NATURE AND CITIES

The Ecological Imperative in Urban Design and Planning

By Frederick R. Steiner, George F. Thompson, and Armando Carbonell

This feature is adapted from the introduction to Nature and Cities: The Ecological Imperative in Urban Design and Planning, *a compilation of essays and images by leading international landscape architects, architects, and planners, some of whose work is showcased here. The book is scheduled for publication in June 2016 by the Lincoln Institute of Land Policy, in association with the School of Architecture, The University of Texas at Austin, and George F. Thompson Publishing.*

EVERYTHING SEEMS SO CLEAR FROM THE AIR, where details do not get in the way. At an elevation of 33,000 feet (10,058 meters), we see the handiwork of our actions all over the ground below, as if the landscape were our reflecting mirror. As we know, landscapes do not lie; they are the embodiment of all that we do on Earth.

Some roads parallel rivers and valleys—no ingenuity there. Other roads converge into settlements like cattle paths leading to a water tank, or they may follow deer paths and other animal trails or topographic contours and soon resemble the organic majesty of a spider's web. Picture El Greco's (1541–1614) home town, Toledo, Spain, from the air: a kind of perfection in organic urban form.

Old North American prairie, largely untouched until two centuries ago, now bears rectangular grids of large-scale farms with no room for any vegetation besides the crops and a thin line of trees alongside riverine and creekside banks, looking like a token tithe to nature and wildlife. And 40-acre (16.1-hectare) center-pivot circles of corn, soybeans, or alfalfa (the trifecta of corporate agriculture) look as if someone had tossed, in perfect symmetry, large half-dollars on the land. Resembling pavements of crops stretching as far as the eye can see, even from one state to another, all this handiwork is the result of a federal farm policy insanely out of balance with nature. No wonder the butterflies and countless other creatures and plants are struggling so mightily against such unnatural odds.

Left: The High Line, designed by James Corner Field Operations and Diller Scofidio + Renfro, runs along a disused elevated freight rail line from the Meatpacking District to West 34th Street, Manhattan. Photographs by Iwan Baan.

On the site of a former garbage dump in Tianjin City, China, Turenscape's Tianjin Qiaoyuan Wetland Park features paved pedestrian paths and a rainwater pond designed to irrigate vegetation that remediates saline-alkali soil. Photograph by Kongjian Yu.

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New sites of natural gas extraction have popped up so suddenly and pervasively that they now permeate much of the Great Plains and interior West of North America, as if enormous prairie dogs on steroids had burrowed through these large swaths of land. It is Gulliver's travels all over again. Meanwhile, open-pit mines generate impressive depressions in the ground, as if meteors had crashed from outer space. The pits' glorious russet and red and golden and sand-colored hues contrast hard against surrounding terrain, as if the mines, too, were inscribed works of art, poor attempts at recreating a subterranean Roman coliseum or a mini-Grand Canyon. Meanwhile, the new and starkly white wind-powered turbines—some spanning 413 feet (126 meters) and towering 312 feet

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(85–95 meters) in the sky—appear as if a giant surgeon had administered stitches of varying lengths and shapes on the land and in the sea, even as untold numbers of birds die upon impact.

Towns and cities along the coasts cram hard against the adjacent sea, with few buffers to protect communities against a rising tide that likely will be at least three feet (.9 meter) higher a century from now. And the same condition holds true for those towns and cities that reside along rivers, large and small, that naturally want to ebb and flow like the tide, overrunning banks and streets alike from time to time. Even world-class cities such as Chicago, Sydney, Tokyo, and Toronto look like LEGO sets from above and bar graphs at eye-level, in which cars and trucks move about like busy ants, and trains slide like snakes along the concrete.

Deserts, long the forlorn outposts of biblical wilderness, are now bespeckled oases of new towns, cities, and resorts, each with homes nestled against aquamarine-blue swimming pools, as if pools are required for entrance into a neighborhood. Shimmering lakes are impounded by large-scale dams, the water evaporating into the dry, cloudless sky. A jigsaw puzzle of improbably green lawns is highlighted by extensive, even more preposterously verdant golf courses. One might believe that a new school of art called Landscape Cubism had gone awry on the land.

Yet there are the exceptional expanses of undeveloped land as well. Trails such as the Appalachian, Continental, Ice Age, Grande Randonnée, Greater Patagonian, Natchez, Pacific Crest, Te Araroa, and Tokai saunter along for great distances deep into the heart and soul of their respective countries. Forests stretch for thousands and thousands of square miles and kilometers, relieving a planet in dire need of new lungs in order to process the increasing levels of carbon dioxide (CO^2). Still-intact watersheds and wetlands retain their natural place between land and water, providing incalculable value as a water supply for towns and cities downstream and as habitat for fisheries, insects, birds, and other wildlife. Contour farming thrives in harmony with the terrain and the life-giving principles of the Soil Conservation Act of 27 April 1935. And more cities boast integrated systems of parks, open spaces, and greenways, providing evidence that nature can return to the urban scene and enhance communities in biological and socioeconomic ways.[1]

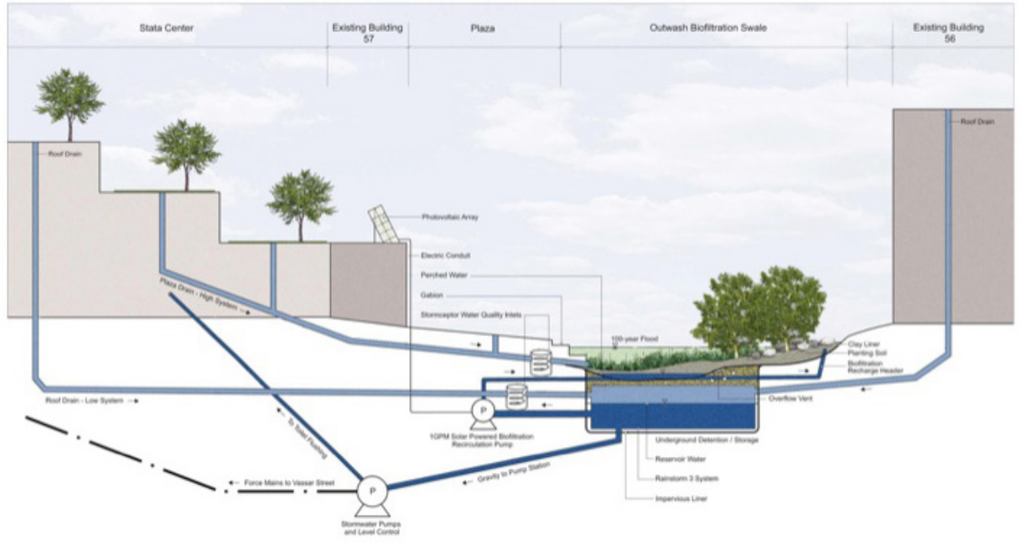
The land tells us so much. And it is the role of landscape architecture, urban planning and design, and architecture to continue their pioneering ways, offering an ecological approach to the design, planning, and management of our varied landscapes—urban, suburban, rural, regional, social, and wild. It all begins on the ground, in nature and our communities, in the multiple ecologies and economies and cultures that encapsulate our home turf, wherever that may be.

But much of that ground is already urban, and that pervasive and expansive pattern of settlement by every account has no end in sight. So how can we do better? That scene and question are the focus of *Nature and Cities: The Ecological Imperative in Urban Design and Planning.*

EVEN AS LAND USE MAY SEEM RELATIVELY CLEAR and simple from the air, on the ground the picture grows more complicated, because of the unavoidable details. All aspects of life—human and natural intertwined, to varying degrees of success—appear before our very eyes, are heard by our ears, are felt by our skin and clothes by way of dew point, humidity, dry air, sunlight, evening breezes, and cool or warm temperatures. That is a lot of ground to comprehend, even within the limited scope of our senses.

Perhaps this view encompasses your backyard or city street; the one well from which you and your community draw water; a favorite gathering place; a beloved vacation spot; a scene ravaged by drought, flood, or fire; a place recovering from earthquake, cave-in, crime, or war. The imagination can transport us to any place we wish, but there is a bottom line to such inquiry. As you imagine or walk or ride or drive through that landscape around you, take it all in: every blade of grass that adorns your lawn or survives in the seam of a sidewalk; every field, common, or pasture that may be part of your everyday life; every hovel, condo, or mansion that gives you shelter; every tree, greenway, or park

This image depicts SCAPE's Oyster-tecture (2010) concept for New York Harbor: a living breakwater seeded with oysters that diminishes waves and harnesses the biotic processes of shellfish to clean millions of gallons of Harbor water, and stewarded by community schools. The project has since been refined and ultimately received $60 million in funding from the U.S. Department of Housing and Urban Development in 2015. It is currently advancing through a permitting and construction phase off the shore of Staten Island. Image by Kate Orff/SCAPE.



Laurie Olin designed this system to capture, filter, clean, and recycle storm water for use in MIT's Stata Center in Cambridge, Massachusetts. A landscape basin containing plants, sand, and boulders, set atop a very large Silva cell storage basin, provides bio-filtration and prevents runoff from entering the municipal drain system. Illustration by OLIN.

that embellishes your space; every economic entity and activity before you; every smell emanating from a bakery or foundry; every breath you take that, inevitably, is a respiratory cocktail of Earth's natural elements (sand, pollen, and dust) and of all the human-induced chemicals too numerous to name.

Now that you have seen, heard, and felt that landscape, imagine that you are suddenly in charge of the scene. Your family, neighborhood, village, city, region, and country are depending on you. First, to explain every aspect of what you perceive and to make some sense of it all—whether in a public setting or classroom or even corporate boardroom. And second, to envision, communicate, plan, and design improvements to what you see. Where would you begin? What would you do? Under what circumstances would or could you implement change? And how? Bottom-up or top-down? Diplomatically, democratically, or dictatorially? How will your vision, and its associated array of actions, be maintained, nurtured, and, perhaps, changed over time? And by whom and under what circumstances or authority?

This is the terrain that the landscape architect, architect, and planner inherit. So return to your "vision" of what your place wants to be, and consider a process by which change is sought and made through attention to three primary and overarching themes: the human need for clean water, ample and safe food, and humane shelter; the human need for economic well-being; and the natural need to take care of and heal the land, nature itself. How does one work with structure, purpose, and meaning to provide fulfillment, value, and public good? How does one add value to place, communities, cities, and regions by way of designs and plans that offer reprieve from single-purpose thinking and direct us to a sense of stewardship in its many manifestations? Importantly, how do we citizens, as part of increasingly large urban populations, reconnect with the natural world on which we are still dependent, and become engaged in the benefits of ecology to biological and socioeconomic life?

Although nature is at the core of our being and every other life-form, plant, tree, soil, water, and rock on Earth, too often our human connections to nature take a backseat to all-too-prevalent interests of every kind that compete for social good and economic gain without the benefit of a land ethic, as espoused by Aldo Leopold.[2] When we look at the varied landscapes on the ground, questions arise as to how well we are actually doing as human beings in our care of this bountiful planet.

If one travels far enough, long enough, one can still find longstanding human communities and cultures living intimately with the natural systems that surround them. Homes in the Amazon are still built on stilts to allow for the annual and seasonal fluctuations of the world's second-longest river and world's largest river basin. Homes in the American South have traditionally used the front and wraparound porch to offer shade and some relief from the noteworthy heat and humidity of the summer season, even as it allows for socialization from one neighbor's house to another, as can be seen any day of the week in Vicksburg, Mississippi, where streets are lined by shotgun houses with shady front porches animated by conversation. Many Scandinavians still artfully use wood and the fine-art craft of notching to create some of the most energy-efficient cabin-homes anywhere, even as Nordic winters are among the most challenging on Earth. And, increasingly, LEED (Leadership in Energy & Environmental Design) initiatives are helping transform the world's new architecture into energy-efficient structures, from the geothermal-powered Aldo Leopold Center in Baraboo, Wisconsin, winner of a LEED Platinum Award, to the Shanghai Expo UBPA redevelopment, the first project outside North America to receive a LEED Neighborhood Development Platinum Award.

Beyond LEED, landscape architects, planners, ecologists, and others designed the Sustainable Sites Initiative (SITES). Now administered by Green Building Certification Inc., SITES was envisioned as LEED for the outdoors. SITES was developed through pilot projects, including those undertaken by Andropogon, OLIN, and James Corner Field Operations. Pilot projects that received certifications include Andropogon's Shoemaker Green on the University of Pennsylvania campus and the Phipps' Center for Sustainable Landscapes in Pittsburgh, Pennsylvania, OLIN's Washington Canal Park in the District of Columbia, and James Corner Field Operations' Woodland Discovery Playground at Shelby Farms in Memphis, Tennessee.

Yet with every passing generation that becomes ever more urban, the direct connections to nature and its bounties are reduced in spades. In too many cities around the world, nature is an afterthought. The following story is all too common:

> Not very long ago, perhaps it was ten years or so, I read a piece in the newspaper that caught my attention: A boy from Harlem in New York City was being interviewed about his views on nature. He was quoted as saying that the blade of grass at his feet, the blade of grass that was emerging from a seam in the concrete sidewalk, was, to him, the embodiment of nature. It was all he needed from the natural world. Here was a sign of wildness along his city street, his home place. The blade of green grass, somehow managing to survive a half-mile away from Central Park to the south, provided that elementary presence of nature in the urban world that was his comfort zone.[3]

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Even in cities graced by larger representations of nature, these green spaces too often feel like isolated pockets for daily use or the occasional visitor, like small museums or zoos. This need not be the case; this need not be an unintended aspiration or consequence of ignorance of the multiple benefits that nature bestows when it is more fully integrated into the urban fabric of any town or city, whether in Jerusalem or Medellín or Stuttgart, Arkansas. We know how to do better. Landscape architects, architects, and planners have often led the way.

So how is it possible that towns, cities, and counties continue to ignore floodplains and sea level and willingly allow homeowners, developers,

and resorts to build and rebuild in areas that contend regularly with chronic flooding and storm surges? How is it possible that a utility company can disobey the basics of common-sense planning and be permitted to construct a 564-mile (908-kilometers) natural gas pipeline on a route that will not only penetrate and divide critical habitat for rare and endangered species within existing national forests, but also overlay an area known for its extreme karst landscape and major sinkholes—thereby endangering the aquifer that lies beneath that path, a font of the greatest significance for the supply of fresh water for cities, towns, and farms throughout that region? How is it possible that mining companies are not required to close the loop and provide for the ecological restoration and reclamation of project areas as part of the economic deal? How is it possible that Rio de Janeiro was awarded the Games of the XXXI (Summer 2016) Olympiad with full knowledge that water events will be conducted in Guanabara Bay, in conditions at times equated with raw sewage? Obviously, those landscape players do not include the principles and practices of ecological design and planning as part of their respective worldview, and behold the consequences of their chosen ignorance and greed.

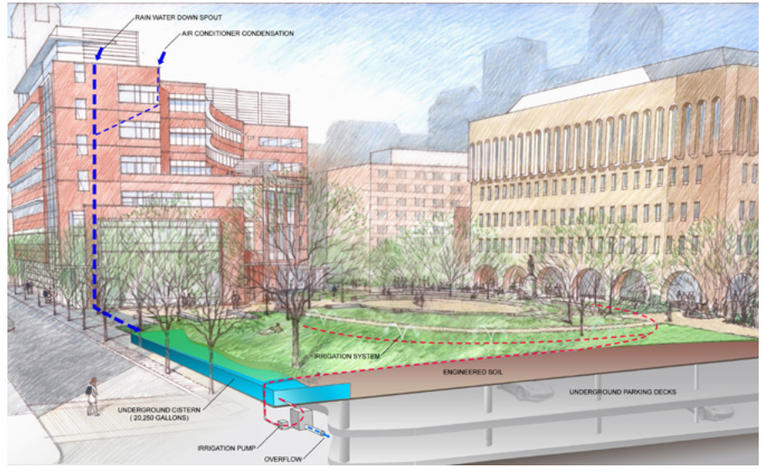
Collectively, the essays in *Nature and Cities* convey the great hope and promise of an ecological imperative in urban planning and design, of a tried-and-true approach by which nature and culture, science and art, come together in a united but creative and fluid way to make life better for all.

The promise of ecological design and planning as it pertains to the health and welfare of our communities and cities everywhere is there for the taking, there for action, there for implementation, there for ongoing care. But too often we dismiss the obvious in how we citizens conceive of urban design and planning: we humans, by our very presence in nearly every sphere on Earth, are the essential players not only in the eternal dance with nature that is part of life and the human condition, but also the overall health and welfare of our home ground.

The essayists in *Nature and Cities* reveal that monumental work has been done and is ongoing in the ecological design and planning of our cities and communities at large. Because landscape architects, architects, and planners have done so repeatedly and throughout the world, we, as a society, can say with certainty that we know how to work collaboratively with all players to provide safe water, food, and shelter; reduce runoff into city streets; accommodate areas prone to flooding and storm surges; safely locate a utility corridor and design it in such a way that it becomes more than a single-purpose pathway for natural gas obtained by the unruly practice of fracking; design parking lots in commercial developments; provide citizens of the world's cities with more than a sliver of grass in the seam of a sidewalk; restore and heal worn and contaminated sites; and provide joy and economic vitality through green design and infrastructure.

But even more progress needs to be achieved, no matter where we live, because the world is becoming more urban, and the consequences of climate change and of poverty, disease, conflict, and war are real. Once again, landscape architects, architects, and planners have been engaged historically in the process of understanding the natural world before us and its multiple manifestations on the ground, where details and interconnections matter. And, by way of their designs and plans, some of them centuries old, we have examples of finished work that has made this a better world. Landscape architects, architects, and planners have historically offered alternative visions to the failed practice of serendipity and single-purpose thinking that have, for too long, dominated the public and private view.

The contributing authors in *Nature and Cities* share real-life experiences and perspectives about where we can go in the future. They discuss and reveal their respective perspectives on the historical and contemporary practice of ecological design and planning in their own



Andropogon 's Lubert Plaza, at Thomas Jefferson University in Phildelphia, was built over an underground parking lot. The plaza effectively manages stormwater onsite, including air conditioning condensation from the adjacent buildings, through infiltration, capture, treatment, and reuse as irrigation. Image by Andropogon.

work and in the work of others. In many cases, this work involves award-winning and path-breaking designs and plans known throughout the world. And so reading their essays is an eye-opening experience, as we share and explore their thoughts about nature and cities, even as they offer reflective worldviews for design and planning. Collectively, the essays convey the great hope and promise of an ecological imperative in planning and urban design, of a tried-and-true approach by which nature and culture, science and art, come together in a united but creative and fluid way to make life better for all.

As is often the case, big projects, designs, and plans tend to dominate the professional view and the ability of design and planning to contribute toward this greater good. Historically, this has included a wide range of undertakings, as large as the design and construction of national parks and new cities, and as small as the private garden and urban mall. But, to most people, ecological design and planning remains an idea and approach not yet in the vernacular. That is where additional work needs to be done. And so here is another story of how far we can travel in but one generation, if landscape architects, architects, and planners are willing to seek work in new ways:

A woman from South Africa, a naturalized American citizen, was inspired by the healing powers of nature. She was well known and highly respected in the community where she lived. She was a quiet but steadfast leader in peeling back the built environment and integrating nature more fully into areas of everyday city life. Even after she was diagnosed with terminal cancer, she served the community and fellow cancer patients as if there would always be a tomorrow. When she died, she was remembered by a new serenity garden, adjacent to an existing park along a popular river. When the city organized a public dedication of the new park in her memory, an overflowing crowd of hundreds showed up on a hot, summer day.

The city manager was among the first to speak. Soon after welcoming everyone and conveying the purpose for the gathering, he began to share this message:

> There is something called a "sense of place." It is a term often hard to describe, but we certainly know a special place when we see it, be it a memorial garden such as this, an historic neighborhood or building or landscape, a community at large, or even a region. As public officials, we strive to cultivate a sense of place in many ways: by providing obvious services and an infrastructure intended to serve all, but also by making connections to the natural world. Even as we may live near one of the most popular and most visited national parks, we need nature to return to the city so that it becomes a daily experience, fully integrated into our fabric of being. Just as Anne-Marie would have wanted.[4]

We dare say that, 30 years ago, the phrase "sense of place" seemed like a pipe dream or even an illusion that had no place in our everyday lives, much less public policy. Yet today, as expressed by this 30-something city manager, the term has been fully realized and embraced. We even hear of teachers at every institutional level, proclaiming the need for and success of "place-based" education—place, of course, referring to the natural and human processes intertwined.

As the world becomes more urban, and even for those who remain tied to rural land, there is the need for "ecological design and planning" to be integrated into our collective being, into our everyday lives, in fundamental ways—just as a "sense of place" has so quickly taken hold during the preceding generation. Even as landscape architecture, urban planning and design, and architecture can continue to advance a "green" vision of a better world through specific projects, both great and small, public and private, it will require a move toward the vernacular, toward the common person, toward the common place, for that vision to be expressed, appreciated, accepted, and embraced more fully: to the point where ecological design and planning becomes an afterthought and, thus, an essential player in providing a healthy and healthful life for human beings and our compatriot life-forms. To heal Earth, our home ground, is to heal ourselves.

In many professional fields and human endeavors, a green vision for an ecological infrastructure has already been achieved. In places where this vision has been allowed to take hold, we see how an ecological approach fosters the necessary interplay between the biotic and abiotic. Establishing a watershed, for instance, as a primary unit of analysis, conservation, and concern has led to instructive work relating to combined sewer overflows (CSOs) within a hydrological system, offering citizens a safe and secure source of water. And it is easy to be impressed by the advances of rain gardens and reduced runoff and other creative solutions that mimic natural processes in biotic enrichment. The further integration of ecological, socioeconomic, and political capacities within specific communities and urban environments at large provides a tried-and-true pathway for landscape architects, architects, and planners to envision improvements at every scale and to implement them through community-based interaction and design.

Left: Rome is ecological, full of interconnections with environments and organisms of all sorts. Photograph of Trastevere, Rome, November 21, 2013, by Frederick R. Steiner.

Right: In the heart of Piazza San Pietro in Rome, one is reminded of the hydrological cycle in the midst of Gian Lorenzo Bernini's (1598–1680) timeless design for Vatican City—and of how we depend on water, which sustains life and helps to sculpt our landscapes. Great urban design reminds us of such fundamental processes. Photograph by Frederick R. Steiner, January 18, 2014.

Each author in *Nature and Cities* offers a sense of direction, purpose, and model for how landscape architecture, architecture, and planning can continue to move forward and be taken more seriously, to be engaged in community life at every scale and in every city and town in the world. This may well mean that a new generation of practitioners will need to explore pathways other than the traditional design and planning office and become instruments of enlightenment and change in occupations still very much in need of such care: notably, engineering, transportation, utilities, agriculture, resource industries, and commercial development—which, with too few exceptions, remain behind the times.

Imagine engineers embracing the tenets of ecological design and planning as they create roads, parking lots, interstates, impoundments, and other basic infrastructure. Imagine those engaged with municipal management as well as agricultural, industrial, transportation, and utility sectors abandoning single-purpose thinking and embracing something grander and more impactful in providing benefits than does a single endeavor. Imagine a young adult being able to swim in clean waters in Rio's Guanabara Bay, a utility company finding a safe and not just the shortest path for the transfer of power and natural gas, a corporation building parking lots that percolate and repurpose runoff, a citizenry knowing that all human life begins and ends with nature, the source of all life. Imagine that.

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[1] To which Yi-Fu Tuan, the world-renowned geographer responded, "Is it Andy Warhol who said that he is biased in favor of the city? Why? Well, one can find nature in the city, but one cannot find the city—not even a small token of it—in the midst of nature." Personal email to George F. Thompson. October 23, 2015.

[2] Leopold, Aldo. 1949. *A Sand County Almanac.* New York, NY: Oxford University Press.

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