monorail stations to the city's hills and downtown areas, creating the water-centric character that we have come to cherish.

None of this adaptation would have occurred without a fusion of foresight and investment. The business community can be credited with recognizing and responding early to the imperatives of climate change. Had they been reticent in accepting the city's adaptation strategy, we would be suffering the same fate as so many other coastal cities.

Instead, Seattle leads the nation in progressive coastal planning. From my vantage, I can look west to the spot where what was once known as Alki Beach lies submerged. Then I can look east and south to our glistening city and its landscaped and terraced waterfront park, an international symbol of coastal adaptation.

Notes

Editing credit to Meg Matthews, M.Phil., Cambridge University.

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Linking Science to Design

Harrison Fraker

Two recent meetings point the way to a more meaningful and focused collaboration on climate change issues between the fields of science and design. Entitled "Energy, Security and Climate: Resilient Pathways for a Non-Linear World," the first was a workshop at the Lawrence Livermore National Laboratory in California from March 31 to April 2. It was attended by leading climate scientists and energy experts whose conclusion was that the most recent report of the Intergovernmental Panel on Climate Change (IPCC) has underestimated the rate and extent of global climate change.

Attendees at the second meeting, at the National Building Museum in Washington, D.C., from July 10 to 11, were members of a steering committee of American planning and environmental-design professionals calling for a "national organization to leverage the expertise of the design and planning professions and institutions to address the impending catastrophic impacts of climate change."

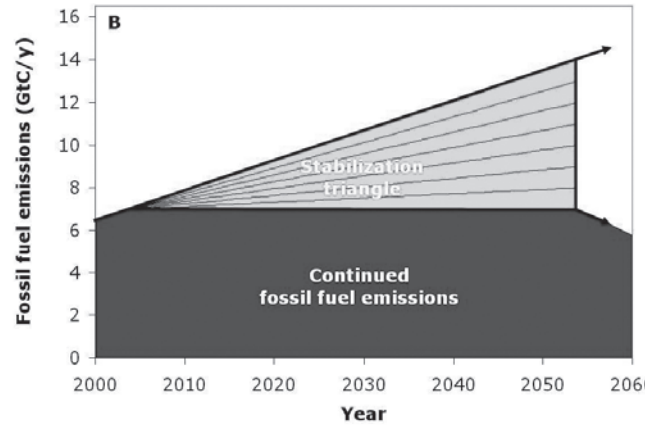
How Critical is the Situation?

The conclusions emerging from the Lawrence Livermore workshop were sobering. Attendees cited recent empirical observations indicating that climate change has accelerated: worldwide emissions of greenhouse gases (GHG) are growing 30 percent faster than predicted, the southern oceans are sequestering a smaller percentage of emissions, and terrestrial carbon-dioxide sequestration is slowing because of drought. As a result, carbon-dioxide concentrations in the atmosphere have increased even faster than emissions.

Attendees at the LLNL workshop further pointed to observed impacts, such as a dramatic decline in Arctic ice cover, an increasing number of severe weather events around the globe (tornados, cyclones, droughts, and floods), and rapidly retreating glaciers, all of which directly reflect this acceleration and add to concern. They argued that the new data suggest that the probability of extreme climate change effects has become much higher than previously thought, and that the consequences for human health, safety, security, and well-being may be dire.

Current scenarios for reducing greenhouse gas emissions—like the Pacala/Socolow "stabilization wedges" and the McKinsey "cost curve for greenhouse gas abatement"—assume a linear growth rate over decades, allowing fifty to one hundred years to stabilize emissions (at much higher levels than today).[1] But in a "nonlinear world" of critical thresholds these strategies may be too little, too late to avoid catastrophic climate impacts.

In response to this newly perceived urgency, workshop attendees called for implementation of a "Plan Z." If Plan A is business as usual, and Plan B is "too little, too late," Plan Z (for zero emissions, or our contingency plan of last resort) would aim to drastically reduce emissions within decades. The scientists at the LLNL workshop, however, speculated that to be successful, "Plan Z may require the kind of national mobilization that occurred in response to World War II."



Workshop participants further identified broad areas of research necessary to support Plan Z. They posed critical questions and noted needs in the following areas.

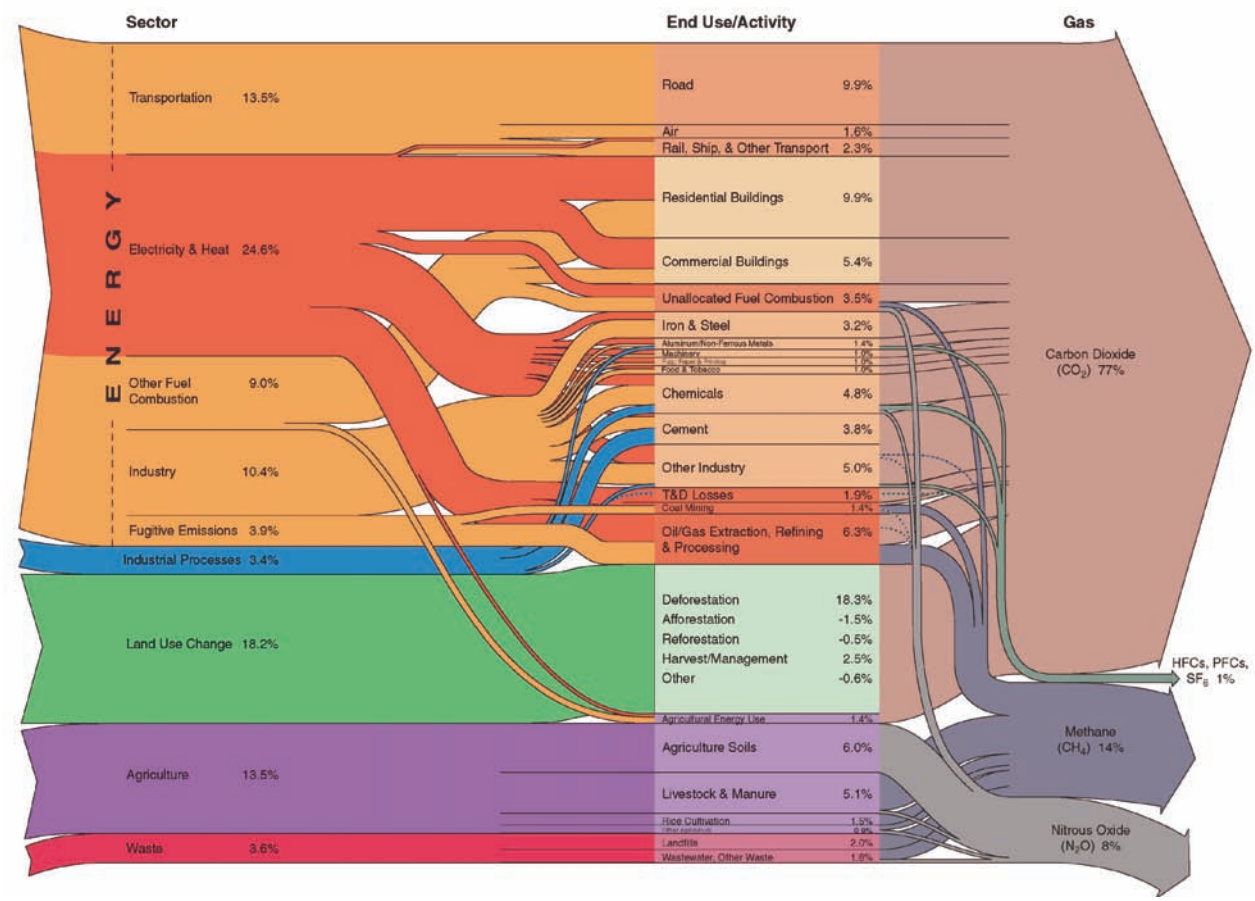
Monitoring the Problem. This is required so that scientists will know if strategies are working.

Energy technologies. How fast and broadly can low-emission technologies in the areas of wind and solar power, carbon capture, geothermal energy, nuclear power, and especially energy efficiency be deployed?

Food, land use, and urban research. What can be done to make the food system, which produces one-third of greenhouse gas emissions, more efficient? How can cities, which generate 60 percent of emissions, be made more efficient? More research is also needed on the effects of deforestation, reforestation, and aforestation.

Social science for managing energy system changes. Some Orwellian questions arose here, such as is "war mobilization" an appropriate way of thinking about such an emergency response?

Above: Stephen Pacala and Robert Socolow's diagram of "stabilization wedges." Each wedge represents an equivalent global emissions savings by 2054, "achieved by a single strategy that will not occur without deliberate attention to global carbon. Implementing seven wedges should place humanity, approximately, on a path to stabilizing the climate at a concentration less than double the pre-industrial concentration."



Geo-engineering. Some attendees discussed purposeful intervention in major earth systems (e.g., atmospheric composition, ocean current, and earth chemistry).

Relationships with the developing world. Attendees stressed the importance of satisfying the legitimate growth needs of developing countries while also not following the carbon-emitting model of the developed world. It called for leadership by example, collaboration, and technology sharing.

Systems integration and Plan Z strategy. This scheme calls for a much greater understanding of how social, political, technical, and environmental systems are connected—i.e., research on this "system of systems." Can the measures in Plan Z add up to a strong enough, fast enough response?

Mobilizing Designers and Planners

At the very same time that environmental scientists have been concerned enough to call for a Plan Z, environmental planners and designers have been arguing that a "whole-systems" design approach is necessary to address climate change effectively. This view was discussed in Washington, D.C., by the steering committee for the establishment of a National Academy for Environmental Planning and Design. Using scientific justification such as that provided by the LLNL workshop, representatives of the planning and design professions made the following case for a whole-systems approach in a recent white paper.[2]

To achieve a clear way forward, global societies need to undertake more planning, design, and research to address the physical, social, economic, cultural, and policy changes required to achieve a reduction of greenhouse gas emissions. Time is of the essence, because some scientists think the current concentration of greenhouse gases (390 parts per million) has already begun to create cumulative and extremely dangerous climate interference.

As a world leader, the United States government cannot wait for a comprehensive, global plan. It must move forward quickly to implement low-risk, "no-regrets" options and to promote a more sustainable future in both its domestic and foreign policies. At the same time, the

environmental design professions need to define the scenarios in Plan Z that are most likely to succeed, with good information and clear options available "just in time."

Many of the options for addressing climate change described by Pacala/Socolow, although technically feasible, involve major technology development and cost reductions in order to achieve widespread market acceptance. For example, major scientific research has already gone into carbon sequestration, biofuels (from sources like switch grass that do not compete with food production), more efficient nuclear power (that eliminates the waste-disposal problem), and entirely new methods of withdrawing carbon from the atmosphere. Unfortunately, most of these options are decades from large-scale deployment.

There are, however, more immediate options. Among these are greater energy efficiency in buildings and vehicles, land use and transportation planning to reduce vehicle miles traveled, lower-carbon agricultural practices, investment in more efficient and low-carbon infrastructure, and the development of renewable energy resources. All of these will depend on how we plan, design, approve, finance, build, maintain, and operate our built environment.

Frequently, the biggest hindrance to deployment of these more immediate options is their place in a complex web of legal, political, economic, and social constraints. Nonetheless, reconsideration of currently disconnected energy, waste, water, and transportation systems according to a whole-systems approach could create tremendous efficiencies and synergies. Waste becomes energy, sewage becomes a water resource, and garbage powers alternate transportation modes that reduce vehicle miles traveled. Through better design and planning, we can reap double and triple dividends. But to unlock the legal and policy frameworks, change the economic incentives, and weigh the social consequences, this approach must also be shown to improve people's lives. And when we apply a whole-systems design approach at the scale of the neighborhood, the metropolitan region, the megaregion, the nation, and across international borders, the challenge becomes increasingly complicated. Large-scale solutions must consider issues such as energy and resource depletion, environmental pollution, epidemic disease, and geopolitical unrest.

In pursuing a comprehensive campaign to save the planet and regenerate human civilization, the planning and environmental-design professions must relate their work to that of others. The work must involve architects, communications designers, developers, ecologists, economists, engineers, industrial designers, interior designers, landscape architects, lawyers, planners, policy analysts, sociologists, and urban designers, among others. While the organization of such a collaborative effort may appear overwhelming, the planning and design fields are ideally suited to lead it. What we lack is an overarching national organization to galvanize, convene, coordinate, and help conduct a whole-systems planning and design effort.

A National Campaign

The discussions of the thirty-member steering committee (which represents) imagined that a new National Academy for Environmental Planning and Design could help lead this effort. It would convene the best, most innovative thinkers from the many disciplines and professions involved in the built environment. They would identify and describe, in concrete physical and spatial terms, the most promising and effective whole-systems strategies for reducing greenhouse gas emissions.

Rather than compete with other academies like the National Academy of Sciences or the National Academy of Engineering, the new organization would complement work being done across disciplines by creating design alternatives that employ existing analyses and findings. In this way the design process can become a "search engine" for creative solutions. To date, most preliminary assessments of GHG-reducing scenarios have been hypothetical and overly technical, based on scientific parameters. Collaborative work by planning and environmental-design professionals on whole-system alternatives would allow more detailed assessment of barriers, and might suggest practical steps to broaden application, estimate costs, and evaluate needed policy-change recommendations.

The challenge is profound, the solution is essential, and the time is now! We need both science and innovative whole-systems design to address this global challenge.

Notes

1. See Stephen Pacala and Robert Socolow, "Stabilization Wedges: Solving the Climate Problem for the Next 50 years with Current Technologies," *Science*, 305 (2004), pp. 968-72. The McKinsey Company has undertaken a variety of studies in recent years to assess the relative economics of different approaches to reducing greenhouse gas emissions.

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Opposite: Flow diagram of the sources and activities across the global economy that produce greenhouse gas emissions. Source: World Resources Institute.

The CABE Climate Change Festival

Paula Vandergert

As the giant, shiny pylon was gingerly craned into place in the middle of Birmingham's main city square, someone called out over the security fencing, "So this festival, then—are there rides? Music? Girls?"

Good questions. The event was about climate change. How much fun could you reasonably expect? Yet it definitely was a festival—not another conference or exhibition. We wanted to turn the climate change debate on its head. No scolding, no guilt. Just one big idea—that a sustainable city would be much better to live in than the ones we know now.

In the United Kingdom half of all carbon emissions come from the built environment. Fundamental changes in the way cities are designed and managed, from green infrastructure to transport to energy systems, are needed. Yet the biggest barrier to progress is frequently the idea that a low-carbon life is restricted and dull—no more shopping, no more holidays. No one broadcasts the promises of cutting carbon—that cities will become more beautiful, more equitable, more competitive, more sociable.

So the answer to those beyond the fence was, "yes!" Over nine days, from May 31 to June 8, 2008, there were rides (a low-energy carousel and a helter-skelter), world music, dancing, and jazz—all in the name of addressing climate change.

A Reimagined Birmingham

When the Commission for Architecture and the Built Environment joined the Birmingham City Council to plan the climate change festival, our goal was to inspire people about life in a well-designed, low-carbon city. We also wanted to create a positive platform for civic leadership on climate change. But what would the main ingredients of the festival be?

First of all, it needed a dramatic focal point. Hence the 29-meter-high, mirror-coated, electricity pylon. It would sit outside the town hall in a small cornfield as if it had just been lifted there from its more usual, rural setting, making the issue of climate change visible and local.

We are so rarely conscious of how much energy we use and where it comes from. During the week, our goal was to have more people give it serious thought; we even retained animateurs to challenge people to talk about it. The pylon was a brutal object transformed. Its nickel plating sparkled in sunshine and turned color through the night from green to gold. For nine days it provided an object for reflection, in sharp contrast to the pubs, clubs, and drinking strips which dominate nightlife in many British cities.

The theme of the festival was good design. Another of its features, then, was a popular program of walks and talks led by architects and developers. Because the festival focused on solutions to climate change—rather than its threat—there were celebratory tours of newly refurbished buildings, eco-conversions, green roofs, and secret canal networks on the cusp of regeneration. Giant photographs of the city's buildings and spaces—past, present and future—also lined the streets of the city center so residents could get to know their heritage better.

We even curated the city itself. You can never have too many places to sit, so we commissioned a series of benches to frame views. They were brightly colored, broad and generous, inviting entire families to picnic. As "furniture with a message," they were witty as well, prompting people to reflect on connections between climate change and daily choice. One view, framing buildings supplied by a district heating system, was titled "Hot, not bothered." (This was where our enquirers would likely have found girls, posing as in an informal photo studio.)

One of the most popular and simplest features was called "Claystation," featuring a giant map, half a ton of plasticine, and an outline of existing plans for urban regeneration. Claystation brought hundreds of people of all ages together for creative learning about city design. The final "remodeled" city—a map covered with lumpy fountains, new allotments, green walls, and pocket parks—illustrated what most people's dream city looked like—verdant, with the sound of water, not traffic.

Less visible, but equally important, was a program of seminars for professionals and of technical debates which engaged the city's business and design community. Schools also held a "Green Day" to bring to life the connections between climate change and the built environment. Twenty thousand pupils took part, in Birmingham and other cities, in this event, which also gave teachers the chance to explore the linking role of environmental issues in a broader curriculum.

We promised something for people aged eight to eighty. So the festival launched with teenagers watching displays of parkour, turning the urban jungle into performance space.[1] It ended with 160 people taking part in a kind of mass *t'ai chi* on the Sunday morning, followed by free dance lessons in waltz, fox trot, and rock and roll. All were presented as a low-carbon alternative to shopping, and a way of helping people take ownership of public space.

Opposite: "Furniture with a message." Benches around the city, commissioned for the Climate Change Festival, prompted people to reflect on the connections between climate change and everyday choices. Photo by Michele Turriani.

Bringing Concern into the Mainstream

So, did it work? It was hard to miss—what with a "Break the mould" billboard campaign featuring neon-colored jelly replicas of Birmingham's best-loved buildings. The festival also attracted hugely positive media coverage and gave CABE a chance to make the case for a radical redesign of cities. Many people also personally pledged to cut carbon emissions. You cannot expect a festival to change public behavior at a stroke. Still, transformation—or permanent change—has to start with a dream. We were daring people to dream about a low-carbon city and how much better life there might be.

The festival also started to take climate concern out of the niche of green obsessives. Research by Minnesota Opinion Research, Inc., shows that taking individual action to cut carbon is not yet considered socially normal in the U.K. The festival moved it a step closer to becoming a normal—even positive—thing to think about. It also created a place to broker new relationships. We encouraged events that focused on practical solutions led by coalitions of people who usually work in separate silos. And it provided a platform for local Birmingham authorities to demonstrate political leadership. This matters, because although 68 percent of people in the U.K. believe the government should do more about climate change, neither business nor government seem to believe the political space currently exists to be radical.

Birmingham was a powerhouse of the first industrial revolution. Nowadays the city is characterized by an enduring entrepreneurial spirit, a handsome Victorian industrial heritage with a wonderful canal network—and too many cars. During the festival, the Birmingham City Council, the biggest local authority in Europe, announced its intention to cut carbon emissions by 60 percent in just eighteen years—twice as fast as the target set by the national government.



Every age has its challenge; ours is climate change. Yet right now, statistics show that little is changing. We think that is because the debate is framed in unhelpful ways. Successful public engagement requires choices to relate to positive core values, such as fairness, fun, and health. A festival offers us all a way to re-present the offer to politicians, professionals, and the public.

In 2009, the Climate Change Festival will become a multicity event across the U.K. In 2010, it will go international. If your city might take part, just get in touch at www.climatechangefestival.org.uk.

Note

1. Parkour participants move from one point to another as efficiently as possible, using only their bodies to overcome obstacles from branches and rocks to rails and concrete walls.

What is CABE?

The Commission for Architecture and the Built Environment is the U.K. government's advisor on architecture, urban design, and public space. Each year, the commission reviews 350 proposals for the most significant developments in England. As a result, we know what will be built over the next decade, and few designs are being driven by sustainability.

CABE works with local authorities engaged in commissioning public building, from schools and hospitals to new city squares and flood defense. It also runs a "sustainable cities" program to help decision-makers prioritize effective spatial policies across scales and issues. The program includes a master class, in which leadership teams from the biggest English cities (outside London) and the private sector address the most intractable issues facing them in a setting that showcases best practices in sustainable design. Our goal is the delivery of good-quality places that are socially and economically vibrant.

CABE is also developing a major on-line resource: www.cabe.org.uk

Climate-Related Disasters: Humanitarian Challenges and Reconstruction Opportunities

Pablo Suarez, Graham Saunders, Sandra Mendler, Isabelle Lemaire, Jorge Karol, and Laura Curtis



Humanitarian organizations, and the vulnerable communities they serve, are dealing today with the life-threatening consequences of poor design and planning. Climate change is not only taking place but also quite literally "taking places," imposing more frequent and intense events such as floods, hurricanes, droughts, and heat waves on built environments and people that are not prepared to deal with them. Staff and volunteers working in disaster management are at the forefront of the current climate crisis, but the complex relationships between place and climate require that humanitarian organizations rethink the way they will work in the future. They must forge new partnerships that address the root causes of the problem: not just by reducing the emissions that result in global warming, but also by reversing the social construction of vulnerability.

A changing climate means more work for humanitarian organizations, as the impacts of global climate change disproportionately affect poor people in developing countries (who have contributed least to greenhouse gas emissions). Rural livelihoods are collapsing, pushing more farmers into urban areas that are already unable to provide services to rapidly growing populations in sprawling periurban shantytowns. This migration in turn exacerbates inequities in health status and access to food, water, energy, and other resources. The higher frequency of disasters also means less time for recovery and an added loop on the downward spiral of poverty. Revising design goals and methodologies to mitigate the effects of climate change is an urgent challenge in both developed and developing countries.

This article is an invitation to architects and designers to collaborate with humanitarian organizations in promoting adaptation to climate change. From hazard-resistant residences and affordable flood shelters to disaster-resilient, inclusive urban planning policies, to public awareness campaigns or funding and design of reconstruction and relocation projects after catastrophic events, the humanitarian challenges brought by climate change can become a source of inspiration for those who shape urban places. The climate crisis may nurture development of sustainable design solutions that will help the most vulnerable sectors of the global population.

Impact of Climate Change on the Humanitarian Sector

The number of climate-related disasters is rising rapidly, as anticipated by climate scientists. On average, 250 million people a year are affected, more than 30 percent in just one decade. In Asia alone, some 66 million households suffered from the damage to or destruction of their homes by floods in 2007. Although governments and humanitarian agencies in these countries did respond, most affected households received little or no assistance. With the exception of some planned relocations and more resilient construction technologies, many of these households continue to live on vulnerable sites.

Particularly in urban areas, vulnerability is tied to a host of development patterns, from damaged natural systems to economic short-sightedness. Most obviously, coastal cities need to plan for sea level rise. If the cost of protective infrastructure is prohibitive, their residents need to learn to live with disasters, or relocate—a massive humanitarian endeavor. Despite recognition of risks, much more needs to be done to integrate climate change adaptation into planning and design.

The largely "invisible" populations of the urban poor need a place in planning solutions. The caseload of households that lack adequate shelter as a result of a rapid-onset disaster is often viewed as separate from the caseload of households that require shelter as a result of marginalization. Large portions of cities in the Global South are built by the poor by whatever means are available, often by squatting on hazard-prone land. As a result, too many people live in places that are unplanned and left "blank" on official maps, which makes humanitarian response more difficult. Poor communities need better infrastructure and services, as well as advocates in the urban design and planning process. Strategies that enable the poor to be designers of the places where they live are more effective than strategies that marginalize them because they do not have the resources to participate as consumers.

Similarly, residents of rural areas need to rethink their places in the light of changing climate risks. Humanitarian organizations are supporting the transformation of subsistence farming communities so that villagers can arrive at adaptation options based on both local knowledge and improved understanding of how climate change threatens their livelihoods. Numerous innovative ideas have emerged from participatory processes that allow people to understand the problem and conceive solutions.

Improvements in Disaster Response and Shelter

Disasters provide an entry point through which awareness of the need to reduce risks can be approached. They also may prompt the availability of resources and institutional support to address both the impact of the disaster and some of the underlying causes. For the International Federation of the Red Cross and Red Crescent (IFRC), providing shelter assistance after a disaster is an opportunity to ensure that shelter risks of affected households are reduced through informed programming and improved construction methods.

In the Philippines, the homes of four hundred thousand families were damaged or destroyed by Typhoon Durian in 2006. Although the national government had an established response mechanism, including the provision of basic building materials to affected households, this typhoon was the fourth such event of that particular season and public resources were depleted. While the IFRC with the Philippines Red Cross Society recognized that the affected households required immediate shelter assistance, they knew that these households would also be exposed to similar typhoons each year. The solution involved developing a household repair kit including roofing, framing materials, and fasteners for the targeted families, complemented by "construction theater" in the communities to promote basic safe and resilient building principles. Local Red Cross volunteers oversaw these activities, with the involvement of construction specialists from within the communities.

While fifteen thousand households received materials for construction of safer homes, entire communities were made aware of safe building principles. The introduction of coconut-timber structural frames, extended eaves, and thatched side-wall enclosures demonstrated improved construction technologies and employed the skills of local craftsmen. The use of familiar materials retained the sense of place and ensured a culturally appropriate response. When Typhoon Fengshen struck the Philippines, in June 2008, the Philippines Red Cross Society adopted the same safe building-assistance program, including the involvement of community volunteers who had experience with the previous safe shelter program.

The extensive flooding in Sudan, in 2007, displaced whole communities, and resulted in significant demands on locally

Opposite: Crossing a temporary bridge to an emergency shelter. Dhaka, Bangladesh, 2004 floods. Photo by Jesse Moore/CARE.



harvested timber and grass for reconstruction. Communities expressed concern that repeated seasonal floods would place excessive demands on households to rebuild, which would be exacerbated by the resulting shortage of materials, price increases, and environmental impact. The IFRC supported the Sudanese Red Crescent Society in advocating safer, more robust house construction, with raised floor levels and more resilient lower-level perimeter walling.

Many families had expressed concern that they would be forced to relocate to safer but distant parcels of land, disrupting established social and economic networks. To retain a sense of place while reducing flood risk, humanitarians held demonstrations of reconstruction of one or two houses per community. Household members and local construction artisans illustrated the benefits of intermediate frameworks to brace side-wall panels, improved fasteners, and secure anchoring to provide greater resistance to rising waters. Such a public process in a traditionally conservative society enabled the participation of female members of the affected households, who as a result were able to contribute to informed decision-making by the respective families.

In Gujarat, India, following the earthquake in 2001, the choice of appropriate materials for the reconstruction of rural housing was limited. The traditional use of stone was problematic, because of high cost and a building-code requirement for steel reinforcement. Fired clay bricks were in limited supply, and the high fuel demands on producing such a product was a concern. Concrete blocks offered a scalable local solution, but required extensive use of water, an issue in a semi-arid region threatened by climate change.

Local production of cement-stabilized compressed-earth blocks was encouraged by a number of nongovernmental national and international agencies as a way to provide local employment and minimize water requirements. It ensured that the greatest distance from any source of production was seven kilometers, a distance that minimized transport costs and ensured greater local ownership of the production process. The use of local materials also ensured that the finished houses were visually in keeping with existing masonry constructions, and the flexibility provided by masonry enabled new houses to be comfortably incorporated into existing settlement patterns. Although the new housing with reinforced compressed-earth block walls and tiled roofs could clearly be identified among the existing housing stock, it complemented the surviving structures. This program resulted in the development and ratification of official standards on earth technology, enabling more widespread adoption of an appropriate system for earthquake risk reduction measures that also supports climate change adaptation given increased water scarcity in the region.

The destruction in New Orleans and throughout the Gulf Coast wrought by hurricanes Katrina and Rita provide a profound illustration of the planning and design challenges that remain in the United States.

The damage affected some four hundred thousand homes, left three million people without electricity, and

Above: Transitional shelters capable of resisting typhoon-strength winds, built after typhoon Durian in the Philippines. Photo by International Federation.
Opposite: Flooding in New Orleans after Hurricane Katrina, 2005. Photo by Jocelyn Augustino/FEMA.



overnight submerged the region into a condition usually associated with catastrophic events in the Third World. The most expensive natural disaster in United States history, this event ninety thousand square miles (about the size of Great Britain) with recovery costs in the range of $75 billion to $100 billion.

Hurricane Katrina has also revealed the effects of inadequate maintenance of infrastructure (in this case the levee system) and deterioration of the protective coastal ecosystems. According to the pre-Katrina strategic plan (published in 1998) entitled "Coast 2050: Toward a Sustainable Coastal Louisiana," it was well known that New Orleans was at risk as lowland marsh and swampland along the Gulf of Mexico was deteriorating and being replaced by open water. Reversal of this trend is essential, as experts predict that the Gulf coast's wetlands are nearly impossible to recover.

Physical progress in the reconstruction of New Orleans and the Gulf coast region has been slow and piecemeal, highlighting the fact that developed nations as well as underdeveloped one need to refine disaster management processes. However, this event did stimulate an inspiring and unprecedented response from the planning and design community. Planning workshops were held by the U.S. Green Building Council and other organizations to seek solutions for rebuilding damaged communities in a way that would solve long-standing problems while respecting the rich history of the region. The "New Orleans Principles," developed to help guide the planning and rebuilding efforts, provide a solid template for environmental, economic, and equitable rebuilding solutions.

Promoting Collaboration between Sectors

Addressing reconstruction needs resulting from climate change requires concerted effort from humanitarian agencies, the commercial sector, and built-environment professionals from the public and private sector. Humanitarian agencies could benefit from more technical expertise to advance planning solutions and avoid liabilities in the design and construction sector. Likewise, the disciplines of planning, design and construction could benefit from engaging with humanitarian entities familiar with the demands of rapid, incremental decision-making that is often a necessity in disaster response. The manufacturing and construction sectors can also be valuable partners in advancing technical and programmatic solutions.

To enhance its effectiveness in coordinating housing and reconstruction agencies after disasters, the IFRC is supporting several collaborative initiatives. Examples include:

- Development and dissemination of risk-management tools and shelter-risk mapping.
- Partnerships with educational institutions (initially in the United Kingdom and the Netherlands) to develop design and construction curriculum focused on disaster response and risk reduction.
- Collaboration with technical institutes and the private engineering sector to develop appropriate technological and material solutions. (Current initiatives include construction materials in Peru, Indonesia, the Philippines, the Netherlands, and the U.K.).
- Providing reconstruction agencies with access to local craftsmen.
- Training of private-sector specialists in construction for disaster response and in risk reduction and disaster mitigation measures.

A number of roundtables have led to the creation of an embryonic shelter alliance whose firms are working with the humanitarian sector. In its turn humanitarian movement is seeking alliances with academia and the private sector to advance postdisaster reconstruction.

Where Designers and the Humanitarian Sector Overlap

The increased frequency and intensity of climate-related events call for new ways of conceiving the built environment and integrating information about rising risks into humanitarian tasks that includes disaster management, community risk reduction, health and care, water and sanitation, food security, and migration and conflict. Design



professionals can contribute to the work of humanitarian organizations showing them how to adapt to climate change. Strategies include the following.

Perform climate risk assessments. Planning agencies and humanitarian organizations should assess the potential impacts of climate change in rural communities and urban places, and planning follow-up. Examples include tropical cyclones, floods, droughts, fires, and heat waves. Evacuation routes and other risk management measures may need revision.

Engage land use planning and urban design processes. Cities need to plan services and infrastructure for all populations and find alternate uses for areas that are not appropriate for development. Systems such as wetlands and natural drainage corridors need to be protected so that their ecosystems can remain functional. Planning solutions including transit, utility networks, community resources (schools, primary-health-care centers and hospitals), and public open space reduce risk and enhance responsiveness when disasters do occur.

Invest in infrastructure. Cities are places that house families, businesses and community facilities on a network of shared infrastructure. Planners, designers, and professional and humanitarian organizations need to become a stronger voice for investment in infrastructure—both natural and built systems—as well as development of adaptation measures.

Improve building technology. New buildings demand bioclimatic designs, minimize water and energy consumption, employ alternative energy sources, incorporate efficient solid-waste recovery, utilize appropriate materials, and institute recycling and reuse of existing buildings where possible. Furthermore, homes, schools, and other public buildings can be designed to be habitable refuges during a crisis that disrupts energy, water, and/or sewer systems—a concept referred to as *passive survivability*.

Above: Designers raised awareness in downtown Buenos Aires: the installation of a submerged dwelling in the pond in the Planetarium park brought the stark reality of flooding to the heart of the city. Photo by Argentina Red Cross Society.

Establish and enhance partnerships. Addressing climate change cannot be done in isolation and requires partnerships among governments, civil society, the private sector, and knowledge centers. Design practitioners can contribute their facilitation and communication skills. They can also assist in formulation and management of public policies; and in coordinating the activity of diverse social stakeholders.

Support advocacy. Humanitarian organizations can work with design practitioners to help people and institutions learn about climate change and its humanitarian consequences, through both community-based activities and public awareness campaigns. Professional associations can influence governments and public opinion, helping to call on all relevant decision-makers.

Share experiences and information. We are only starting to address the rising risks, and there is much to learn. Humanitarian and design practitioners alike should document their experiences, in order to refine their own responses and to share good practices with others.

Complementarity

The vulnerabilities of households that are already marginalized is increasing increase because of climate change. This trend will result in excessive workload for government and humanitarian agencies, already overstretched in their capacity to respond to such disasters. Preserving the integrity of places and helping people adapt to different conditions will require the complementary skills of humanitarian and design practitioners.

The design professions must recognize that they have a role to play in reducing shelter and settlement risks as part of their responsibilities. Building standards, construction guidelines, land use planning, rights issues, and public policy will need to engage support from a broader range of stakeholders to meet the pressing humanitarian challenges that will result from climate change. Innovative thinking that builds upon practical experience from the field and promotes collaboration among professions will be essential in reducing vulnerabilities and creating safe and secure places.

Further Resources

Addressing climate change requires focused collaboration both within disciplines and across disciplinary boundaries. Organizations such as Architects w/o Borders, Engineers w/o Borders, and Architecture for Humanity help direct design efforts towards humanitarian issues, while platforms such as the Open Architecture Network and the UNFCCC database facilitate the exchange of ideas. These organizations promote critical discourse on humanitarian design, facilitate the exchange of ideas between design professionals, and provide opportunities for designers to work on-site, in partnership with developing communities. —*Ben Spencer*

Acknowledgement

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Global Climate Change in Maryland: Loss at the Margins of Place

David Myers



The impacts of global climate change will certainly be greater in some environments than in others. Temperatures will rise more in the polar regions than in the tropics, and ecotones will face changing moisture and temperature gradients before interior habitats. In North America, we typically think first about edge locales such as coastal Florida and Baffin Island when we visualize the impacts of warming and sea level rise. But more familiar places, such as Maryland, will also be affected.

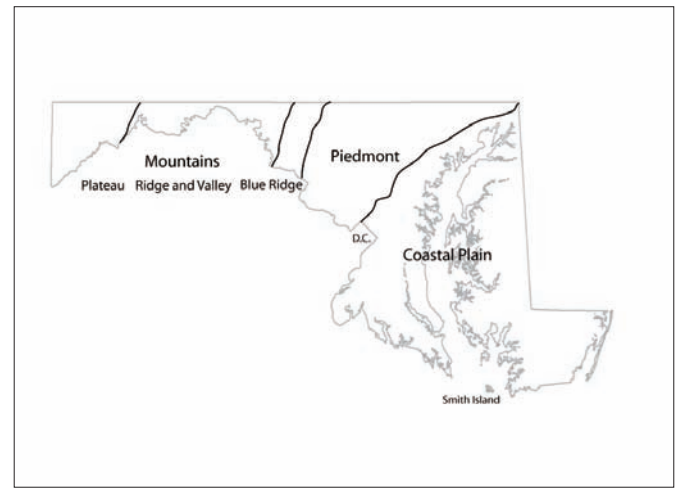
In the complexity of its physiographic edges, Maryland is a microcosm of North America, its margins defined by two elevation extremes, mountain and bay. To the east, inundated coastal plains meet the Atlantic to help form the largest and the most researched estuary in the United States, the Chesapeake Bay. To the west rises one of the continent's oldest mountain chains—the Appalachians—creating a topography of ridges and valleys.

Above: Forest and fields of Maryland from the edge of the Interstate.

Maryland's boundary landscapes are not "Edge of Forever" landscapes.[1] They do not offer vantages toward wilderness. From bay to ridge, human settlements have ebbed and flowed across this terrain, and people have both altered its coast and deforested its mountains. More recently, people have polluted its bays to record levels. Today we recognize that these boundary areas are not pristine, yet we can imagine that they have become wild again as the result of nonhuman processes. Efforts are growing to conserve them as areas that define the state in the face of rapid suburbanization.

In contrast to its margins, the majority of Maryland's built environment occupies a rolling middle landscape of piedmont and gently sloping coastal plains.[2] This is a day-to-day world of commuters, soccer games, and mowed lawns. But it is the edges of mountains and bay that define our sense of place. We brag that we can get to the mountains or the coast in a couple of hours: to our landscape of play, the one that relieves us of the sense of *nowhereness*. We live in the middle, but we dream of the marshes and ridges; and some of us live our dreams.





At the Edge of the Bay

Climate change means that much of Maryland's productive estuarine and palustrine wetlands along the Chesapeake Bay will eventually be lost. Baltimore has seen seven inches of sea level rise in the last century, and another nineteen inches is expected by 2100.[3] At the Blackwater Wildlife Refuge, on the Delmarva Peninsula, the "Everglades of the North," more than one-third of the marshland has already vanished because of sea level rise, human alteration, and subsidence—a mix of impacts that is hard to untangle. Home of the bald eagle, the migrant peregrine falcon, and the endangered Delmarva Peninsula fox squirrel, the Blackwater also hosts more than 165 species of threatened or endangered plants. Will the $700 million saltwater recreational fishing industry in Maryland and Virginia be jeopardized? Will the Delmarva Peninsula fox squirrel become extinct?

Losses caused by sea level rise have already forever changed the historic coastal culture. Saltwater intrusion has forced miles of former farmland to become idle.[4] Poplar, Barren, Hambleton, Royston, Cows, Punch, Herring, Powell, Swan, and Turtle Egg are the names of islands that have disappeared.[5] The largest of the Poplar Islands, the result of the split of the original Poplar Island in the late 1800s, was inhabited by a small community around 1900 and was a hunting site used by Presidents Franklin Roosevelt and Harry Truman.[6] By the 1960s the main island was only eighty acres; over the next thirty years it lost an additional thirty acres.[7]

The last inhabited island in the Chesapeake Bay is Smith Island, the subject of the film *We Are All Smith Islanders*.[8] One-third of its land area has already been lost to sea level rise. The thirty to fifty thousand tourists who visit Smith Island annually seek to capture a sense of its fated way of life and sense of place. But it is predicted that Smith Island will go the way of the Chesapeake's other islands by the end of the century.

At the same time that these older economies decline, commuters, second-homers, and escapees from the middle landscape continue to arrive at Maryland's coastal margins. A million new residents are expected in the state by 2030, and new and old are attracted to views of the water. But the steady accumulation of homes along the coastal margin is threatening death by a thousand cuts.

Unilateral and multistate efforts to protect the Chesapeake have led to such tools as the Critical Area Law—intended to protect one thousand feet of bay edge. But such regulations are irregularly applied, poorly enforced, and underfunded. They seem unable to stem the tide of individual desire to love the bay to death.

Meanwhile, Maryland is acting on global warming.[9] There are successes in the Chesapeake Bay that consider future change.[10] But even well-intentioned shore dwellers think most about breathtaking views and the whoosh of herons. Far less consideration is given to the reality that their great grandchildren will have to deal with higher water levels and more frequent flooding.

Left: Blackwater Wildlife Refuge. Small changes in hydrology have significant impacts to the distribution of vegetation communities.

Right: The State of Maryland. The five physiographic provinces are the coastal plain (surrounding the Chesapeake Bay), the piedmont, the Blue Ridge, ridge and valley, and the Appalachian plateau. The Appalachian Trail and South Mountain are located in the Blue Ridge.



Above: The Appalachian Trail and South Mountain.

Along the Appalachia Ridges

In the next century the average temperature in Maryland could increase by three degees Fahrenheit. If the rate of temperature change is slow enough, organisms will be able to migrate north, as some have already. In 1928, maple syrup production was centered in Garret County, Maryland. It is now centered in New England, and with development and warming, it is expected to move to Quebec's Gaspe Peninsula.[11]

Rare species may have less chance to migrate, and may face extinction. Predicting species extinction in response to global warming is a daunting task.[12] But some principles are known. For example, certain organisms endemic to mountaintops may be particularly susceptible because they have nowhere to go. This is the escalator effect, noted most famously in the cloud forests of Monteverde in Costa Rica, where rising temperatures and other changes have led to species extinction.

In the mountain counties of Maryland, tourism and development are today replacing forestry and farming. Like the Chesapeake shoreline, these areas provide an attractive alternative to the suburban middle. However, developments such as the controversial 4,300-unit Terrapin Run in Allegany County have been opposed by proponents of smart growth because they would bring too many people to the mountains. Garret County is another place where models predict that ecologically important landscapes are likely to be degraded by additional development.[13]

The Appalachian Trail runs along one ridge in western Maryland. The state has only forty miles of this footpath, which, from Maine to Florida, receives between three and four million visitors a year. The trail is central to the vision of one user community, which is seeking to monitor changing biological conditions along it. Composed largely of day and weekend hikers, this community is seeking to understand changes via citizen science, as reflected in the establishment of the A.T. MEGA-Transect and the NBII-SAIN Appalachian Trail Environmental Monitoring Portal Community.

The Appalachian regions of Maryland have long been affected by acid rain and atmospheric deposition. They now face additional environmental stress from changes in temperature. Inaccessibility, conservation, and regulatory activities typically afford mountain landscapes greater protection than other landscapes. Yet it is unclear what regulatory protections will defend these mountain crests from the expected effects of global climate change.

Margins and Sense of Place

If the margins help us define a sense of place, what happens when those boundaries change? What happens when the causal forces that define those borders are more the result of human action than the wild forces we used to count on to shape the wonderful and seemingly untamed landscapes that frame us in the middle? Wendell Berry and others have noted the importance of the physical environment in the formation of identity.[14] Individually, the boundaries that we establish with others help to establish our own identities. Collectively, the protection of edge cultures—minorities, the disadvantaged, the indigenous—and of other species and landscapes helps define the status of our social evolution and provide a hopeful view of our humanness. Is this a way we can define our response to global warming and its impact on sense of place? Can we address the boundaries—the mountains and coasts that help frame the middle landscapes in which we live day to day?

I have a corner office in a building on the boundary of the coastal plain and the piedmont. At this moment, I look east toward a blue sky over a flat plain of buildings intermingled within expectant early March forests. In that direction lies the bay, with warmth ahead and the continuation of an endless cycle. I see in my mind marshes and crabs and fisherman toiling at their nets and traps. Out the other window to the north is the Piedmont, and in the distance are the forests of the Appalachians. There hiking trails beckon me to once again, if time permits, take in the view from a ridge of a landscape unchanged from my last visit.

I know this will not be. I know that both landscapes will change. But I don't want to relinquish this captured sense of place in which it seems the richness of my life is threaded in a million ways, and the hopes for my children are founded. Humans will survive the end of this nature—a nature that is untouched by us—but a sense of place imagined as untouched by humans draws to a close.[15]

Notes

1. See John Mitchell's description of the Utah wilderness in "To the Edge of Forever," in T. H. Watkins and Patricia Byrnes, eds., *The World of Wilderness: Essays on the Power and Purpose of Wild Country* (Niwot, CO: Roberts Rinehart Publishers in cooperation with the Wilderness Society, 1995).

2. In "Climate Change Impacts: Maryland Resources at Risk," a 2002 report of the Joint Global Change Research Institute, Moss et al. report that the "midsection of Maryland is the largest area in population, geography, and economic importance."

3. U.S. Environmental Protection Agency. 1998. *Climate Change and Maryland*, 1998. Report no. EPA 236-F-98-007l. Washington, DC.

4. Mike Tidwell, *The Ravaging Tide: Strange Weather, Future Katrinas, and the Coming Death of America's Coastal Cities* (New York: Free Press, 2006).

5. For more on the loss of Maryland's islands, see Donald Smith, "The Case of the Vanishing Islands," *National Geographic News*, April 28, 2000.

6. B. C. Douglas, M. S. Kearney, and S. P. Leatherman, *Sea Level Rise: History and Consequences* (San Diego: Academic Press, 2001).

7. The re-creation and fate of Poplar Island rests with us. Today the U.S. Army Corps of Engineers is restoring Poplar Island as a national model of the beneficial use of dredge materials. See U.S. Army Corps of Engineers. www.nab.usace.army.mil/projects/Maryland/PoplarIsland/index.html.

8. *We Are All Smith Islanders*, the 2004 award-winning film produced by Mark Cohen and Mike Tidwell, illustrates how global warming is changing the Chesapeake Bay region. The film was made for the Chesapeake Climate Action Network.

9. The State of Maryland established the Maryland Climate Change Commission (MCCC) in April 2007 to develop an action plan to address climate change. The action plan "Interim Report," released January 14, 2008, outlines policy options. See www.mdclimatechange.us/.

10. Mary H. Cooper Ellis presents a case study of accommodation for rising sea levels in the planning of a local Virginia community in "Managed Retreat: Coastal Development in an Era of Climate Change," *LAM*, March 2008.

11. Mark Schwartz et al., "Predicting Extinction as a Result of Climate Change," *Ecology*, Vol. 87, No. 7 (2006), pp. 1611-15.

12. National Assessment Synthesis Team, U.S. Global Change Research Program, "U.S. National Assessment of the Potential Consequences of Climate Variability and Change Educational Resources Regional Paper: The Northeast," in *Climate Change Impacts on the United States: The Potential Consequences of Climate Variability and Change*, 2000. See www.usgcrp.gov/usgcrp/nacc/education/northeast/default.html.

13. T. Weber and R. Aviram, "Forest and Green Infrastructure Loss in Maryland, 1997-2000, and Implications for the Future," Maryland Department of Natural Resources, Annapolis, MD, 2002. The authors documented that Garret County, among all Maryland's counties, had the largest number of acres of green infrastructure, the most ecologically significant lands in the state, converted from forest to development from 1997 to 2000.

14. Richard Stedman explores the symbolism of place and its behavioral implications in "Toward a Social Psychology of Place: Predicting Behavior from Place-Based Cognitions, Attitude, and Identity," *Environment and Behavior*, Vol. 34, No. 5 (2002), pp. 405-25.

15. The reference is to Bill McKibben, *The End of Nature* (New York: Random House, 1989).

All photos are by the author.

Caring about Places and *Places*

Randolph T. Hester

but also related in order to make sense of them. This extends the idea of place from places—however wonderful, one at a time—to sets of places that, taken together, describe the place of people in the world.

In light of this critique, what are we now to make of the virtual worlds in which so many work and play—even dwell, considering the proportion of time spent there? These range from e-mail and other activities complementary to our physical space and resources, to such inventions as "Second Life," which seem to arrogate all of life to themselves.

And what are we to make of shifting roles in the environmental professions? John Habraken, in that first volume of *Places*, warned that as professionals, "our genuine concern for the built environment as a whole is not matched by our behavior, methods, or skills. The reasons for this ambivalent attitude are, of course, part of the broader dilemma of modern professionalism: when does expertise nourish the common good?"

I hope that the fascination of discovery that has accompanied *Places* over all these years will continue in an unfolding landscape of new ideas and images, through fresh insights into existing places, through patterns of life better understood, through places being imagined where newly empowered groups can establish claims that express both their identities and our collective aspirations.

It was part of Don Lyndon's and my hopes at the outset that the journal would reflect the widest possible range of views about how places are imagined, experienced, conceptualized, and designed. Now that "place" is becoming increasingly complex in this globalized and mobile world, how can *Places*, the journal, reflect these new conditions?

Today has been an "Orchard That Measures." And by any measure that orchard, at twenty-five, is in full bloom. Some say it is aging, but I see blossoms both sensually delightful and robust with budding ideas.

That orchard may well have started small—*Prunus Appleyard*, *Prunus Porter*, and *Prunus Lyndon*, the most poetic of all orchard trees. But the orchard has grown to include all of us. And today it measured accomplishment. The main accomplishment: place matters. The shape of place matters. Place is not placeless. Place is not without propinquity. Place is not irrelevant, as many in the academy claimed three decades ago—and, in fact, some still claim today. Place matters because for every one of us dwelling is an intimate relationship with place. And *Places*, the magazine, has singularly made that clear. For twenty-five years, *Places* has been the orchard that measured place in all its dimensions. *Places* has informed, inspired, and cajoled. Today was no exception. Place matters, and the dream of place matters.

What is most obvious from today's event is that *Places*, the journal, is like places, the places. *Places* is a magazine that we collectively hold in our minds, care about, and have made part of our lives. *Places*, the magazine, has made us into a community—some of us of a single place, others dispersed without propinquity, but with a shared vision. We know that to shape place is to be alive.

Some may believe, as Donlyn states, that places primarily instill the choreographies of society. Some of us don't even know what "choreographies of society" are, but we trust that Donlyn does. Others may hold that places are primarily concretized symbols of society. Some may see places as livable streets. Still others may see places as Aldo Leopold's inhabited ecologies. Some others may see places, as Dr. King did, as the single garment of our shared destiny.[1] Some argue that places develop native wisdom. Others argue that places simply let natural daylight in to gladden a kitchen table. Some few of us may emphasize that places enable ecological democracy.

But whatever our emphasis, we are a community of place and part of the *Places* community, because we know we depend upon places and *Places*, and because places and *Places* depend on us. This is cause for optimism, because the community of *Places* has cultivated a healthy orchard. But it will continue to be productive and fruitful for another twenty-five years, and far beyond that, only if we all assume in some manner responsibility. It is our *Places*.

The external enemies of place are substantial—thin democracy, virtual capital, and placeless theory among the most ferocious. But internal enemies of overly polite debate, insularity, education as a concept without dimension, neglect of oppositions and conflict, and failure to propagate new orchard stock are actually more threatening.

We and a very few absent members are the only stewards *Places* has. We are both the orchard itself and the caretakers of the orchard. We can celebrate the spring blossoms. We can share the fall harvest, and we can enjoy the ripened fruit of *Places*. We can plant new trees to replace the old and expand the territory. But we are also in charge of pruning, watering, and daily maintenance. We are the stewards of *Places*.

Note

1. "All life is interrelated. We are caught in an inescapable network of mutuality; tied in a single garment of destiny"—Martin Luther King, Jr.

Community Activism vs. Community Design

John N. Roberts



Of the many powerful forces that influence the form and function of a city, citizen involvement in a design process is one of the most complex. Activists influence agendas that are set for the physical environment, as well as the process by which issues are aired and reconciled. Design-oriented participants often give direction for the plan itself. Individual opinions frame preferences, clarify concerns, and filter resolutions. But activism alone will not result in urban designs that fully address a community's needs.

Community design occurs when all voices, not just the loudest, are integrated into the physical resolution of a space, and when each accepts the resolution with full understanding of the choices made. An inclusive design process is essential to reaching common ground and reconciling differences while balancing the myriad factors critical to place-making.

Over the past twenty-four years, I have been an active participant in the evolution of downtown Berkeley, California, doing both voluntary and paid professional urban design work. I have been in the front lines of the struggle to improve a city in which community activism is a value and community design is both disparaged and demanded. This experience has given me an understanding of the interrelationship between community activism and community design.

Getting Hooked as a Voluntary Professional

There was a time, not so long ago, when a walk in downtown Berkeley was a frightening experience. From the late 1960s into the early 1980s, downtown became a creepy place. The sidewalks were poorly lit, dirty, and untended. Buildings stood vacant, deteriorating with neglect. Windows were boarded up out of fear, and those fears projected back through the lifeless walls onto dreary public spaces. The few new buildings that were built were conceived as fortresses against political demonstrations and urban decay, with the perception of danger contributing to further decay. Strange confrontations, bizarre activities, violence, and hostile behavior were common on the streets, especially at night. People gradually lost interest in downtown.

My family and I were affected. Both my children were assaulted, my wife was afraid to go downtown, and I was on edge whenever I walked the sidewalks. This was simply unacceptable, and by the mid-1980s I had had enough. But that was when I discovered that others felt the same, and I joined with various groups of citizens and city staff to carry out revitaliza-

tion activities that continue to influence downtown.

Over the years a number of projects have flowed directly from this community activism, from new City of Berkeley programs, and from widely supported professional planning efforts by such individuals as Allan Jacobs, Donlyn Lyndon, Gregory Tung, and Peter Calthorpe. Government grants and voter approval of a bond measure also indicated broad public and institutional support for this community-based planning. Outreach to the public has been essential to building consensus. Urban designers, activists, property owners, and city staff have been full collaborators in this community-design process.

Two long-term projects have evolved along different paths, offering useful lessons about consensus building. These are an arts district along a once neglected and funky block of Addison Street and improvements along Center Street, an important pedestrian corridor between the University of California, Berkeley, and the city's main transit hub.

Consensus through an Inclusive Design Process

By the early 1990s, the city's Economic Development Department had concluded that the key to economic revitalization in downtown Berkeley would be to stimulate arts and cultural activities. At that time the nationally renowned Berkeley Repertory Theater was threatening to move to Oakland. But the mayor bravely committed the city's resources to help the theater company expand by purchasing the property next door to its existing building, on Addison Street. And when the Berkeley Rep agreed to stay, discussion began about the creation of an arts district.

As a first step, Michael Caplan, the city's newly hired downtown coordinator, convened a meeting of property owners, arts activists, city staff, and others to help brainstorm the idea. The block of Addison Street where the theater stood was identified as the logical core of the district and targeted for renovation. But the group, of which I was a member, also imagined the arts district as a place where other kinds of creativity could flourish, where art might be part of the urban fabric, and where a critical mass of cultural activities would spin off other arts-supported entities like restaurants and galleries.

The group's early efforts went into creating an arts district plan. We agreed it would have to be a public/private partnership. As a result, an art overlay zone now regulates ground-floor uses of private property in the district, and the city has upgraded the street while offering private development incentives.

As part of this effort, Donn Logan, a local architect and property owner, and I developed a plan for the street that would provide a physical representation of the group's abstract ideas. After revisions to reflect broad community input, the Berkeley City Council officially endorsed it. The plan embodied a common vision of an arts district, offered a phased implementation schedule with cost estimates, and held strong support among stakeholders.

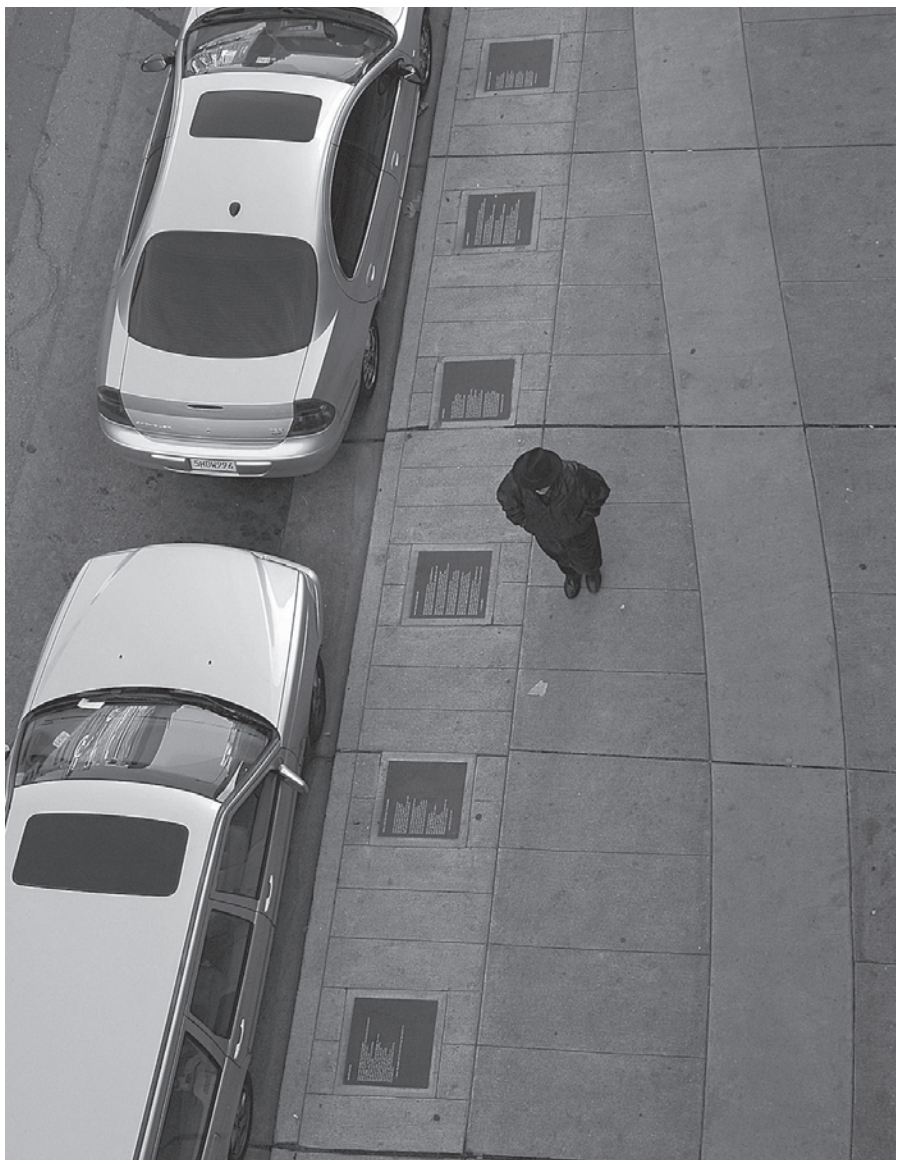
To sustain momentum and ensure that the hard-won funds allocated by the City Council would be used only for construction, ELS Architects (Logan's firm) and I prepared the first

Opposite: Looking east along Addison Street from the Berkeley Repertory Theater during the Front Row Festival in 2003.

At the 2007 workshop on "Design Activism" numerous presenters told stories of grassroots groups organizing around the world to fight powerful forces threatening their homelands, valued places, endangered species and cultures. Most employed planning and design in some phases of their efforts, but John Roberts' case of his work to reclaim his hometown, downtown Berkeley, was distinctive in that design was central to the story.

Roberts described the designer's singular capacity to turn unimagined ideas into multiple concrete visions that can be comprehended, debated and carefully evaluated via civil society. He shows how small design actions can cumulatively have major positive impact. He champions long-term design volunteerism to improve one's civic places, but he acknowledges the awkward roles the professional designer confronts balancing "volunteer" and "for pay" work on the same project. All of these are important lessons, but Roberts' distinction between activist design and community design is most insightfully provocative. He warns that often the activism that dominates is contrary to the collective good. Just as dominant cultures or external forces often do, grassroots activists can likewise hijack civic processes and places. This is an essential warning to design activists not often sounded.

—Randolph T. Hester



phase construction documents pro-bono in 1996. With these in hand, the arts district began to take physical form. Sidewalks were widened, driving and parking lanes narrowed, and placeholders were created for art works, new utilities, and street trees. Separately, the city converted a blank wall of a public parking garage into a street-front gallery that would feature displays of work by local artists, curated by a member of the Berkeley Arts Commission. These modest investments soon attracted millions of dollars of new private development.

Passage of the bond measure a few years later allowed completion of more of the planned public work from 2001 to 2003. This included patterned paving, additional trees, pedestrian lighting, and the incorporation of artwork and poetry into the sidewalk. Anticipating the installation of artworks, I refined the plans with artists, the Arts Commission, technical specialists, and public arts administrators.

A key feature of this effort was paving art. Eight local artists, out of a field of sixty applicants, none with any prior experience in public art, were chosen through a competitive Arts Commission-sponsored process to design twelve pieces of paving art to be installed in predetermined locations. Not all pieces passed the final "slip" test; in the end, two had to be mounted on walls. But Addison Street's sidewalks are now embedded with a variety of artistic emblems: lips, root webs, critters, notations of local historic events, and other unusual work.

The new sidewalks also provided a regular pattern of two-foot square cutouts (127 of them) next to the curb to be used for poetry. Bob Hass, a local resident, University of California professor, and a former United States poet laureate, agreed to select the verses. He chose a variety of short poems spanning the cultural history of the City of Berkeley. These began with songs of the native Ohlone people (as translated by University of California professors), included Bishop Berkeley's paean to the westward course of empire, and ran through the protests of the Vietnam and free-speech eras to verses from the present day. The words of local Nobel Prize-winning poets, Pulitzer Prize winners, several poets laureate, songwriters, and other Berkeley writers now grace the street, and the complete compendium has been published locally as the *Addison Street Anthology*. The enameled poems, on cast-iron plaques, were installed in April 2004 and by September, the Berkeley Poetry Walk had been designated a National Poetry Landmark by the Academy of American Poets.

The creation of the plaques, the book printing, and the installation were funded entirely by private donations.

Today the Addison Street Arts District reflects a gradual progression, with sections patched together at different times—and with more to come. Individual parts are exquisite, and the overall concept is compelling, but it is not a refined, singular statement. Despite the rough edges, it is an authentic community work, the result of collaboration by activists and designers, stakeholders, and staff who responded at each stage of the process, translating abstraction into reality. It is a deeply compelling expression of place.

The sidewalks are filled with art and poetry, the street is wired for performances, and the exhibitions in the garage's window-gallery change monthly. Other theaters have joined the Berkeley Rep on the block. So have a jazz school, a traditional music coffeehouse, a bookstore, a theater school, terrific restaurants with entertainment, and new housing. Plans are also under way for the Berkeley Art Museum to move downtown, extending the arts district across Shattuck Avenue to the edge of the university. The renewed sense of place created by the arts district as well its economic effect elsewhere downtown has been more than anyone had dreamed possible.

Conflicting Visions in an Advocacy-Based Process

A different scenario has been unfolding over the past ten years along the Center Street corridor, one of downtown Berkeley's most important public spaces and one of its most successful retail streets. In this case, an activist-driven, ideologically based proposal to open a creek channel along the corridor has been vigorously promoted independent of any city-sponsored design process.

For years, the city has delayed committing to a public design process for the corridor despite repeated requests by the community, focusing on other priorities. All the while it has been hoping that funding for such a process will come from development fees extracted from a future hotel and conference center on Center Street. Yet, absent a design process to channel creative energies and find common ground, persistent pressure by outspoken advocacy groups has resulted only in an adversarial environment that has accentuated rather than resolved conflict.

The loudest and most politically effective voice for the transformation of Center Street has been that of a group led by Richard Register's "Ecocity Builders" and Citizens for Strawberry Creek. This association of creek advocates has focused on the "daylighting" and "restoration" of Strawberry Creek within the Center Street right-of-way (i.e., uncovering it within a new natural channel). They chose Center Street as a demonstration project because of its size and visibility. But presently the culverted creek is not even within Center Street's right-of-way, and there is no evidence that a natural creek ever flowed in the proposed location. Their dramatic and somewhat arbitrary proposal would replace a street that is well used by vehicles in the heart of downtown with an excavated artificial water feature and pedestrian precinct. Achieving this passionately held vision would not only be technically challenging but would raise complex issues for successful retail outlets there.

The creek proposal is on the city's agenda because of the political skills of its advocates. As evidence of this skill, the city's general plan supports creek "daylighting" on public property. The possibility of an open channel on Center Street has also been endorsed by the Mayor's Hotel Task Force, a citizen group appointed to advise the city on plans for the hotel and conference center. Furthermore, the Downtown Area Plan Advisory Committee (DAPAC), a City Council-appointed group overseeing development of a new downtown plan, recommended funding only that design option for Center Street that will be vehicle-free and accommodate a maximum feasible creek—although that conclusion is being challenged by the Berkeley Planning Commission.

The citizen effort so far has been one of effective advocacy, but it has not been one of community design. A design process is essential to exploring ramifications of the actions being promoted, in order to clarify and balance competing interests. The process might also create a place that reflects a full range of community values.

The overall vision of an ecologically based, pedestrian-friendly downtown environment is generally shared, but many community members have legitimate questions about the efficacy of and rationale for a creek channel along Center Street. Flexibility in the street design is a high priority for merchants, property owners, and other interested citizens, who worry about the effects of an excavated channel in the confined right-of-way. Many also consider vehicles desirable, perhaps on a reconfigured plaza-like "slow street," and they argue that cars could be phased out if pedestrian activities increase.

Skeptics further question whether pedestrian use would support total street closure and whether the open

Opposite: Plaques set in the sidewalk provide an anthology of Berkeley poetry.



creek would actually attract more people than an alternative design. And they have pointed out how failed pedestrian malls elsewhere are now being converted to "slow streets." Finally, in more practical terms, they have raised concern about cost, maintenance, retail vitality, safety, customer access, emergency access, daily services, and effects on the larger context.

In the face of relentless pressure to transform the street and conflicting visions for the space, citizens and stakeholders alike have become increasingly frustrated that city government has been able neither to create a more effective forum in which legitimate alternatives for the corridor can be explored, nor to turn the advocacy from a political act into a place-making tool.

Above: Center Street, downtown Berkeley, on a summer evening.

The Importance of a Design Process to Consensus Building

Anxious to promote their own vision for the corridor and to jump-start a design process, the creek advocates hired local landscape designer Walter Hood to prepare plans for Center Street. Hood spent some time with stakeholders listening to concerns about the corridor, and made an effort to respond to a broader range of community input than that of his sponsors alone.

At a recent event catered by the famed Berkeley restaurateur Alice Waters, he presented with great fanfare a wide range of urban patterns for the corridor. The twenty-one schemes balanced ecology and urbanism with stimulating variety. The apparent preferred scheme of the sponsors was an open creek channel, with water diverted from an upstream impoundment of Strawberry Creek.

The richness of patterns revealed to the community that a pedestrian street with a water feature could take many forms while satisfying common goals. However, the work, no matter how intriguing, did not emerge from a community process in which stakeholders frame and hone a design in concert with a designer. Instead, it reflected a personal response to the place, based on a program framed by specific interests. In reality, it is advocacy planning that reinforces its sponsors' points of view, despite the designer's interest in the commons.

Hood was charged with creating a visionary plan, not a community-based design. The goal of his sponsors is to persuade the community of the wisdom of their vision—to help it see the light with the help of an esteemed professional. The real goal of community design, however, is to discover the wisdom within the common vision, with the community guiding the development of the commons. These are fundamentally different approaches to place-making.

There is currently no public framework for an inclusive design process for Center Street, or for developing consensus around a particular plan. Visionary planning can be useful to a community design process. Ultimately, Hood's visions will enrich the community-wide discussion about Center Street. But Berkeley's history indicates that, for the community to truly embrace a plan for its commons, the design must flow from a process that includes full participation of all stakeholders and interested parties.

All images courtesy of the author.

Reimagining Center Street

Walter J. Hood

Revealed through time-lapse photography, the life of Center Street in downtown Berkeley, California, is like that of most American streets: a cacophony of cars, buses, and people moving back and forth. Looked at more closely, Center Street is not so ordinary. At one end is Berkeley's Civic Center and Park; at the other, the University of California. The street dramatizes arrival at these destinations through a gradient that exceeds twenty feet over its short, three-block length.

But the most profound aspect of Center Street in environmental terms may be that it is built near what was once the riparian corridor of Strawberry Creek. This stream, which flows out of the Berkeley hills and through the university campus, disappears once it reaches the edge of downtown. From there it continues underground toward San Francisco Bay—first in a culvert beneath the blocks south of Center Street, on which are various businesses, a BART station, City Hall, and the lawns, paths, and memorials of Civic Center Park.

It is within this context that the city and university are connected—and disconnected. Standing in Civic Center Park or in the university's green entry crescent, one senses no formal or natural connection between these emblematic spaces, even though Center Street runs directly between them.

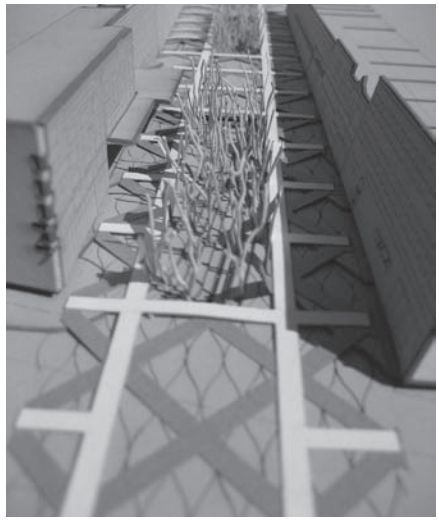
Revealing Landscape

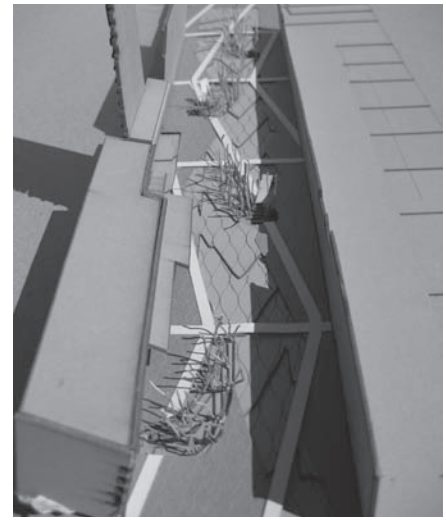
Walking along Center Street is a memorable experience. The body engages the gradient by leaning back going downhill and shifting the weight forward on the uphill. Visually and sensorally, one is also always aware of the sun: because of the east-west orientation, one is either in shade on the south sidewalk, or sun on the north. Looking upward, toward the university, one sees simply hills and…trees.

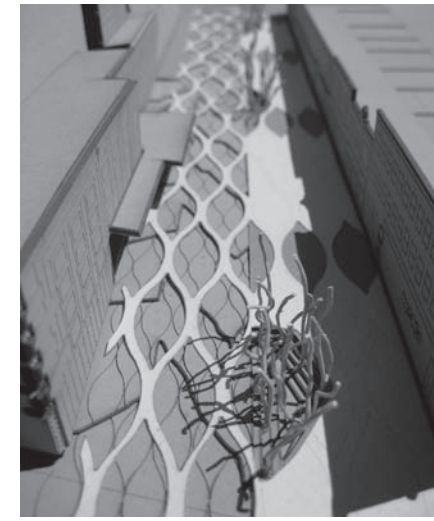
These are the tangible experiences of place that do not always factor into street design. But suggest a real distinction between figure and figuration.

There is another excellent example of this distinction nearby, on the Berkeley campus. Its central portions were ordered by a formal plan in 1898. But this figure has since been augmented and reshaped by the presence of Strawberry Creek. Today, the path of the creek and its associated flora provide an equally powerful figurative spine.

Understanding the dynamic between figure and figuration is paramount in designing an urban landscape that reveals its context. If designing with figure and ground can give order, balance, and spatial clarity, the figuration of space suggests involving users—or, more literally, entangling them within a set of experiences that emanate from the landscape.







From Studies to Scenarios

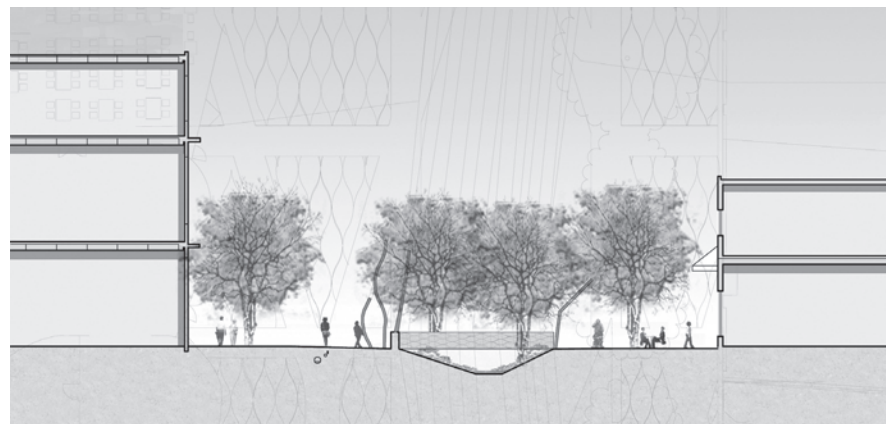
Clear morphological understanding can create a set of figurative strategies to employ in the design process. In the case of our work on Center Street, we sought to discover these through three areas of investigation. One was to look at the watershed of Strawberry Creek; a second involved understanding the general morphol-

Above: Models of three out of fourteen scenarios for Center Street.



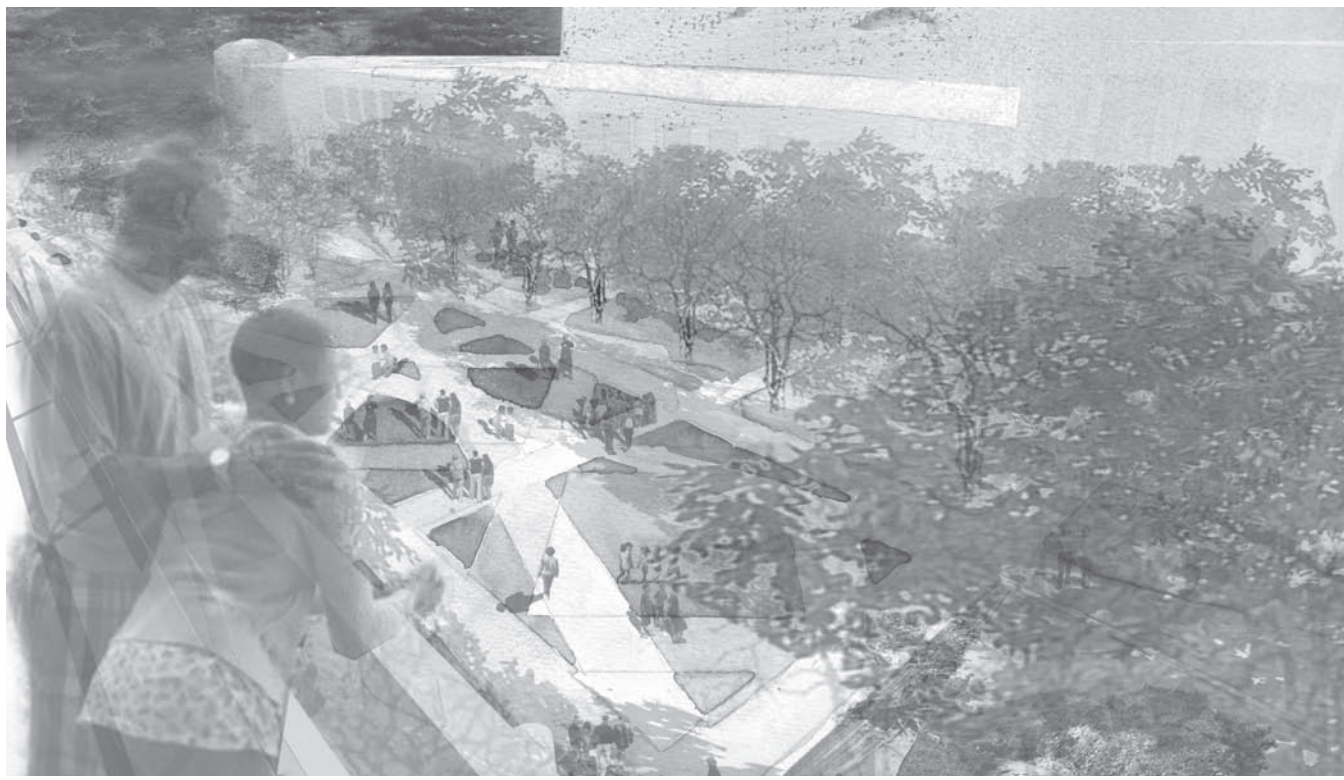
ogy of streams; the third was to look at patterns of aggregate movement, of both humans and local fauna.

From these analytics, we derived a landscape vocabulary. From the watershed study came an awareness of triangulations of alluvium. From stream morphology came the knowledge that gradient and form are intrinsically linked—the steeper the slope, the straighter the stream. And from the study of human and animal behavior came a sense of social enmeshing and interconnected fabric.



Further development of this vocabulary in the context of Center Street meant combining it with a basic understanding of streets. Physically, streets can be manipulated in many ways to accommodate people, infrastructure, and vehicles. However, we considered seven models: a central median (as in Barcelona's Ramblas); bulb-outs at corners and mid-block (creating a crooked street); an open street (with no curbing); justified north (curb only on the north side), justified south (curb only on the south); stepped (where retaining walls create a series of terraces); and divided (split down the middle).

Next, we combined these typologies with various character "samplings" of Strawberry Creek and the Berkeley city grid. We subjected twenty-eight such composite scenarios to feasibility studies of access, public safety, hydrology, and new development. The results were four-



teen practical combinations. From these, we created three hybrid designs to advance discussion.

Each design took a different position on rebuilding the landscape in the presence of the nearby creek. One imagined an open street where natural creek flow would be maximized within an open channel at the upper and lower ends, and where a grand public space would emerge in the middle. A second involved a stepped street, where the creek would be allowed to pool in three places, creating an episodic experience and the chance to remediate natural water quality. The third imagined a central median where the creek was absent, but where a porous field of bioswales might remediate storm runoff from the street and nearby roofs in contrast to an adjacent set of mechanized fountain pools.

Community Design, Scenario Building, and Hybridity

This is not the end of our design exploration. The next step is to produce a single design that builds upon these three positions. To get to this point, however, will involve further technical scrutiny and consensus-building.

There are many roles for the community designer within the context of city and neighborhood building: facilitator, translator, instigator, advocate, and even provocateur, to name a few. Reimagining Center Street indicates that at times the designer must move between these. The work may also be less about evaluating design positions than reframing the terms of conversation about people and the environment.

The Center Street project is less about whether a street should be open or closed, or whether a creek should be daylighted or not. It suggests a need to reimagine our everyday world by looking more closely at the environments in which we live. In this case, research and design have revealed what may be a false polarity between nature and the city that must be broken down if we are to achieve a new, more hybrid view of urbanism.

All images courtesy of Hood Design.

Opposite above: Plan—Open Hybrid Scenario.
Opposite below: Section—Open Hybrid Scenario.
Above: Perspective—Open Hybrid Scenario.

The "Places 25" Symposium

Cassim Shepard

Places25

The "Places 25" symposium, held May 3, 2008, at the U.C. Berkeley College of Environmental Design, was part anniversary celebration, part design retrospective, and part brainstorming session on directions this publication might take. Like the best birthday parties, it commingled commemoration with concern for the future in ways that were both celebratory and critical.

Twenty-five years is a milestone that few design publications reach. Yet the purpose of the symposium was not simply to dwell on past success. The event was framed by two quotations from the writings of *Places*' cofounder and editor, Donlyn Lyndon: "Places are spaces that you can hold in the mind, care about and make part of your life"; and "places instill the choreographies of society."

In opening remarks, Lyndon said he hoped the event would "test and extend these propositions." Like the pages of the journal, he hoped it would produce "lively discussion of how valued places come into being, how they are designed, how they matter, and what we may all do to make places that nurture lives and enrich the public realm."

Designing for Place

To set the stage, the symposium began with a series of reports on *Places*' history and recent activities. These came from William Porter, its founding co-editor; David Moffat, its current managing editor; and Lisa Sullivan, its current publications director.

The first morning panel began with a presentation by Robert Campbell, an architect and the architecture critic for the *Boston Globe*. Campbell based his remarks on two poems he had written about his grandparents' house on Lake Erie, both of which struck notes of nostalgia and intellectual curiosity about place. Their processional sequences of imagery, moving from inner realm to larger environment, evoked an elegiac architecture of the imagination. Campbell's remarks also functioned as a call for the kind of thoughtful consideration of built form and social experience that has long been a hallmark of *Places*.

The discussion then turned to the presentation by their designers of buildings for various types of public assembly. . First, the architect Peter Bohlin described Bohlin Cywinski Jackson's designs for the Apple Store, on Fifth Avenue in New York, and for the Teton National Park Visitor Center, in Wyoming. In entirely different contexts, the two structures explore the dynamic relationship between interior and exterior space. The work also did much to expand on Lyndon's epigraph, "places instill the choreographies of society." Movement in the Apple store is upward, from a belowground retail space to a highly visible public plaza. At the Teton Center, it is through a perfectly proportioned courtyard, which gathers people before they enter a grand, log-supported hall where the beauty of the Tetons unfolds before them. In both cases the architecture uses transparency, concentrated mass, and carefully articulated detail to create paths.

The choreography described next, by Mark Simon—Centerbrook Architects' design for the Park East Synagogue, in Connecticut—was also one of approach. Yet, fortunately, the design did not treat the building as a precious object so much as a simple place of worship and community. His methodology of "carving program" was particularly eloquent. It resulted in a vigorously shaped wood-strand canopy that hovers over the ark and creates an altogether memorable place, echoed by analogous forms elsewhere in the building.

To complete the session, Professor Elizabeth Macdonald of the University of California, Berkeley's, Urban Places Design Group, presented her work as part of a collaborative of artists in the design for a "Circle of Memory," constructed of hay bales, to be installed in several museums. At each installation, the journey into and out of its central cylindrical space, where a steady fine stream of salt accumulated in a cone over time, created a ritual of movement that could be used to remember the deaths of children.

The projects discussed in the second morning panel were more urban in scale—campuses, streets, and towns. The standout for me—the most stimulating project presented—was a series of design proposals by the Oakland landscape architect Walter Hood for Center Street in Berkeley. Hood's work revealed a deep engagement with systems, natural and social, beyond the site in question. And the project was unique among those presented for its sensitivity to factors outside of the designer's control.

The other presentations were also strong. The MIT architecture professor Stanford Anderson discussed the historic layout of the town of Aiken, South Carolina, platted in the 1830s by a local railroad, speculating in land for the construction of private summer homes. As a measure designed to promote health, the town featured extraordinarily wide rights-of-way where the pine trees were left uncut. Today these provide the city with a dramatic grid of linear parks.

The architect Frances Halsband presented her firm's design for a new pedestrian "green" linking areas of the Brown University campus, in Providence, Rhode Island. It highlighted the importance of boundaries, building character, and landscape in determining the sense of campus as a particularly memorable kind of public realm. She also explained how these same qualities informed Kliment Halsband's work on the small campus of Arcadia University in Pennsylvania.

Coming last, architect Mario Violich presented plans by Moore Ruble Yudell for a new building on the U.C. Berkeley campus, not two hundred yards from where the symposium was being held, to be shared by its law and business schools. The charge was to create a "forum" space, where expansion of the two programs could forge new connections. To accomplish this unity on a difficult, sloping site, they conditioned the shape and location of programmed areas on existing complex patterns of circulation on the campus around it.

The Place of *Places*

After the eight morning speakers, the symposium broke into small groups for lunchtime discussions directed at the journal's future. When the full group reconvened, six members of the *Places* editorial advisory board reported on the substance of these brainstorming sessions. Topics ranged from the value of peer review, to the journal's engagement with international contexts, to the potential of digital delivery mechanisms for scholarly publication. Issues of audience, editorial agenda, and format were also addressed.

For a journal to search its soul in public, to question its identity as a forum for scholarship and professional excellence, reflects its commitment to remaining vital and relevant. But the crowd who remained for the afternoon session, some forty people or so, seemed largely composed of *Places*' loyal core of professional and academic supporters, rather than new audiences or design enthusiasts from other disciplines, biases, or institutional cultures.

Yet, despite—or, perhaps, because of—the palpable insularity of the afternoon session, the loyalty of this core group seemed to predict that *Places* still has a role to play in critical discussion of environmental design and the public realm. However, to maximize that potential, *Places* would do well to heed the advice of the plenary session: solicit international subject matter, cultivate a younger and more interdisciplinary readership, and respond proactively and innovatively to the possibilities of digital distribution and community-building.

Two final speakers, the U.C. Berkeley architecture professor Nicholas de Monchaux and former *Places* executive editor Todd Bressi, touched on some of these issues in their concluding remarks. Both tried to expand the frame of reference of *Places*' work to include the relationship of architectural interventions to digital culture and governance, two realms that are inextricable from serious conversation about design in the public realm today.

These presentations, in the context of all that had come before, led me to wonder about the role of design within the broader realm of environmental design. In that, the "Places 25" symposium was an enormous success: I left inspired by the range of solutions being applied to place-making, the attention to program, the responsiveness to human behavior. But I also left puzzled by the decision to address only factors under the control of physical designers.

The presentation of architecture, landscape architecture, and urban design at the symposium indicated that the role of place-makers is primarily to determine form rather than to interrogate the conditions that affect experience. Even the presentation of larger urban projects tended to privilege the singular authorial voice rather than analyze how design choices and processes interact with external forces and flows. This pattern begged the question: where were the scholars, artists, and urban planners? While the projects discussed exist in the public realm—educational, religious, cultural, and commercial—almost all were structural responses by designers to clear programs defined by clients.

Designs for the public realm that intervene in the network of relationships that govern legislation, generate revenue, or respond to demographic or socioeconomic change were conspicuously absent. Perhaps that is not the role of designers, who were the primary audience for the symposium. But it is certainly within the province of place-making, and I hope it will become a more central part of the future editorial agenda of *Places*.

Contributors

Marina Alberti is a professor of urban and environmental planning in the Department of Urban Design and Planning at the University of Washington, Seattle, where she also directs the Urban Ecology Research Laboratory. Her interests are in the impacts of alternative urban development patterns on ecosystem dynamics.

Robert Campbell, FAIA, is the Pulitzer Prize-winning architecture critic of the *Boston Globe* and a regular columnist for *Architectural Record*. He also practices architecture as a consultant to cultural institutions.

Martin Felsen and **Sarah Dunn** are co-founders of UrbanLab, a collaborative design office practicing architecture and urbanism, whose primary interest is in projects that speculate on a more sustainable and resourceful tomorrow. Felsen also teaches city design and theory as an associate professor in the College of Architecture at the Illinois Institute of Technology, and Dunn is an associate professor of architecture at the University of Illinois, Chicago. In 2008 they became co-directors of Archeworks, an alternative design school in Chicago.

Harrison Fraker is a professor of architecture and urban design at the University of California, Berkeley. He served as Dean of the College of Environmental Design there from June 2000 to June 2008.

Cynthia Girling is a professor and chair of landscape architecture in the School of Architecture and Landscape Architecture, University of British Columbia. She is a co-principal in the elementsLAB, and conducts research on sustainable urban design.

Ray Green is an associate professor of landscape architecture at the University of Melbourne, where his research explores community perceptions of environmental change. He is co-author of *The Green City: Sustainable Homes, Sustainable Suburbs* (2005, University of New South Wales Press and Routledge).

Randolph T. Hester is a professor of landscape architecture and environmental planning and urban design at the University of California, Berkeley, and the author, most recently, of *Design for Ecological Democracy* (MIT Press, 2006).

Walter J. Hood is a landscape architect in Oakland, California, and a professor of landscape architecture and environmental planning and urban design at the University of California, Berkeley.

Mary Carol R. Hunter spent fifteen years as a research ecologist. After realizing the need to bring ecological knowledge into the cultural landscape, she became a professional landscape architect, and is now also an assistant professor in the School of Natural Resources at the University of Michigan.

Donlyn Lyndon is editor of *Places* and Eva Li Professor emeritus of architecture and Urban Design at the University of California, Berkeley.

David J. Matthews, AIA, is a principal of Jones & Jones Architects and Landscape Architects, Seattle, WA. His thirty years of professional practice have been committed to environmentally sensitive solutions to projects that are nature centered, culture based, and community driven.

Virginia Matzek is an assistant professor of environmental studies at California State University, Sacramento. Her research centers on the restoration of California oak woodlands and grasslands. **Peter Kareiva** is chief scientist for the Nature Conservancy. His work aims at making concrete the links between conservation and human well-being so that conservation can work for people, not against them.

Kiel Moe is an assistant professor of architecture at Northeastern University, whose work focuses on material, energy and construction systems. His book, *Integrated Design in Contemporary Architecture*, will be published by Princeton Architectural Press in October 2008.

David Myers, ASLA, is an associate professor in the landscape architecture program at the University of Maryland and an affiliate member of the National Center for Smart Growth Research and Education. His work focuses on landscape ecology, regional design, conservation design and planning, and sustainable environments.

Guy Nordenson is a structural engineer and partner at Guy Nordenson and Associates, New York, and a professor of structural engineering and architecture at Princeton University. **Stephen Cassell**, AIA, is principal and co-founder, with Adam Yarinsky, of Architecture Research Office, New York. **Marianne Koch** is a recent graduate of the civil engineering and architecture program at Princeton University and an engineer with Guy Nordenson and Associates. **Catherine Seavitt**, AIA, is an architect and landscape designer, principal of Catherine Seavitt Studio, New York, and a lecturer in architectural design at Princeton University. **James Smith** is a professor of civil and environmental engineering at Princeton University, whose research interest is in natural hazards that affect the urban environment. **Michael W. Tantala** is a professional engineer with Tantala Associates in Philadelphia, PA, who specializes in risk assessment for earthquake, wind and flood hazards.

William Porter is a professor emeritus and former dean of the school of architecture and planning at the Massachusetts Institute of Technology, where he taught studios in urban and architectural design and seminars in design methods and theory. He was a founding editor of *Places*.

John N. Roberts is a Berkeley landscape architect who has been a visiting lecturer in the Department of Landscape Architecture at the University of California, Berkeley.

Nancy Rottle is an associate professor of landscape architecture at the University of Washington, Seattle, where she directs the Green Futures Research and Design Lab. Her interests are in green infrastructure systems, ecological treatment of water, and design for environmental literacy.

Cassim Shepard is a filmmaker whose work has been exhibited at the Musée de la Civilisation, Quebec, the Cineteca di Bologna, and the 2006 Venice Biennale. He is currently the founding director of Urban Omnibus, an experimental digital communications project of the Architectural League of New York (http://urbanomnibus.net).

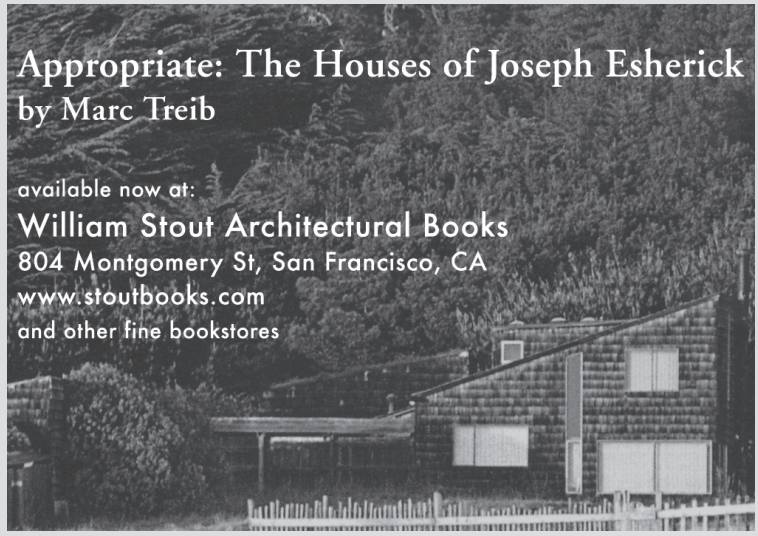
Contributors

Pablo Suarez is Associate Director of Programs for the Red Cross/Red Crescent Climate Center, and climate change advisor for Oxfam America, and a visiting fellow at the Boston University's Frederick S. Pardee Center for the Study of the Longer-Range Future. **Graham Saunders** is an architect and current Head of Shelter for the International Federation of Red Cross and Red Crescent Societies. **Sandra Mendler**, AIA, is a nationally recognized advocate for sustainable design and a principal with the design and planning firm Mithun in San Francisco. **Isabelle Lemaire** is a freelance filmmaker, communications consultant, and participatory video consultant with an M.Sc. in Environment and Sustainable Development. **Jorge Karol** is a senior researcher at Habitat Research Institute and a professor of urban planning at the School of Architecture and Planning, Universidad Nacional de La Plata, Argentina. **Laura Curtis** is completing an M.Sc. degree in Environment and Sustainable Development at University College London; her dissertation examines wetlands degradation in Louisiana.

Danai Thaitakoo is a lecturer in the Department of Landscape Architecture, Chulalongkorn University, Bangkok, Thailand. His current research focuses on landscape and urban ecology, particularly issues of change, resilience and adaptability. **Brian McGrath** is a principal architect with Urban-Interface, an urban design firm concerned with the interrelationship of space, media, and ecology. He is also an associate professor of urban design at Parsons, The New School of Design, and was a senior Fulbright scholar in Thailand.

Paula Vandergert is a senior research and futures advisor at the Commission on Architecture and the Built Environment in London.

Adam Yarinsky, FAIA, is a principal and co-founder, with Stephen Cassell, of Architecture Research Office. The firm's work includes a diverse range of residential, commercial, academic, cultural, and public projects informed by research into site, program, materials, and construction technology.



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A House on the Lake

Robert Campbell



Good Morning.

I will not be showing any images. Those who wish to leave may do so now.

What I am going to do is read you two poems, both of which I wrote some time ago.

I want also to remind us of Donlyn's two keynote quotations:

> *Places are spaces that you can hold in the mind, care about, and make a part of your life.*
>
> *Places instill the choreographies of society.*

Above: The house on the lake. Photo by author.

Each of us has once inhabited, I believe, usually in childhood, a place to which we return continually in memory and imagination. We replay scenes from our time there. The place is, for ourselves and no one else, the navel of the universe, the center against which all later places are, to some degree, peripheral.

The most important place in the world is one I think of almost every day. I spent all my summers, when I was growing up, at a house on the Canadian shore of Lake Erie, a short distance from my native city of Buffalo. It was a house owned by my grandparents.

I'm going to read you first a poem that I wrote about that house and place. The poem was published in the *Atlantic* some years ago. But first I have to describe the scene.

Imagine a bay on Lake Erie, a bay lined with sandy beach. (*Holds out arms in shape of a bay.)* The bay is maybe two miles across. We can barely see the other side of the lake, because Lake Erie is almost as big as an ocean, but sometimes we can see freighters creeping along the horizon.

At the far tip of the bay, on the left, is an amusement park called Crystal Beach. An excursion boat arrives there every two hours from Buffalo across the lake, puffing black smoke. The park with its roller-coaster towers, and the periodic boat with its smoke, are two things that are deeply recorded in my mythical consciousness.

The right-hand side of the bay is enclosed by Point Abino (rhymes with cabin-oh). A single lonely tree

stands—or so it appears—at the end of the point. So you have Crystal Beach on one side and the lone tree on the other—except, when you drive or hike or bicycle up Point Abino, you can't find that tree. From the bay it appears to be the end of the point, but in fact the point curves away from it and continues on. This small mystery also is among my mythic icons.

The Screened Porch

A chorus upon the pure
formal fling of myself,
projectile, arrow, bird,
on the axis of the world
out of the dark and brown
bookshelved living room,
the catapulting feet
tiny, naked, pounding
the Navaho rugs, the call
of gulls, the shuffle of oaks,
the blade of threshold brass,
the porch air bright and warm,
smell of the sun, a figure
shadowy on the swing,
or creaking in the wicker,
the smash through the screen door,
the stone path chilly, the pierce
of acorns, the downward leap
through the wall and the hot steps,
the pale and yielding sand,
the lake, the far dissolving
horizon of New York State
the screen door slam behind.

Okay, the house. It was a big house, gray stucco, white trim, ivy, with a broad screened porch across the front, facing the lake across a lawn with a big old oak tree. I am telling you this because the house is referred to in the poem. There are actually two poems, but I'll start with this one. It is a narcissistic poem, so take it as you will.

I am imagining myself racing, as I often did, from the living room to the lake. The living room is relatively dark, very much an arts-and-crafts room, with a stone fireplace and walls paneled in dark wood, and bookcases filled with the likes of Mark Twain, who was a pool-playing pal of my grandfather's uncle in Elmira. Imagine that I am running through the screened porch out onto the lawn, down through the stone wall, across the beach, and into the lake.

When I wrote that, I was thinking about nothing other than having had that experience. It wasn't until some time after I'd finished the poem that I realized it can also be read as a metaphor for the cycle of life.

I begin in a dark and cozy living room, with the books and Navaho rugs reaching into the American past. Pounding feet, tiny, naked—like a baby being born. I hadn't thought of any of this when I was writing. With each step forward, the world gets bigger, brighter, and more public. From the living room, to the porch, to the front yard, to the beach, to the lake: a series of gates and thresholds. The world is opening out and becoming more bright, more transparent. And I am growing up. We end with the lake, and the lake, if you still believe in Freud, the plunging into water, is a symbol of either birth or death. And the screen door heard slamming behind is something that says, "You can't go back again."

Screened porch—I am fascinated with them, as I think most of us are—a screened porch is neither indoors nor outdoors, and that is the magic of it. It is a space of a unique kind, and I wish everybody had one, as they do in California, I guess, but we don't where I live. In my grandparents' house I often slept on another screened porch, a sleeping porch higher up among the rustle of leaves and patter of rain, with the crunch of gravel in the driveway below and the smell of sunshine stored in the blankets.

Some other footnotes to the poem:

"The call of gulls…" Something pulling me forward and outward.

"A figure shadowy on the swing or creaking in the wicker…" Mysterious grownups, I guess. I encounter them right after crossing the brass threshold.

"A smash through the screen door…" I was always being told not to slam through doors and make a racket. I suppose this is also some kind of angry declaration of escape and independence.

"The pierce of acorns, the downward leap through the wall and the hot steps, the pale and yielding sand…" As with everything else, the metaphors here are not intentional, but I can't help reading these lines—hot steps, pale yielding sand—as being, in part, a sexual metaphor. I think it has to be understood that way, but I wasn't conscious of it. So I am maybe a teenager by the time I get to the beach.

"The far dissolving horizon of New York State, the screen door slam behind…" My future and my past?

(Reads the poem aloud again.)

Now what does that have to do with what Donlyn said? "*Places instill the choreographies of society.*" Well, places also instill the choreographies of one's individual biography, not only those of society. And as we play out against these game boards, the architecture enriches us with all kinds of images and metaphors.

The second poem is titled "Bay Beach, Ontario, 1941–1949." It was published in *Croton Review*, and it's about the same place. What happened is that my mother sent me a clipping from a Buffalo newspaper about that excursion ferry that once went back and forth between Buffalo and

Crystal Beach. One of those Proustian moments: the newspaper photo was my Madeleine.

Okay, some footnotes to this one:

"Lightnings slapping…" Our house was five houses down the beach from the largest Lightning club in North America. Lightnings are sailboats, and you could see them racing up and down the bay all the time.

"Collie chasing an airplane…" The collie was Terry, who lived next door. Collies need life work. They're supposed to herd sheep or whatever. To be happy, they need a job. Terry decided it was his job to make sure no airplane ever landed. So if an airplane appeared, he would go barking down the beach until he had chased it out of sight.

"Highballs and wicker chairs behind screened porches…" All sorts of adult mysteries going on around us.

"Small shouts from the lake…" Are they playing? Drowning?

"Giggles upstairs…" Oh my goodness, what are they doing?

"The smell of oil on the soft dark floorboards of the old garage…" That garage was down the drive, empty except for a rake or two, always hot inside with a rich smell. Smell is for me, like many of us, a Proustian memory evoker. I suppose this image too may have a sexual connotation.

"With a red toy shovel I bury a blue matchbox deep in the wet sand beside the steps in the stone wall Boppa built…" Boppa was a family term for my grandfather. I actually did bury the box. Perhaps I imagined that some day I would come back and dig it up. It felt very important, very secret, when I was doing it.

(Reads the poem aloud again.)

Just yesterday I heard someone, it was Daniel Libeskind, quote a definition of architecture by Marcel Duchamp: "*Architecture is sculpture with plumbing*." I think this is a useful definition because it is, characteristically of Duchamp, precisely and brilliantly wrong.

My own definition of architecture is different: "Architecture is the art of making places." It is certainly an art. But it is the art of making places for human habitation, whether these are rooms or streets or gardens or cities. It is not primarily an act of sculpture, plumbing, image-making, politics, or philosophy.

Places instill choreographies in societies. I hope I have helped illustrate that. You've been very kind. Thank you.

Editor's note: Robert Campbell asked to append the following comment, which was made later in the symposium by Harrison Fraker:

I thought the two poems that were read this morning were really appropriate. I was moved by how well those poems, through words, captured two fundamental ways of perceiving and constructing experience.

The first one was a serial, linear portrayal of this sprint into the lake. It summarized an understanding of place as a sequential event. The second was simultaneous, layered, and nonlinear in its evocation of the totality of that place. These two ways of being in the world—a serial experience and a simultaneous experience—are critical to how we understand places. They are near the core of one of the things the magazine has done over its history. They reflect the difference, for example, between early and late Cubism, so-called analytic Cubism versus synthetic Cubism, as in the distinction between Duchamp's "Nude Descending a Staircase" and Picasso's "Three Musicians." I just want to remind you all of that. It was beautiful poetry, but those are two fundamental ways of being.

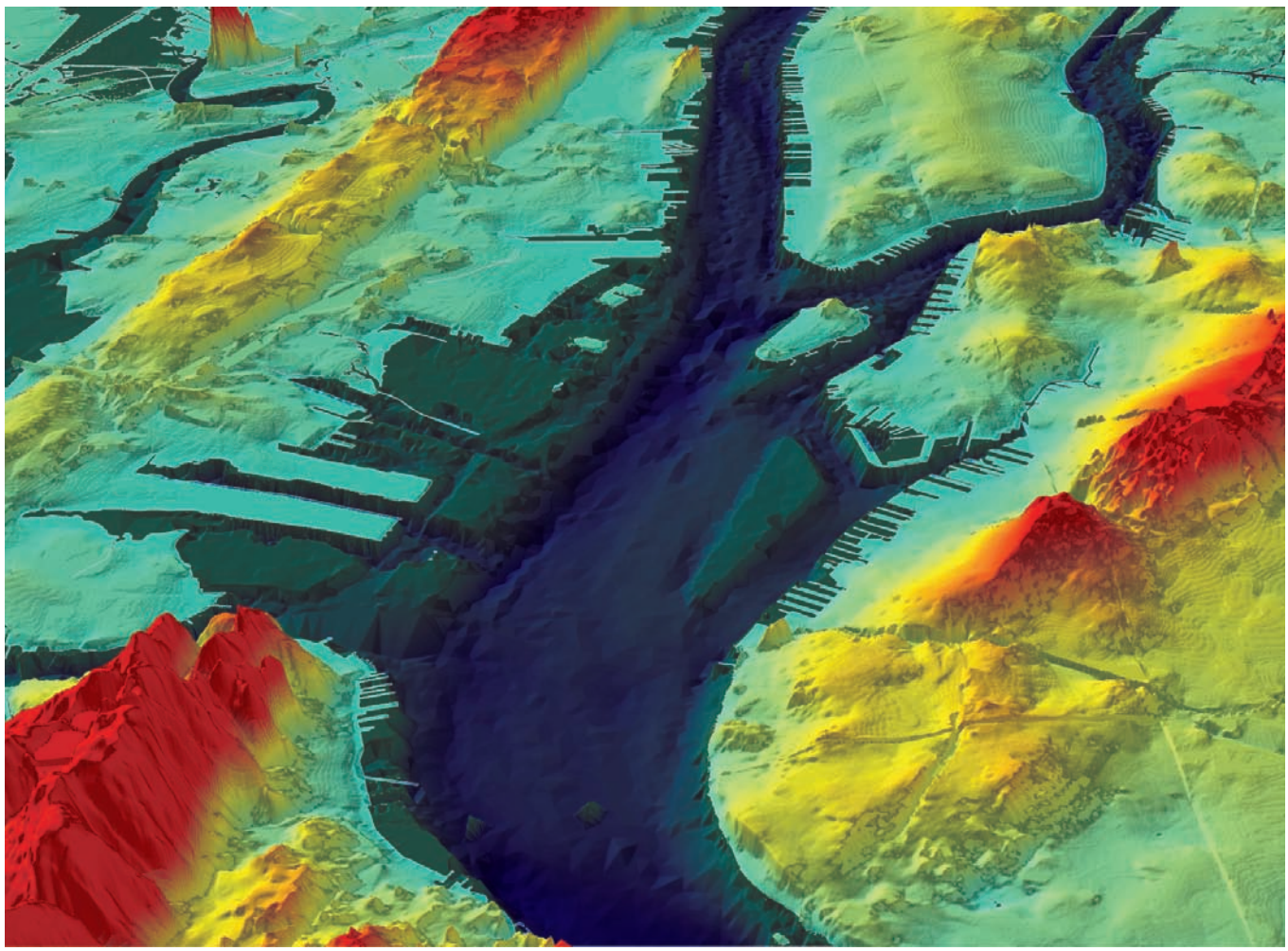
Bay Beach, Ontario, 1941–1949

They're running the film again—
the Crystal Beach Boat puffing, turning too slow,
settling to dock grainy and jumping—
the lone tree at the end of Point Abino—
the compass legs of the known world framing
the bay, the Lightnings slapping, a collie chasing an airplane,
highballs in wicker chairs behind screen porches,
small shouts from the lake, giggles upstairs,
the smell of oil on the soft dark floorboards
of the Old Garage.

With a red toy shovel I bury a blue matchbox
deep in the wet sand beside the steps
in the stone wall Boppa built.

On The Water:
The New York—New Jersey Upper Bay

Guy Nordenson, Stephen Cassell, Marianne Koch, Catherine Seavitt, James Smith, Michael Tantala, Adam Yarinsky



At the end of a hundred leagues we found a very agreeable location situated within two prominent hills, in the midst of which flowed to the sea a very great river, which was deep at the mouth.

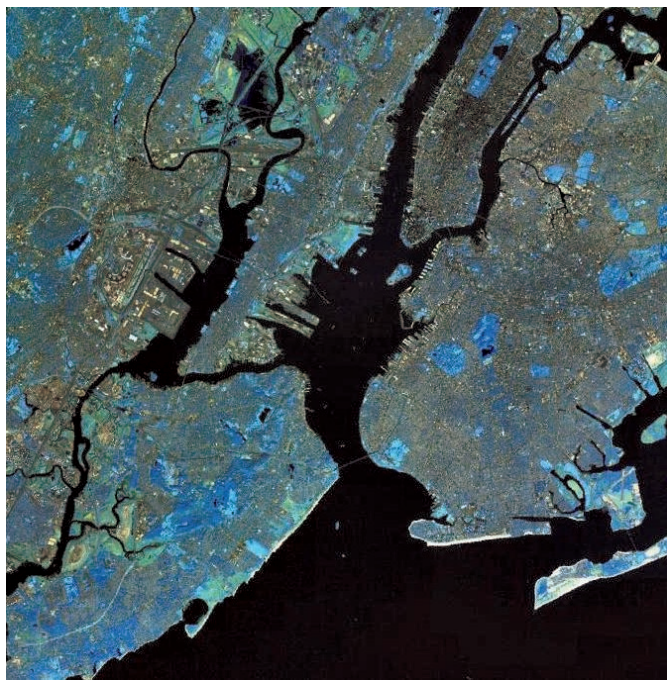
—Giovanni da Verrazano, 1524

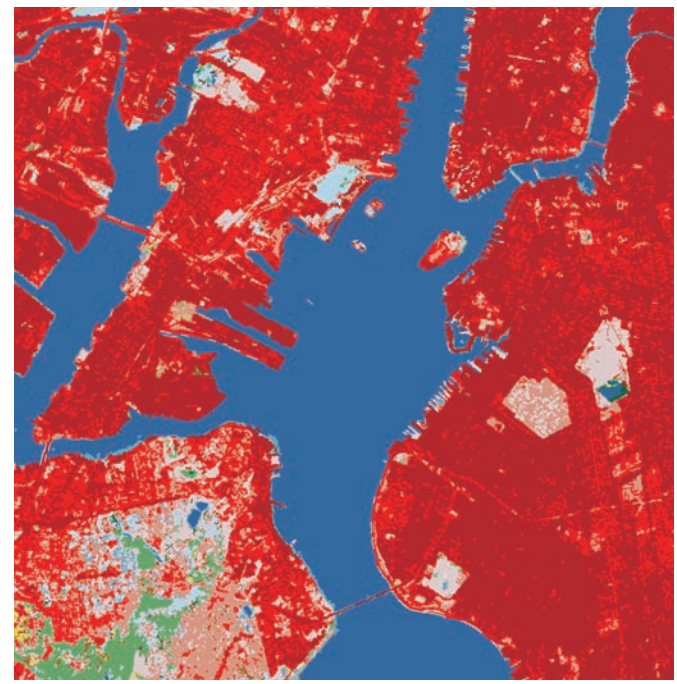
Sea level rise will affect infrastructures, environments, and coastal communities around the world. The New York-New Jersey metropolitan region is no exception. With twenty million people living within a fifty-mile radius of its central harbor, the region is an economic powerhouse, and the harbor itself is home to a rich but fragile estuarine ecosystem. Both the built and the natural elements of this tenuous relationship will be radically affected by global climate change and its consequences.

Above: GIS-generated image of the New York-New Jersey Upper Bay, with merged bathymetric and topographic datasets. The vertical scale is exaggerated by a factor of ten.

By 2050, it is likely that the mean sea level in the New York-New Jersey area will rise by between six inches and two feet as a result of warming oceans. And given the potential widespread melting of the Greenland and Antarctic ice caps, it is quite possible that the relative sea level in the New York-New Jersey area could rise by three feet by 2080.[1]

Sea level rise is merely the static part of warming's impact. The dynamic aspect is the flooding produced by storm surges. Because of higher water levels, it is likely that flooding resulting from severe storms—hurricanes





and Nor'easters—will increase dramatically. What is currently considered the one-hundred-year storm flood will recur every nineteen to sixty-eight years, and the five-hundred-year storm flood may recur closer to every one hundred years.[2] Furthermore, higher ocean temperatures could increase the frequency and severity of hurricanes, thus heightening the likelihood of extreme storm surges.[3] Storm surge levels could reach twenty-four feet in the New York area with a Category 3 hurricane.[4]

The hazards posed by climate change, sea level rise, and severe storm surges make this the time to transform our coastal cities through adaptive design. The conventional response to flooding, in recent history, has been hard engineering—fortifying the coastal infrastructure with seawalls and bulkheads to protect real estate at the expense of natural tidal wetlands and ecosystems. This approach has been proven environmentally damaging, unsustainable, and often ineffective. The failure of levees and other coastal protection structures facing Hurricane Katrina in 2005 is a dramatic example of infrastructural inadequacy. The unexpected ecological effects of the Eastern Scheldt Storm Surge Barrier in the Netherlands also indicate the risky nature of such systems.

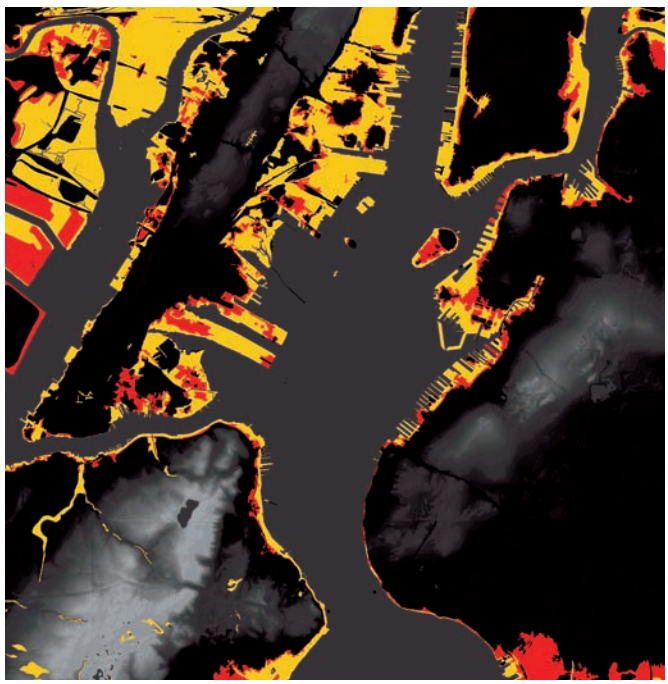
Significant research into the risks of climate change in the New York-New Jersey area has led to several proposed solutions—in particular, a system of four storm surge barriers.[5] But the shortcomings of such conventional systems should provoke a comprehensive reconsideration of coastal planning. It is time to invent a new approach that can not only be sustainable from environmental, technical, and economic standpoints, but also improve the quality of urban life.

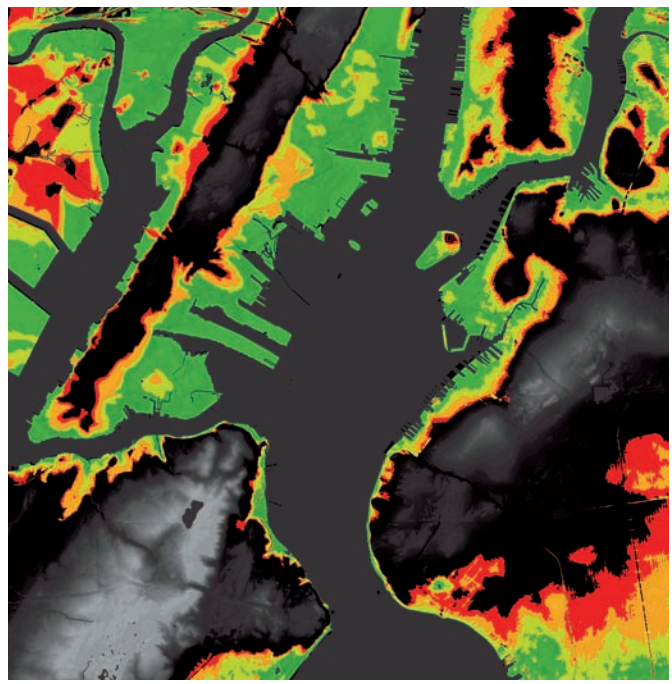
The Proposal

"On the Water," is a project funded by the Latrobe Prize, the American Institute of Architects' College of Fellows biannual research grant. It reflects the initiative of a group of engineers, architects, landscape architects, and planners, working collaboratively to imagine the transformation of the New York-New Jersey Upper Bay in the face of certain climate change.

The project's study area is the Upper Bay of New York Harbor, framed by the Bayonne Bridge at the western edge of the Kill van Kull, the Holland Tunnel and the Manhattan Bridge at the north, and the Verrazano Narrows Bridge at the south. The surface area of the Upper Bay is approximately twenty square miles, and it measures almost four

Left: NASA World Wind pseudo-color satellite image of the New York-New Jersey Upper and Lower Bay and the greater estuarine complex.
Right: GIS-generated image of the New York-New Jersey area's high-intensity landcover. Dataset by the U.S. Environmental Protection Agency.





miles across at its widest point. The Upper Bay has been chosen as the site for our proposal because of its potential to create a unified regional place for New York and New Jersey, a body of water with shared ecological and physical boundaries rather than one divided by arbitrary lines of political districting.

We propose three adaptive strategies to transform the Upper Bay, to reduce flood risk from both sea level rise and storm surge, and to challenge current functional relationships among water, land, and shelter.

Create an archipelago of islands, shoals, and reefs in the Upper Bay to both reduce the impact of storm-induced wave energy and improve the ecology of the estuarine environment. The bathymetrics of the bay will be modified, but current shipping channels will be maintained.[6]

Create a soft but resilient coastal edge, combining tidal marshes, public parks, and finger piers and slips for recreation and possible development, and determine where to selectively place protective seawalls.

Create flexible and democratic zoning formulae for coastal development that evolve in response to climate change and storm events to increase community welfare and resilience to natural disasters.

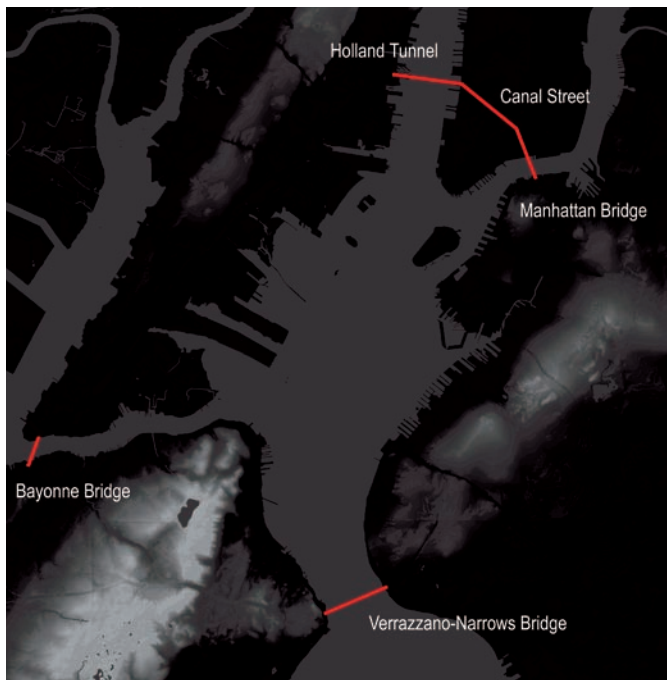
Together, these three strategies—on the water, on the coast, and in coastal communities—form a radical proposal for transforming the Upper Bay into the region's central open space. The Upper Bay can become an ecologically sound archipelago "park," a place that will be for the New York-New Jersey region in the twenty-first century what Central Park was for Manhattan in the late nineteenth century.

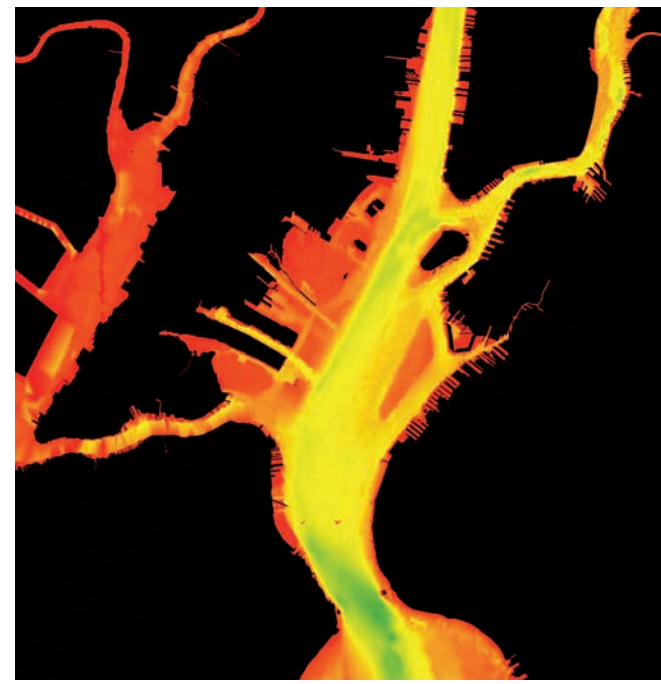
Left: GIS-generated inundation analysis of one-hundred- and five-hundred-year floodplains. The one-hundred-year floodplain is indicated in yellow, and the five-hundred-year floodplain indicated in red. Dataset by FEMA.

Right: GIS-generated inundation analysis of the SLOSH (Sea, Lake, and Overland Surges from Hurricanes) zones. Category 1 hurricanes are indicated in dark green, Category 2 in light green, Category 3 in orange, and Category 4 in red. Dataset by the National Hurricane Center.

The Rationale

The role of the upper New York-New Jersey harbor as a site of distributed, conventional maritime use was gradually lost as the shipping industry shifted to the more concentrated container-based ports of Elizabeth, Newark, and Bayonne in the 1960s. This led to the near total demolition of the piers that once lined Manhattan, Brooklyn, and Staten Island. The subsequent "clean-up" of the disused waterfront opened the way for recreational, residential, and commercial use and gave the impression of progress, renewal, and redevelopment.





Yet, in fact, this conversion led to the degradation of existing coastal habitats and, in some areas, an increased vulnerability to flooding. Because it most often resulted in a hard sea-walled edge, any ecosystems that may have gathered around or in the shadow of the piers were displaced or destroyed, and any sense of tidal variation was lost. Any protective advantage of the piers in the event of storms was also eliminated. At the same time, valuable real estate was pushed to the waterfront, often privatizing access to the water.

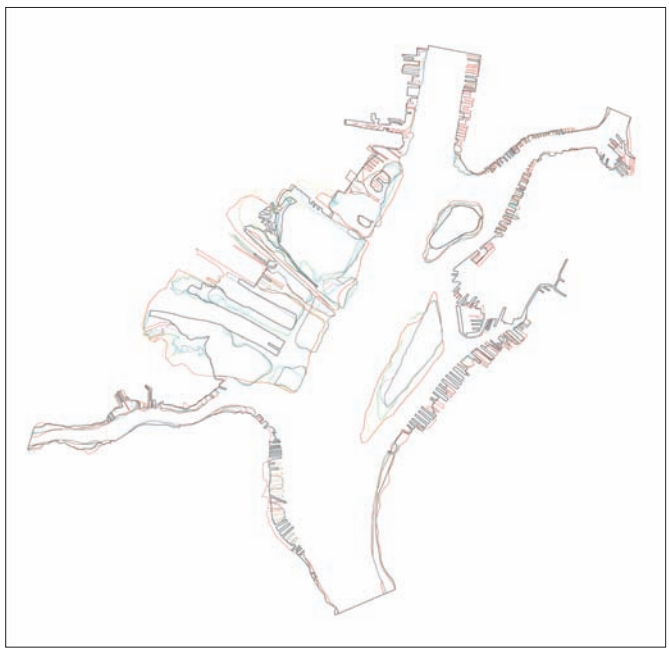
A principal hypothesis of this research is that a softer shoreline—a more gradual transition from land to water—provides a more resilient edge, better able to contend with sea level rise and increased storm surge flooding. A "fingered" edge like the repetitive piers of the former working waterfront would offer a buffer zone of breakwaters and relieving structures in case of flood events. These pier structures could also be adapted to create a graded edge of tidal wetland terraces or other sloped surfaces, rather than a hard vertical edge. In contrast to the hard edge of the waterfront "clean-up," a softer shoreline and broader edge zone are likely to prove more sustainable and resilient.

This thinking extends to the water of the Upper Bay itself. In addition to the establishment of a hard waterfront edge, the shift to container shipping led to the dredging of deep channels providing ship access to Bayonne and Red Hook, through the Kill van Kull, and up the Hudson River. This dredging continues today in order to accommodate ever heavier container traffic around the Upper Bay, even though some of these channels may no longer be necessary, and might in fact funnel storm surges.

We propose filling in some of the channels and recovering the bay's original shoals, anchorages, and oyster beds, particularly the Jersey City and Red Hook shores. These changes would not only enrich the bay ecology but also serve as breakwaters to diminish wave action and thus the extent of storm surge flooding. Our scheme for a matrix-like field of caisson islands—an archipelago of shoals, oyster beds, artificial barrier reefs, and low islands—would transform the bathymetrics of the Upper Bay into a nature preserve on the water, enhancing its ecology and improving storm protection for the region.

The transformation of the Upper Bay will be studied both as an urban landscape design strategy and as a plan

Left: Limits of the Latrobe study area of the New York-New Jersey Upper Bay. **Right:** GIS-generated bathymetric model of the Upper Bay. Deepest areas indicated with green, shallowest areas indicated with red. Note the deep Verrazano Narrows, the shallow Jersey Flats to the west, the Bay Ridge Flats to the east, and the straight dredged shipping channels cutting through the Jersey Flats.



for flood protection. We will test its design elements using computational fluid dynamic models to evaluate their effectiveness as storm breaks and barriers. The extent of flooding predicted by these models will then be used in GIS-based economic analyses to determine damage and cost consequences.

We propose to implement this transformation using the most cost-efficient and environmentally sound methods possible. One potential strategy for achieving the desired bathymetric changes is the use of clean dredge spoils from dredging projects. The Harbor Deepening Project—the largest such undertaking for the Port of New York and New Jersey—will make available an estimated forty million cubic yards of dredged material. Habitat restoration and environmental improvement in conjunction with dredging—authorized under federal law and a major goal of the Army Corps of Engineers' Dredged Material Management Plan—are mutually beneficial endeavors.[7]

Above: Tracings of a century of coastline transformations. Edges, flats, shoals, and anchorages from a series of National Oceanic and Atmospheric Administration historical nautical maps and charts.

Opposite: Preliminary design strategies for an adaptive intervention of wetlands, windmills, reefs, oyster beds, island fields, extended piers, detached piers, and extracted slips.

Costs and feasibility for the use of dredged material in the creation of caisson island fill, mudflats, dredged-rock reefs, and the restoration of oyster reefs are promising.[8] Likewise, the use of "recycled" materials such as out-of-commission "retired" subway cars to create artificial reefs has proven economical and successful on other waterfronts.[9] Other possibilities for fill material include clean garbage and construction debris, as well as the enormous volume of earth and rock that will be removed for the Metropolitan Transportation Authority's Second Avenue subway project. Given the economic and environmental costs of traditional flood protection methods, unconventional ones like these may in fact be the most sustainable.

The Challenge

This proposal seeks not merely to protect the New York-New Jersey region from sea level rise and storm surge flooding, but also to reconceptualize the relationship between adaptive infrastructure and ecology in the twenty-first-century waterfront city. With looming climate change as catalyst, we aspire to develop a new and versatile system of coastal planning, to enrich ecology and the health of the urban estuary, and to create a vital urban place on the water.

Notes

1. Vivien Gornitz, Stephen Couch, and Ellen K. Hartig, "Impacts of Sea Level Rise in the New York City Metropolitan Area," *Global and Planetary Change*, 32 (2002), p. 72.
2. Ibid., p. 85.
3. The Intergovernmental Panel on Climate Change establishes that it is "likely" that tropical cyclones will be more intense. See *Climate Change 2007: Synthesis Report, Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, R. K. Pachauri and A. Reisinger, eds. (Geneva, Switzerland: IPCC, 2007), p. 47.
4. Gornitz et al., "Impacts of Sea Level Rise," p. 66.
5. Malcolm J. Bowman et al., *Hydrologic Feasibility of Storm Surge Barriers to Protect the Metropolitan New York-New Jersey Region: Final Report to HydroQual, Inc.*, Marine Sciences Research Center, State University of New York, Stony Brook, NY (March 2005). Also see M. J. Bowman and D. Hill, "Bracing for Super-Floyd: How Storm Surge Barriers Could Protect the New York Region," Briefing for the New York Academy of Sciences, www.nyas.org/ebriefreps/splash.asp?intebriefID=415.
6. Bathymetrics are the relative depths of large bodies of water.
7. David J. Yozzo, Pace Wilber, and Robert J. Will, "Beneficial Use of Dredged Material for Habitat Creation, Enhancement, and Restoration in New York-New Jersey Harbor," *Journal of Environmental Management*, 73 (2004), pp. 39-52.
8. Ibid., pp. 39-52.
9. Ian Urbina, "Growing Pains for a Deep-Sea Home Built of Subway Cars," *New York Times*, April 8, 2008.

