

Land Lines

The background of the cover is a dark blue field with numerous bright yellow lines crisscrossing it. These lines often converge at points where there are clusters of small, bright white dots, resembling a network or a map of urban development. The overall effect is one of dynamic, interconnectedness.

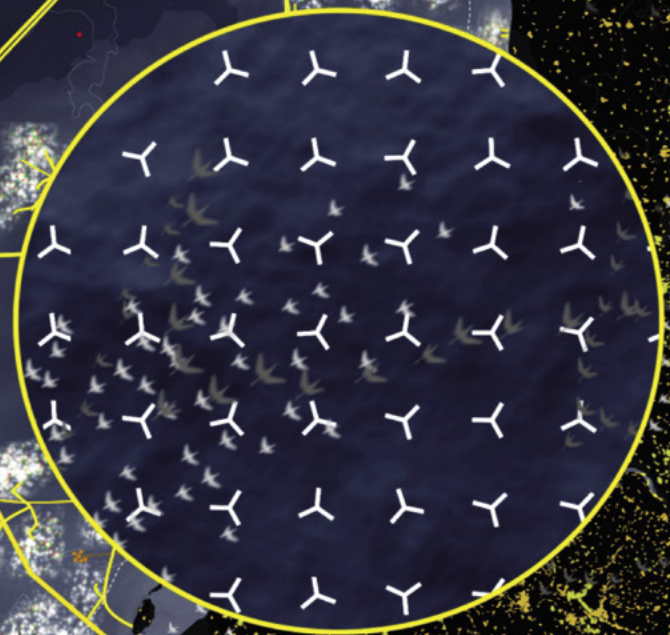
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SPECIAL ISSUE

Design
with
Nature
Now



Land Lines

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LINCOLN INSTITUTE
OF LAND POLICY

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By Richard Weller, Karen M'Closkey, Billy Fleming, and Frederick Steiner

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Editor's note: In accordance with the style used in Design with Nature Now, this issue of Land Lines relies upon footnotes instead of author-date citations.



Projections of potential wind farm locations in the North Sea by 2050 (white areas). From 2050—An Energetic Odyssey (see page 16). Credit: International Architecture Biennale Rotterdam, 2016.



Restoring Nature to Its Rightful Place

"Man is an epidemic, destroying the environment upon which [he] depends and threatening his own extinction."

ADDRESSING A THRONG OF 30,000 people in Philadelphia's Fairmount Park at the first Earth Day demonstration in 1970, landscape architect and author Ian McHarg minced no words. His was not a feel-good speech; in addition to the sobering assessment above, he also informed the crowd, "You've got no future."

Those words, though dark, were intended to help his listeners see the light. McHarg believed humanity was mired in a plight of our own creation, but not an intractable one—and he had solutions to offer. Exactly one year earlier, he had held in his hands the first bound copy of his book *Design with Nature*, a nearly 200-page treatise in which he called for a new way of thinking about the relationship between people, the built environment, and the land we occupy. The book's first print run sold out. So would a second. It was evident by the time he delivered that Earth Day speech that a hunger existed for the ideas he was putting forth. In fact, his philosophy would ultimately change the way an entire generation of planners, architects, and designers thought about the relationship between people and place. His book, along with the work of other leading thinkers like Jane Jacobs, helped change the way many of our cities look and function, especially in the United States. It still tops lists of influential design and planning publications.

Fifty years ago, *Design with Nature* helped launch the field of ecological planning—and helped us pivot from a late 20th-century society that viewed cities as a necessary evil to one that increasingly sees them as attractive, liveable

places that just might hold the key to our salvation as a species. Today, the Lincoln Institute is delighted to partner with McHarg's successors at the Stuart Weitzman School of Design at the University of Pennsylvania on the follow-up volume excerpted in this issue, *Design with Nature Now*. Edited by Richard Weller, Karen M'Closkey, Billy Fleming, and Frederick Steiner, the new book offers an unprecedented collection of thoughtful tributes to McHarg, exemplary projects that reflect his tenets, and forthright assessments of how far we've come—and how far we've yet to travel.

Taken together, the book (forthcoming in October) and an eponymous international exhibition and conference, both hosted at Penn in 2019, remind us of the urgency that led McHarg to write his seminal work—and the unavoidable fact that, in many ways, that urgency has only increased. With urbanization occurring rapidly—some two billion more people are expected to live in the world's cities by 2050—and climate change demanding that we rethink nearly everything about where and how we live, McHarg's ideas are more apt than ever.

For the Lincoln Institute, introducing a new generation to his work is part of a broader effort to elevate the critical role of land as a solution to our most pressing economic, social, and environmental challenges. We do this through publications like this book, and through our work on the ground in places like the U.S. Rust Belt, where we bring together small legacy cities to think about innovative revitalization strategies; in China, where we support a government-led effort to implement stormwater-absorbing sponge cities; and in Latin America, where we promote new teaching tools to engage planners in the work of improving urban conditions.

This kind of work is important everywhere, but especially in the developing world, where urban growth is accelerating and weakly governed. A shift toward *quality* growth is beginning to happen; we can support that shift by embracing and spreading McHarg's principles. To contradict his warning that society has no future, we must continue the work of getting urbanization right. That means ensuring safe neighborhoods and strong economies, yes, but it also means replacing impervious pavement with bioswales and redesigning streetscapes at the human scale; implementing green and blue infrastructure where gray infrastructure once reigned; and converting energy-intensive buildings into sustainable structures that are healthier places to live and work. These are not glamorous projects, but neither are they extraneous; they are fundamental to our ability to redesign and rebuild a functioning society for ourselves that does not, in the words of McHarg, "threaten our own extinction."

For the Lincoln Institute, undertaking this project is part of a broader effort to elevate the critical role of land as a solution to our most pressing economic, social, and environmental challenges.

Is humanity indeed an epidemic bent on destroying our environment and ultimately ourselves, or can we find and apply a cure? At the Lincoln Institute, the Stuart Weitzman School of Design, and other organizations dedicated to studying the connections between people and place, we know that tools ranging from thoughtful land use policy to innovative design can contribute to a positive prognosis. But the time for action is now. We can't change the past, but we can embrace the vision of McHarg and his many successors in the field of landscape ecology and broaden the implementation of ideas that elevated practice in the fields of architecture, urban planning, stormwater management, and many others. We must build upon McHarg's legacy and *Design with Nature Now*—before it truly is too late. □



Design in the Anthropocene

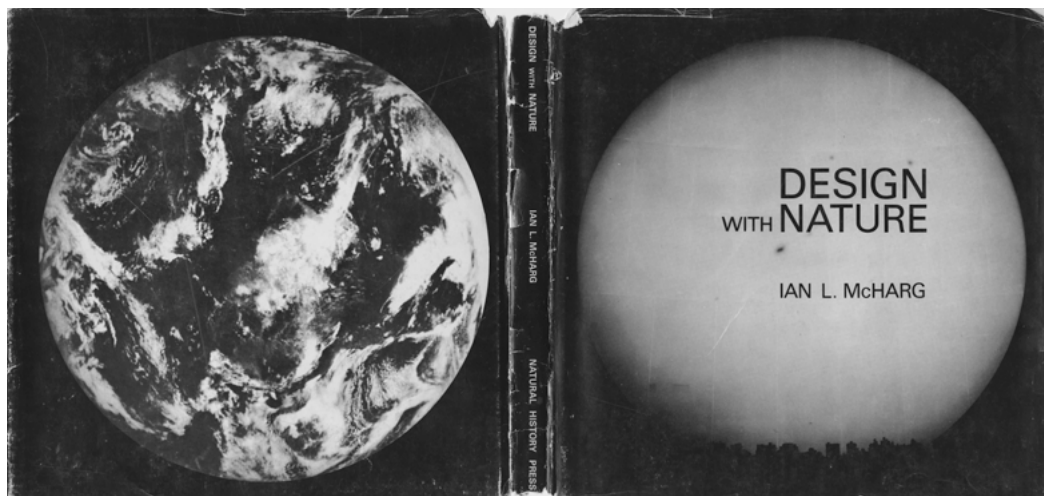
By Richard Weller, Karen M'Closkey, Billy Fleming, and Frederick Steiner

IN 1969, IAN L. MCHARG, professor of planning and landscape architecture at the University of Pennsylvania, published a manifesto titled *Design with Nature*. Translated into Chinese, French, Italian, Japanese, and Spanish, and still in print to this day, it is arguably the most important book to come out of the design professions in the 20th century. *Design with Nature* not only captured the zeitgeist of the late 1960s by decrying modern civilization's—or at least North America's—sprawling urbanism and environmental degradation; it went further than most by proposing a practical method for doing something about it.

Using rudimentary digital tools and painstaking analog drawings, with his students and

colleagues at Penn, McHarg developed a method of overlaying maps of the biophysical characteristics of a given place to make decisions about future land use. Part science and part common sense, the method provided an empirical, rational, and ostensibly objective basis for deciding which land was most suitable for which purpose—for example, farms on the good soil here, forest upland from water supply there, and of course, housing outside of flood zones and behind coastal dunes.

Throughout history, cultures have either withered or flourished as a result of how they live with land and water, or per McHarg, how they designed with nature. For cultures attuned through experience to the specific conditions of



Cover of *Design with Nature*, 1969. Credit: Doubleday/Natural History Press, American Museum of Natural History.

their landscapes, designing with nature becomes a form of lore. In this sense McHarg's design philosophy is nothing new. But his advocacy of ecology as the basis for design and its application to the modern city was. McHarg's great achievement, then, was to create a simple, universal method for assessing and then incorporating environmental science into the decision making processes of modern development. When applied well, his method offered a way to both guide and substantiate design decisions, especially those that limited the scope and scale of otherwise sprawling development.

However, *Design with Nature* is more than a land use manual. It soars from geology to cosmology, it cuts from Christianity to Buddhism, and it interleaves speculations on entropy and evolution to arrive at a unifying theory of design. For McHarg, to design with nature meant for humanity to intentionally and benignly fit itself to the environment. Drawing on the most advanced ecological science of his time, this idea of fitness flowed from a belief that cultural and natural systems could coexist harmoniously, in balance, if each part were in its proper place. For him, this was not just biological determinism at work; it was the highest of arts.

McHarg's vision, like that of his mentor the great polymath Lewis Mumford and Patrick Geddes before him, was that by living *with* rather than against the more powerful forces and flows of the natural world, humanity would gain a biocentric sense of place; and this, in the deepest sense, would replace the Abrahamic theologies and capitalist culture of consumption he held responsible for the environmental crises of the 1960s.

For McHarg, Western culture's greatest promise was a synthesis of the sciences and the arts that had yet to be applied to how we dwell on the land, and it was the profession of landscape architecture that could steward society through this evolutionary process. To this day, at least in theory if not in practice, this remains the field's primary *raison d'être*.

On the occasion of the 50th anniversary of the publication of *Design with Nature*, with this

new book and its associated exhibitions and conference, we ask what might be meant by design(ing) with nature *now*? As faculty at the school to which McHarg devoted his life, we feel a particular responsibility to explore these questions at this time and from this place. While McHarg's prescience warrants celebration, our intention in marking the 50th anniversary of his magnum opus is not hagiographic. Rather, we view our responsibility, and the purpose of this volume, as one of constructive and critical discourse—to ask how the ethos of designing with nature has evolved over the past half-century, and to speculate on its prospects over the next fifty years.

By making recourse to Nature as a higher authority on the one hand and reducing it to interpretation through data-driven positivism on the other, McHarg was always going to get into philosophical trouble and attract criticism. Indeed, much of what has happened in landscape architecture over the past fifty years can be read as either an endorsement or a critique of his philosophy and method. Had McHarg titled his book *Design with Landscape* instead of *Design with Nature*, and had he offered caveats about the limits of his method to inform human creativity and ingenuity, then accusations of hubris and artlessness that were periodically leveled at him could have been largely avoided. But in his rush to change the field—and indeed to change the world—McHarg overlooked some of those critical details.

That McHarg inspired debate is, however, no small part of his enduring significance. Whereas these debates once may have threatened to split the profession between “the designers” and “the planners,” we can now see a profession that has intellectually matured around these tensions. We see a profession that is diversified in its practices but united in its sense of ecological and artistic purpose. We see a profession equipped with a range of design techniques that build on, rather than obviate, their foundation in the McHargian method of landscape suitability analysis described earlier. And yes, we also *still* see the rift between McHarg's grandiloquence and daily practice—a rift that to some extent

must always exist between the ideal and the real. Without gaps between the theory and practice of designing with nature, there would be nowhere for landscape architecture to grow or evolve. . . .

As anyone who knew him or even attended just one of his lectures will attest, McHarg was an unforgettable character, a man of passion and erudition in equal measure. Ian McHarg died in 2001, his life's work completed well before the expressions "climate change" and "the Anthropocene" became central societal concerns. The environmental reality these terms now signify, the debates and anxieties they engender, and the increasing calls for climate action make McHarg's prophetic injunction to *design with nature* more pertinent than ever. Paul Crutzen, the atmospheric scientist usually credited with first declaring this to be the epoch of the Anthropocene, has described its advent as beginning with the Industrial Revolution and then radically accelerating after 1945. In 2011, along with his colleagues Will Steffen and John McNeill, Crutzen argued that we should begin moving into a new period in which we "steward the earth."¹ This of course was the essential message of *Design with Nature* some fifty years earlier, and in this regard the profession of landscape architecture has been at the vanguard of a broader cultural revolution that now comes into its own in the context of the Anthropocene. This is not to say, however, that the profession has fulfilled its McHargian mandate of leading global environmental stewardship. Such a claim would be absurd. More to the point, it could hardly be argued that the world is environmentally better off now than it was when *Design with Nature* was first published. On the contrary, the dawn of the Anthropocene signals the opposite. We are plunging, headlong, into an epoch of global environmental change at an unprecedented scale and pace. How we learn to live with that change is the central challenge for the next half-century of design. In the work we have collected here there are real clues as to how, through design, we can better tune our cities and their infrastructure to the forces and flows of the Earth system. The fact

that such projects are the exception and not the rule only underscores their importance as landmarks of a more widespread historical change yet to come.

The 21st century is marked by the fact that humanity has directly or indirectly modified every habitat on the planet, and much of it deleteriously so. With the unintended consequences of global warming, species extinction, and resource depletion, it is now possible that our extraordinary success as a species could also become our demise. Our recognition of this "tragedy of the commons" is what distinguishes us from other species that have also flourished in the course of evolutionary history. To not only know this, but to act on that knowledge in a precautionary way, is to intentionally design environments so that they are more life-giving and more life-sustaining, for all forms of life. This is not a punitive or messianic project; it is a political and above all a creative project, one that transcends geographies, economies, and the forces of globalization that have overwhelmed and divided the planet—between developed and developing, rich and poor. That is the enduring and inspiring meaning of *Design with Nature*, and it is to that end that this new book is dedicated. □

Richard Weller and **Karen M'Closkey** are professors of landscape architecture at the University of Pennsylvania Stuart Weitzman School of Design. **Frederick Steiner** is dean and Paley professor at the school; Steiner and Weller are also co-executive directors of the school's Ian L. McHarg Center for Urbanism and Ecology, where **Billy Fleming** serves as the Wilks Family Director.

NOTES

- ¹ Will Steffen, Paul J. Crutzen, and John R. McNeill, "The Anthropocene: Are Humans Now Overwhelming the Great Forces of Nature?," *AMBIO: A Journal of the Human Environment* 38, no. 8 (2011): 614–621.

"Why Do I Have to Be the Man to Bring You the Bad News?"

By William Whitaker

The following is an excerpt from a longer essay in Design with Nature Now. Its title refers to the opening line of Ian McHarg's speech at the first Earth Day in 1970.

AS A NATIVE OF CLYDEBANK, SCOTLAND, Ian McHarg (1920–2001) grew up on the shadowy fringes of the Industrial Revolution. His father, John Lennox McHarg, started his professional and married life with the promise of upward mobility as a manager in a manufacturing firm. Both of his grandfathers were carters who labored transporting whiskey kegs and soft goods behind teams of Clydesdale horses. The economic depression of the 1930s took its toll on family and city alike. The time McHarg spent alongside his mother, Harriet Bain, tending the family garden—their hands working the soil together—must have awakened his curiosity about nature and the larger landscape. Young Ian's hikes from the urban grit of Glasgow to the idyllic countryside of the Kilpatrick Hills formed enduring counterpoints in his adolescent development.¹

At the age of sixteen, McHarg resolved to be a landscape architect and dropped out of high school to formally apprentice with Donald Wintersgill, head of design and construction operations for Austin and McAlsan, Ltd., the leading nursery and seed merchants in Scotland. Service in the British Army during World War II (1938–1946), including bloody fighting during the

invasion of Italy, delayed the completion of his training. However, it was in these years that a parochial, "gangling . . . hobbledehoy" developed a strong sense of self-confidence and courage.² He had also marched through the Roman ruins in Carthage, Paestum, Herculaneum, Pompeii, Rome, and Athens, as well as the length of Greece, and returned to Scotland a worldly man.

After the war, McHarg resumed his training at Harvard University, completing a bachelor's degree before receiving master's degrees in landscape architecture and city planning. He supplemented his required courses with classes in government and economics, which had a



Ian McHarg in Portugal, July 1967. Credit: Pauline McHarg, Ian and Carol McHarg Collection, Architectural Archives, University of Pennsylvania.

Penn landscape students preparing for presentation of the Delaware River Basin Study, "DRB II," Meyerson Hall, University of Pennsylvania, 1967. Credit: Ian L. McHarg Collection, Architectural Archives, University of Pennsylvania.



lasting impact on his thinking. At Harvard, McHarg recalled, modern architecture was “a crusade . . . a religion. We were saved; therefore, we must save the world.”³ He had returned to Scotland in the summer of 1950 with the conviction of a reformer, but a life-threatening bout with tuberculosis diminished his professional prospects. Following four years in the Scottish Civil Service engaged in planning postwar housing and towns, McHarg packed up and sailed for America.

The Philadelphia in which McHarg arrived in early September 1954 was thinking big about the future. Postwar reformers had mounted the *Better Philadelphia Exhibition* in the fall of 1947 to introduce the virtues of urban and regional planning through a series of dazzling and engaging displays installed on two floors of the city’s Gimbels department store. New ideas for revitalizing the city took a more sensitive approach to urban renewal, incorporating historic fabric and human scale. *Architectural Forum* called this approach “the Philadelphia

cure,” a version of clearing slums with “penicillin, not surgery” that featured works by architect Louis Kahn to illustrate recent developments.⁴ Three hundred thousand citizens visited the exhibition, and the organizers’ efforts came to fruition in the reform administrations of Mayors Joseph Clark and Richardson Dilworth. Both politicians supported Edmund Bacon, who served as executive director of the Philadelphia City Planning Commission (PCPC) from 1949 to 1970. Under his leadership, Philadelphia was highly regarded for its imaginative city planning, and Bacon’s close ties to architects suggested that the field would have an important role to play in the city’s future. G. Holmes Perkins, who was chair of the PCPC and dean at the University of Pennsylvania’s School of Fine Arts, helped to establish this atmosphere of accomplishment.⁵

Meanwhile at Penn, Perkins was working to shed the vestiges of Beaux Arts formality, but not all of its concern for the City Beautiful. The school was an energetic environment, committed to the city, with a dynamic faculty in architecture

The great river basins of the Potomac and the Delaware became ideal regions for study; their boundaries were shaped by ecological forces rather than political divisions.

and city planning. Broadly understood, the faculty coalesced around the notion that a building, in its design, should be understood as an element integral to a larger context and that the role of the designer was, in part, to interpret how a building should relate to and grow the “patterns” around it. . . .

As concern over cities shaped funding priorities in the 1950s, alarm over environmental degradation—signaled by Rachel Carson’s 1962 book *Silent Spring*—sharpened priorities in the mid-1960s. President John F. Kennedy’s “New Frontier” and President Lyndon B. Johnson’s call for “a new conservation” catalyzed efforts at the national level. . . . Ecology became McHarg’s central focus, a lens through which a comprehensive assessment and evaluation of the environment became possible. Studio problems, as well as his professional commissions, were the primary vehicles for testing ideas and for

developing the method and techniques needed to advance the ecological approach to landscape architecture. The great river basins of the Potomac and the Delaware became ideal regions for study; their boundaries were shaped by ecological forces rather than political divisions. By 1966, McHarg had successfully assembled a team of ecologists, scientists, environmental lawyers, and designers . . . and was actively shaping an expansive agenda.⁶ □

William Whitaker is curator of the Architectural Archives at the University of Pennsylvania Stuart Weitzman School of Design. He is coauthor (with George Marcus) of *The Houses of Louis I. Kahn* and recipient of the 2014 Literary Award of the Athenaeum of Philadelphia.

NOTES

¹ For McHarg’s account of his youth and education, see Ian L. McHarg, *Design with Nature* (Garden City, NY: Doubleday/Natural History Press, 1969); and Ian L. McHarg, *A Quest for Life* (New York: John Wiley, 1996). The official birth registration for McHarg lists his given names as “John Lennox,” after his father. His family must have begun using the Gaelic variation “Ian” early on. Extract of an entry from the Register of Births in Scotland, obtained by author from the General Register Office of Scotland, August 2018.

² McHarg, *Quest for Life*, 63–64.

³ *Ibid.*, 77.

⁴ “The Philadelphia Cure: Clearing Slums with Penicillin, not Surgery,” *Architectural Forum* 96, no. 4 (April 1952): 112–119.

⁵ Thomas Hine, “[Philadelphia] Influence in Architecture on the Decline,” *Philadelphia Inquirer*, September 7, 1980, M1–2.

⁶ Ian L. McHarg, “An Ecological Method for Landscape Architecture,” *Landscape Architecture* 57, no. 2 (January 1967): 105–107.

A Few Choruses Low Down, but Not So Blue for Ian

By Laurie Olin

THE PUBLICATION OF *Design with Nature* forever changed the field of landscape architecture. The book, its ecological point of view, its rational method, and its author also had a significant and positive effect on my own life and career. I first heard of Ian McHarg when architecture classmates from Seattle stayed at my apartment in New York City in 1966. They were traveling to and from the Delmarva Peninsula for a landscape architecture studio at Harvard, where Ian was teaching while on sabbatical from the University of Pennsylvania. I was somewhat taken aback that they were making a plan for an entire peninsula that encompassed large portions of two states.

I first heard McHarg speak in Seattle and met him in March 1971 while teaching with Grant Jones at the University of Washington. He had come to give the John Danz lectures, which consisted largely of excerpts from *Design with Nature*.¹ The three lectures were titled: “Man, Planetary Disease”; “An Ecological Metaphysic”; and “Design with Nature.” He was spellbinding. His presentation of the problems arising from our ideology, politics, and habits of practice was persuasive. Like many others, I got it. Ian was at loose ends during the day between his evening lectures and social events, so he came over to the school and hung out in our studio. Up close he was charming, warm, and kind to the students, who were preparing a landscape master

plan for Bainbridge Island. He was an astute critic and generous to Grant and me. A year later, I went off to Europe to work on a landscape history of southern England and to study the sociology of the public realm of Rome.

By happy coincidence, I joined the Penn faculty in 1974, at a time when the Department of Landscape Architecture and Regional Planning had a bumper crop of natural and social scientists in addition to landscape architects, architects, and planners on its faculty. The curriculum was ambitious, wide ranging, and exhausting, but exciting and remarkably productive in its research, teaching, and production of future educators and practitioners who departed to all parts of the globe, spreading the message of *Design with Nature*. Since then, ecological analysis—the integration of data by overlay techniques, and an interactive matrix-based method for planning and design at a range of scales as advocated by Ian and in our curriculum—has seeped into the working methods of design practices, teaching curricula in academic institutions, and public agencies around the country and the world.

Ian was twenty in 1940, and World War II had begun. His youth was put on hold while he blew up bridges as a commando behind enemy lines. Afterward, he was part of a generation that wanted to fix things, to not make the mistakes of previous generations.

Marxist and Freudian thought, which had been influential in intellectual endeavors for several decades before the war, were displaced by a new perspective: structuralism, which provided meaning and methods in disciplines ranging from linguistics and literature to philosophy and ecology, even economics and design, through the 1950s and 1960s. The intellectual, academic, and professional world of the postwar years was imbued with instrumental systems thinking and a belief that reason and rational methods must be applied regardless of topic and field. McHarg used his graduate study at Harvard to give himself a crash course in science, sociology, and urban planning theory. He was determined to develop a landscape planning method and practice that was objective, not subjective; that was as rational and replicable as the hard sciences, not intuitive and willful—“not like the design of ladies’ hats,” as he would bellow. Step by step he developed the curriculum at Penn with the aid of research money that allowed him and his colleagues to consider the problem of human habitation and the most fundamental issues of community planning and design at a scale from neighborhood to physiographic region.

In concert with a number of natural scientists who had become public figures, McHarg used national television to advocate for environmental planning. There is no question that his rhetoric, performance, and publications had considerable influence on the creation and early years of the Environmental Protection Agency and the Clean Water and Clean Air Acts of the Lyndon Johnson and Richard Nixon administrations in the United States. The problems he raised and attempted to address—issues related to health, safety, settlement, resources, ecology, and resilience—are still the most important problems we face, and seem even clearer and more desperate today than when he was at his most strident.

Occasionally people ask me what the department was like, or suggest to me that they think McHarg was unsympathetic to design. It is simply not true. Others have speculated that Bob

Hanna, Carol Franklin, other design practitioners, and I were something of a design antidote to the so-called method. In fact, with Ian’s support and conviction we were trying to demonstrate that science and ecology were not antithetical to design, but underpinned it when well done—that we were actually part of the follow-through.

He sought to clarify this in a book extending his ideas to human ecology, but the planned “Design for Man” volume never happened, in part because of the intractable difficulties inherent in social science. In the final analysis, landscape architecture is not a science. Like architecture, it is a useful art, one that employs the findings and knowledge of science along with knowledge of art, craft, design, and construction to address human needs in social environments. We knew that, and we discussed ad nauseam how our students at a certain point had to strap all of their analysis to their backs like a parachute and jump, hoping for a soft landing, not a crash. It informed their choices as ethical professionals, regarding costs, safety, health, and environmental outcomes. McHarg’s ideas were for guidance and to be used as a checklist for responsibility, not a set of rules to limit imagination, and as a constraint on foolishness and ignorance, not on creation.

Interestingly, I found that the overlay method of examination, comparison, and interaction between various factors and topics—natural, social, historical, theoretical—could be as stimulating and useful in building up and creating a scheme through additive considerations as it was in digging through history and natural factors to produce suitability matrices. In over two dozen projects with Peter Eisenman, I explored using overlays of information in a forward-projecting manner in an effort to find alternative design structures, formal and artistic solutions to complex planning and design problems. Examples of my built and unbuilt work range from the Wexner Center at The Ohio State University and Rebstock Park in Frankfurt, Germany, to the City of Culture at Santiago de Compostela in Spain. After many somewhat

experimental projects, I also came to find natural processes and ecology to be powerful metaphors that have been enormously helpful and inspirational in my work. Several of my most recent projects have derived from careful considerations and analysis of ecological history to produce both an understanding of a place and situation and complex and responsive physical designs. The recently completed University of Washington north campus residential community in Seattle, Apple Park in Cupertino, California, and OLIN's current and ongoing Los Angeles River Master Plan and its pilot projects exemplify this approach.

In the past two decades a number of critiques have been leveled at McHarg and *Design with Nature* that are misplaced and often as ill-informed as the denigration of Frederick Law Olmsted and his parks by a recent generation of professionals. Most of the criticism of McHarg, however, has focused on the means, methods, and data in the work, arguing that they are outdated and simplistic. There is some truth in this, for structural systems of thought are inherently political and moralistic; they inevitably raise ethical issues, whether in science, the humanities, or the professions. Debates within the department and in his own office over planning and design often centered on social rather than biological issues, particularly fears of determinism derived from particular methods of responding to data, the data themselves, the costs and benefits resulting from the relative weight assigned to various factors, and the role of imagination, politics, and choice in human decisions. Unquestionably, the technologies used for remote sensing, mapping, and digital processes and computation have become more sophisticated. In the social sciences, likewise, quantitative methods have evolved, as have concerns for complex and vexed human relationships, economics, and all manner of groups not considered fifty years ago. Nevertheless, Ian's fundamental insight and approach, despite his method—imperfect as all forms of research inevitably are—frames landscape and regional planning today. For all the developments in geographic information systems, no one has

shown that he was working on the wrong problems, or that those problems are not still vitally important. As well, his critics have underestimated Ian's responsibility for creating the professional context in which landscape architects and planners now operate; today's practitioners are focused on similar concerns and are using the technology that he promoted and encouraged.

Ian was a force who changed our perspective forever, but also a deeply human and contradictory person. Difficult as he could be at times, he was extremely loyal and devoted to friends and family and fiercely proud and protective of his faculty, quarreling and making up with them socially and privately, in reviews and in faculty meetings—all in an endless effort to improve our work, our lives, and the planet. One of my fondest memories is of him standing atop a log, backlit in the blazing sun, wearing pajama bottoms and holding a cigarette in one hand and a hose in the other, watering the giant kitchen garden on his farm in Marshallton, Chester County, Pennsylvania. Sheep, pigs, and Highland cattle wandered about in the background as he drenched the rank and jumbled masses of plants and hummed a favorite Coleman Hawkins tune. Ian always understood that humans were part of nature, and that only through ecological understanding and constructive action could we save ourselves and have a good life. □

Laurie Olin is one of the most renowned landscape architects practicing today. From vision to realization, he has guided many of OLIN's signature projects, including the Washington Monument grounds in Washington, DC, Bryant Park in New York City, and the Getty Center in Los Angeles. He is emeritus professor of landscape architecture at the University of Pennsylvania and former chair of the Department of Landscape Architecture at Harvard University.

NOTES

- ¹ Ian L. McHarg, *Design with Nature* (Garden City, NY: Doubleday/Natural History Press, 1969).

Projects: Five Themes

The projects featured in these pages were selected for *Design with Nature Now* because each in some way narrows the gap between theory and practice and opens up a wider horizon for the future of landscape architecture.

Arriving at the full set of 25 projects for the book involved a long, collaborative process. We began by asking colleagues from around the world to nominate projects that they thought best exemplified and extended McHarg's design philosophy and method. The nomination process resulted in a list of over 80 projects, and after much discussion, we agreed on the final 25.

The projects are organized into five themes: Big Wilds, Rising Tides, Fresh Waters, Toxic Lands, and Urban Futures [each of which is represented in this special issue of *Land Lines*]. Although these themes cover a lot of territory, it will be obvious to readers that the collection does not represent all the types of work the professions of planning and landscape architecture do. We have included projects that engage large complex sites and pressing socioecological issues, and that variously translate into reality what could be referred to as a McHargian ethos of stewardship.

It must be said, however, that some projects show the limitations of the discipline's ability to effect change at the scale that is needed; the projects improve the social and ecological function locally, but may also be part and parcel of development patterns and infrastructural projects that are environmentally degrading at other scales. We wish the full collection comprised a greater diversity of projects from a greater diversity of places. Much as the collection identifies gaps in the thematic areas engaged by contemporary practice, so too there are glaring gaps in the geography of contemporary practice. In short, the project selection is imperfect, but we have found, and hope the reader will also find, that the collection is a good place to begin.

— R. Weller, K. M'Closkey, B. Fleming, F. Steiner

Big Wilds

MALPAI BORDERLANDS | ARIZONA AND NEW MEXICO, USA

IN THE BOOT of New Mexico and the southeastern tip of Arizona along the U.S.–Mexico border, there is a 3,238-square-kilometer (1,250-square-mile) plot of land, almost entirely unbroken by highways or subdivisions. The Malpai Borderlands harbors an estimated 4,000 species of plants, 104 species of mammals, 327 species of birds, 136 species of reptiles and amphibians, and the greatest diversity of bee species in the world. In this biodiverse landscape, 53 percent of the area is privately owned and 47 percent is public—a split that has led to tensions among government agencies, cattle ranchers, and environmentalists.

What sets the Malpai Borderlands apart from other stories of conflict in conservation is how these tensions have largely been overcome in order to conserve the landscape's biological and cultural identity. Fewer than one hundred families use this expansive land to graze their livestock. Despite being long loathed by environmentalists, these cattle ranching families have led the charge to keep the land from subdivision and development.

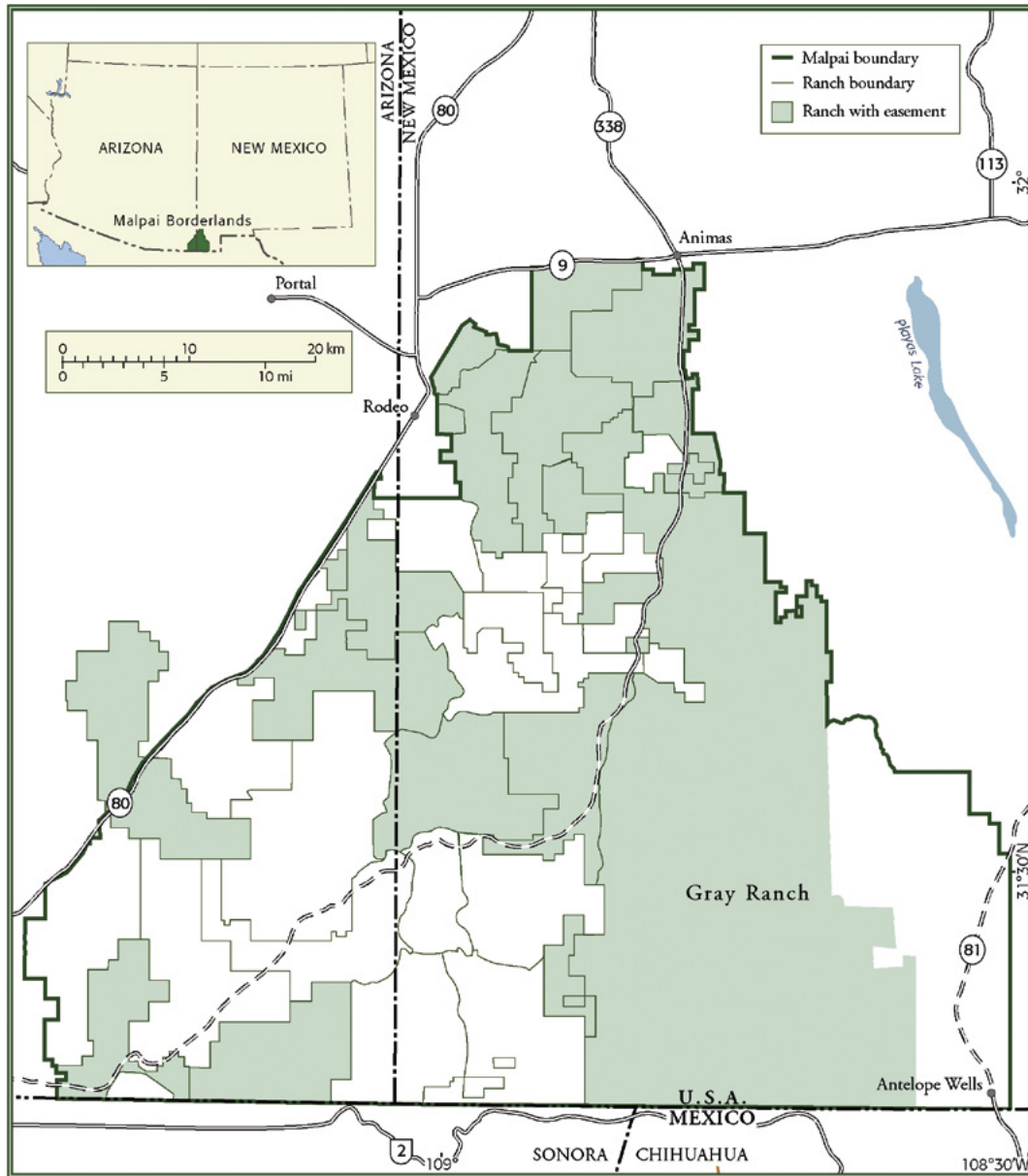
In the early 1990s, the suppression of wildfire caused the land to revert to shrubland dominated by the invasive mesquite tree. This

brushlike tree is bad for grazing and highly flammable, serving as added fuel for forest fires, which can further denude the land. Fire has historically kept the brush at bay, and when a fire broke out on July 2, 1991, ranchers pleaded with the local authorities to let it burn. They did not listen. In response, ranchers committed to stewardship of the landscape formed the Malpai Borderlands Group, which has succeeded in protecting almost 80,000 acres from development.

The success of the Malpai Borderlands Group can be credited both to their reliance on science to help manage the Malpai and to their commitment to educating others about how grazing and conservation can coexist. The first scientist on the board, Ray Turner, specialized in comparative photography, a type of ecological study that traces old photographs to their origin and takes a new picture in the same location. The floral species in the photographs are then compared in order to paint a picture of the area's ecological change. Turner and subsequent scientists have concluded, controversially, that a certain level of ranching can contribute to preserving the land's biodiversity.

Bill McDonald drives in cattle to a corral for branding on the Sycamore Ranch.
Credit: Blake Gordon.





Ranches with conservation easements (shown in green). Credit: Darin Jensen.

Project credits: The Malpai Borderlands Group is a nonprofit organization comprising land owners whose mission is to manage the ecosystem of nearly 404,685 hectares (1 million acres) of relatively unfragmented landscape. See www.malpaiborderlandsgroup.org/.

Rising Tides

2050—AN ENERGETIC ODYSSEY | NORTH SEA, THE NETHERLANDS

2050—AN ENERGETIC ODYSSEY, an immersive installation consisting primarily of a thirteen-minute video with maps, diagrams, and drawing, asks the question: What would it look like if the Netherlands and its neighbors were to switch to renewable energy production at a large enough scale to meet the Paris 2015 carbon emissions goals? *2050—An Energetic Odyssey* (the Odyssey) is not a plan; it is a narrative that recasts the landscape architect as provocateur. It uses techniques of data visualization to make complicated issues understandable to a broad, policy-oriented constituency.

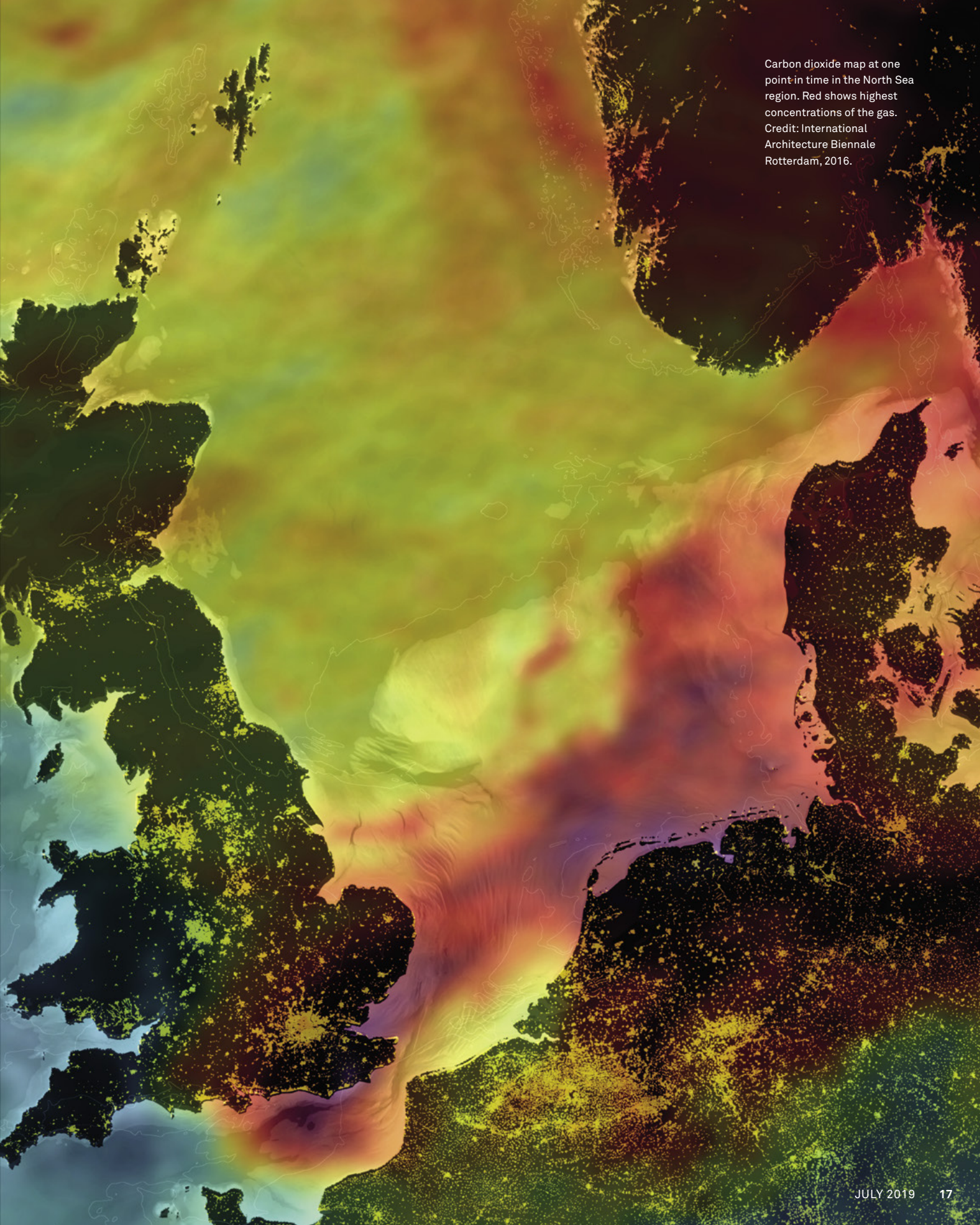
The Odyssey envisions 25,000 wind turbines with a net coverage of 57,000 square kilometers (22,000 square miles) that would enable 75 percent of the North Sea countries' current energy to be converted to renewable energy by 2050. Most of these turbines would be clustered on wind farms off the coastline of the North Sea countries. There is, however, one

notable exception: a proposed cluster of wind farms on Dogger Bank, an ecologically vital sandbank submerged more than 50 meters (approximately 55 yards) below the water's surface in the middle of the North Sea. To produce the necessary energy, a construction island and massive cluster of wind farms would need to be placed on Dogger Bank.

Therefore, the proposed construction method would minimize impacts on sea mammal navigation and avoid conflict with the migratory pathways of birds. The zone closest to the coast, which birds use for orientation, would be left untouched wherever possible, and wind turbines could be temporarily taken out of operation if sensors detected birds approaching. In addition, the wind farm locations could be combined with new marine reserves. Finally, the visual impact of the windfarms would be mitigated by siting the farms more than 19 kilometers (12 miles) out from the coast so that the Earth's curvature would reduce visibility.

The Princess Amalia offshore wind farm. The wind farm consists of sixty wind turbines and is located in block Q7 of the Dutch continental shelf, 23 kilometers (14 miles) from shore. Credit: Siebe Swart, 2013.





Carbon dioxide map at one point in time in the North Sea region. Red shows highest concentrations of the gas. Credit: International Architecture Biennale Rotterdam, 2016.



Spatial occupation of the North Sea, including shipping routes (blue lines), oil and gas rigs (red lines and dots), fishing areas, and international crossings (yellow lines). Credit: International Architecture Biennale Rotterdam, 2016.

Project credits: Commissioned by the International Architecture Biennale Rotterdam (IABR) in the context of IABR—2016—THE NEXT ECONOMY. Concept: Maarten Hajer and Dirk Sijmons. Realized by: Tungstenpro, H+N+S Landscape Architects, and Ecofys in partnership with the Ministry of Economic Affairs of the Kingdom of The Netherlands, Shell, Port of Rotterdam, and Van Oord.

Fresh Waters

WEISHAN WETLAND PARK | JINING, CHINA

The first phase of the Weishan Wetland Park in the town of Jining in China's Shandong Province was completed in 2013. The impetus for this 39-square-kilometer (15-square-mile) park was the adjacent development of a new urban center just south of the existing city of Weishan, near the southeastern edge of the expansive Nansi Lake (also called Weishan Lake). This new southern town will eventually have 50,000 residents in an area that was previously agricultural. The Weishan Wetland Park will filter polluted water from the future development, and it is hoped that it will be the centerpiece of a larger program of nature-based tourism in the region. The proximity to Nansi Lake, one of the country's largest and most polluted lakes, makes the park's purification function especially important, as the lake is a part of China's ambitious, though ecologically and socially disruptive, South-North Water Diversion Project, which redirects fresh water from the Yangtze River in the south to the more arid Yellow River basin in the north.

The master plan is structured around the creation of five zones: core protection, natural restoration, limited human activity, develop-

ment, and a village community. Various types of wetland were restored or created from scratch, with the intention of attracting diverse species of waterfowl and enticing tourists to the park. There is some access to the park by vehicle, but much of the sightseeing can be done only on elevated pedestrian walkways built with local recycled wood and steel.

Although the water filtration and purification techniques used are not novel in the field of landscape architecture, their scale and integration into the new town mark a significant shift in thinking about water, both within the Shandong Province and in China as a whole. As of 2015, 1.3 million hectares (3.2 million acres) of new wetland park had been created and 130,000 hectares (321,000 acres) of wetland had been restored throughout the province.

China is in the process of rethinking its water infrastructure in the face of rapid urbanization and climate change. The national government's renowned "sponge cities" initiative in 2015 funded the development of ponds, filtration pools, and permeable roads and public spaces in sixteen cities to improve flood and drought resilience.

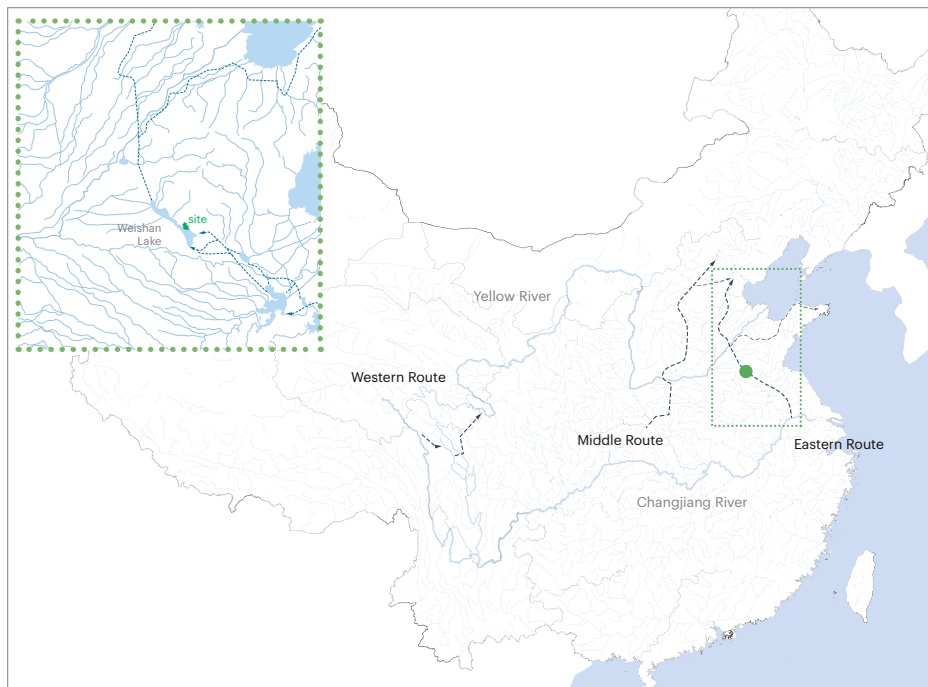


View of the boardwalk through the Weishan Wetland Park. Credit: AECOM.

Tiering and diverse plantings create seasonal interest and opportunities for outdoor science education. Credit: AECOM.



South-North Water Diversion Project (bottom); Eastern Route Project (inset). Credit: AECOM.



Project credits: Client/Owner: Wei Shan Wetland Investment Co. Ltd. Photography: AECOM. AECOM team: Qindong Liang, Lian Tao, Yan Hu, Heng Ju, Yi Lee, Jin Zhou, Enrique Mateo, Xiaodan Daisy Liu, JiRong Gu, Li Zoe Zhang, YinYan Wang, Yan Lucy Jin, Kun Wu, Qijie Huang, Jing Wang, Ming Jiang, Danhua Zhang, Junjun Xu, Shouling Chen, Gufeng Zhao, Benjamin Fisher, FanYe Wang, Shuiming Rao, Changxia Li, Donald Johnson, Agnes Soh. Contractor: Shanghai Machinery Complete Equipment (Group) Co., Ltd. Wetland consultant: Shandong Environmental Protection Science Design and Research Institute. Sculpture consultant: UAP.

Toxic Lands

FRESHKILLS PARK | NEW YORK, USA

THE GENERAL PUBLIC'S negative view of marshland as wasteland in the 1940s helped determine the location of landfills throughout New York City. Fresh Kills landfill is one example. It was opened in 1948 as a temporary landfill on Staten Island on the banks of the Fresh Kills estuary. Robert Moses, a key figure in the city's planning, promoted the landfill at Fresh Kills, hoping to later reclaim its marshland for real estate development and to build an expressway connecting Staten Island to New Jersey and Brooklyn.

Despite strong opposition, the Fresh Kills landfill remained, becoming permanent in 1953. At its peak in the 1980s, the landfill received up to 29,000 tons of refuse daily, and averaged 2.8 million tons annually over its lifespan. Over time, its four garbage mounds grew from a few feet above sea level to 69 meters (225 feet) tall. Until its closure in 2001, Fresh Kills reigned as the largest landfill in the world.

Restored wetlands are visible in the foreground of a capped landfill mound. Credit: Alex S. MacLean/Landslides.

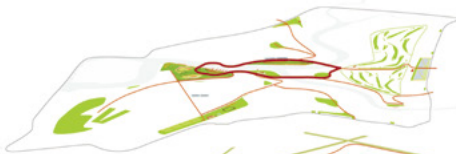
From 2003 to 2006, the design firm James Corner Field Operations and its consultants worked to create a master plan for the site. Capping a landfill and converting it to public open space is hardly a new practice, but creating a viable ecology in such a hostile location requires innovation and experimentation. First the landfill was capped and the infrastructure for methane extraction was set in place. Then, since importing good topsoil to cover the vast landfill (which was nearly three times the size of Central Park) was not feasible, the designers developed methods of in situ soil development through a highly curated process of plant succession. Various planting strategies have been tried, monitored, and adjusted.

The creation of Freshkills Park is a work in progress and is not expected to be completed until 2036. Once built, the new park will enlarge the existing 1,214-hectare (3,000-acre) Staten Island Greenbelt and connect it to the William T. David Wildlife Refuge, offering the community a full range of recreational activities.

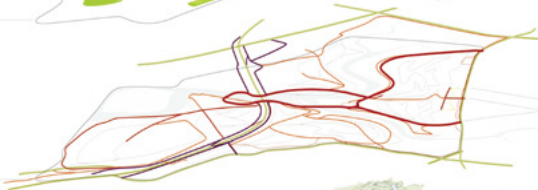


Freshkills Park landscape layers. Credit: James Corner Field Operations.

New Program



New Circulation



New Habitat



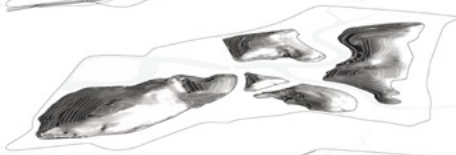
Soil Cover



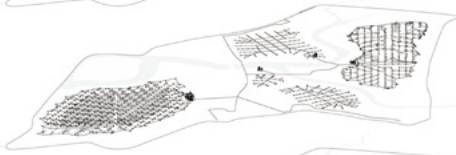
Surface Water



Impermeable Liner



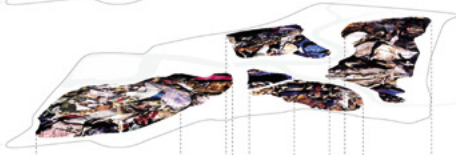
Gas Extraction Network



Liquid Collection and Containment



150 Million Tons of Waste



Wetland Prior to 1948





Freshkills Park illustrative plan. Credit: James Corner Field Operations.

Project credits: Project lead, landscape architecture, urban design: James Corner Field Operations. Consultant team: AKRF; Applied Ecological Services; Arup; Biohabitats, Inc.; BSKS Architects; Brandston Partnership Inc.; Jacobs (previously CH2M Hill); Daniel Frankfurt; Faithful + Gould; Geosyntec; HAKS; Hamilton, Rabinovitz & Alschuler; Langan; L'Observatoire International; Philip Habit and Associates; Project Projects; Rogers Surveying; Sage & Coombe Architects; Richard Lynch (ecologist); and Sanna & Loccisano Architects (expediter).

Urban Futures

MEDELLÍN | COLOMBIA

THE CITY OF MEDELLÍN suffers from extreme inequality that is reflected in its housing types and the broader built environment within the city's valley section. The wealthy tend to live in central, well-served enclaves, while the poor live on peripheral steep slopes in self-constructed settlements. Since 2003, the city has undergone an internationally recognized urban transformation, coinciding with a restoration of peace in what was once the most dangerous city in the world.

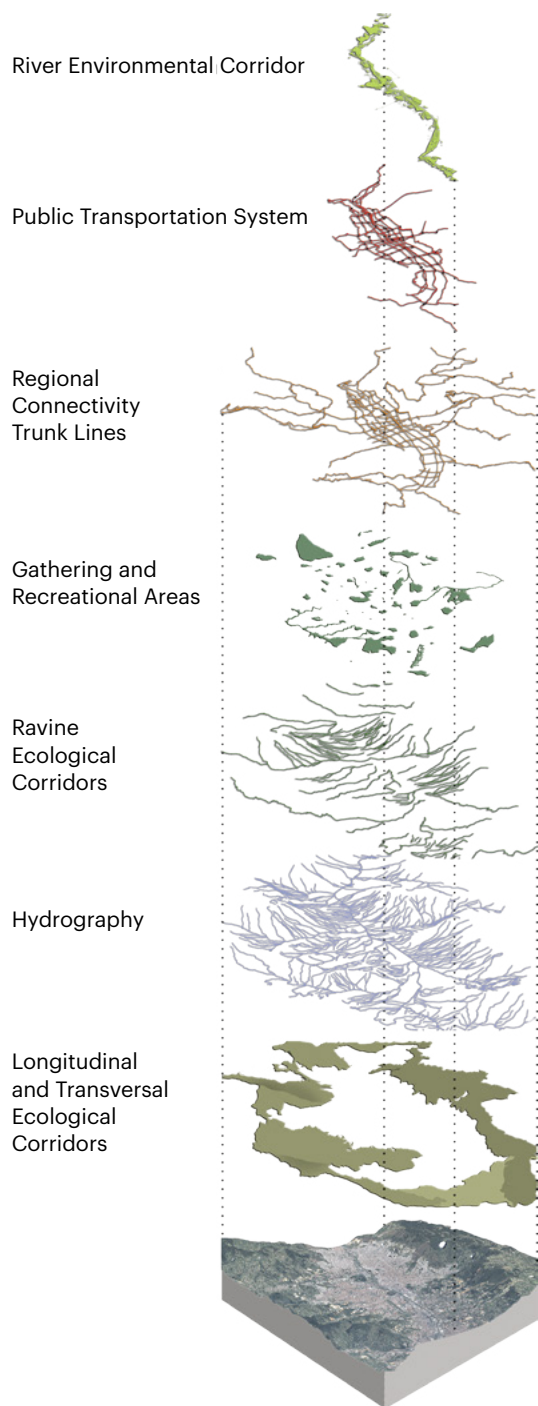
In 2004, Medellín began rapidly linking what it identified as “nodes of development” in some of the city's poorest neighborhoods—libraries, schools, and public spaces—to public transportation. It built gondolas, escalators, and bridges over steep ravines to link those neighborhoods to the city's metropolitan transit system. Public space projects have also been built to bring more life to the channelized river. The Medellín River Parks Master Plan is a linear

sequence of public spaces along the river that bisects the city and is where the oldest formal elements of the city are located. The construction of the first phase of the park required a section of the highway to be buried beneath the new park, and bridges have been built across the river, connecting the two parts of what had been a divided city.

These projects are an outgrowth of a philosophical and practical shift in planning first described in the city's *Plan de Ordenamiento Territorial* of 1998, a document that built on existing United Nations efforts to provide basic services to the informal communities, or *comunas*, on the urban periphery. This document is still used and was updated in 2017, with an added focus on sustainability, walkability, accessibility, and the revitalization of the urban core. Practically and symbolically, the poorest residents were able to connect to the city and to the civility and services it promises its citizens.

Aerial view of the first phase of the Medellín River Parks, constructed in 2016. Credit: Alejandro Arango Escobar.





A section of highway was buried beneath the new park and bridges have been built across the river, connecting the two parts of what had been a divided city.

Though Medellín has successfully provided services to informal settlements on its periphery, the question of how informal settlements arise in the first place and whether their growth can be planned is also relevant to the millions of people expected to migrate to rapidly urbanizing cities in this century. A significant planning document that addresses this larger issue is the recently completed BIO 2030 Plan—a strategic plan to structure future growth through cooperation among the ten municipalities of the Aburrá Valley—produced by governmental bodies in collaboration with Urbam, the Center for Urban and Environmental Studies at EAFIT University in Medellín, an organization led by Alejandro Echeverri. This comprehensive plan documents the geology, hydrology, ecology, and fragmentation of the entire valley and, using these layers as a base, provides detailed designs for different developments. Similarly, professors of landscape architecture and urban design David Gouverneur and Christian Werthmann, among others, are developing projects with students related to the social, ecological, and political challenges of designing informal settlements. Gouverneur’s Informal Armature approach offers a framework for self-constructed neighborhoods, prior to the occupation of the land, and Werthmann’s team, building on the work of Urbam EAFIT, offers detailed construction techniques to minimize risks from earthquakes and landslides and maximize access to basic infrastructure.

The built and natural systems of the Aburrá Valley, including transit, recreation areas, hydrology, and ecological corridors. Alcaldía de Medellín, Área Metropolitana del Valle de Aburrá, Urbam EAFIT, 2011. Credit: Bio 2030. Plan Director Medellín, Valle de Aburrá. Un sueño que juntos podemos alcanzar. Medellín: Urbam EAFIT.



Shifting Ground pilot projects in informal settlements: cooperative micro-farming, slope stabilization, reforestation, and warning system. Credit: Institute of Landscape Architecture, Leibniz Universität Hannover (ILA, LUH) / Centro de Estudios Urbanos y Ambientales (Urbam) / Escuela de Administración, Finanzas e Instituto Tecnológico, Universidad Medellín (EAFIT).

Project credits: Plan Director Medellín, Valle de Aburrá. Un sueño que juntos podemos alcanzar. Medellín: Alcaldía de Medellín, Área Metropolitana del Valle de Aburrá and Urbam EAFIT, www.eafit.edu.co/centros/urbam/articulos-publicaciones/SiteAssets/Paginas/bio-2030-publicacion/urbameafit2011%20bio2030.pdf. Medellín River Parks: Architectural design: Sebastián Monsalve, Juan David Hoyos. Design team: Osman Marín, Luis Alejandro Jiménez, Andrés Santiago Fajardo, Sebastián González, Juan Diego Martínez, María Clara Trujillo, Alejandro Vargas, Carolina Zuluaga, Daniel Zuluaga, Sara París, Daniel Beltrán, Daniel Felipe Zuluaga, David Castaneda, Alejandro López, David Mesa, Andrés Velásquez, Juan Camilo Solís, Melissa Ortega, D. David Hernández del Valle. Landscape design: Nicolás Hermelín. Photography: Alejandro Arango Escobar, Sebastián González Bolívar. Engineering team: Consorcio EDL. Builder team: Guinovart Obras y Servicios Hispania S.A. Grupo OHL Construcción. Construction supervision team: El Consorcio integral—Interdiseños. Design audit team: Bateman Ingeniería S.A. Medellín's town hall: Aníbal Gaviria. Director of Administrative Department of Planeación de Medellín: Jorge Alberto Pérez Jaramillo. Management of Medellín River Parks: Antonio Vargas del Valle.

Shifting Ground / Medellín Project team: Institute of Landscape Architecture, Leibniz Universität; Hannover: Christian Werthmann, Joseph Claghorn, Nicholas Bonard, Florian Depenbrock, Mariam Farhat; Centro de Estudios Urbanos y Ambientales (Urbam) / LA Universidad EAFIT (Escuela de Administración, Finanzas e Instituto Tecnológico): Alejandro Echeverri, Francesco María Orsini, Juan Sebastian Bustamante Fernández, Ana Elvira Vélez Villa, Isabel Basombrío, Diana Marcela Rincón Buitrago, Juan Pablo Ospina, Anna Manea, Daniela Duque, Ángela Duque, Simón Abad, Lina Rojas, Maya Ward-Karet, Santiago Orbea Cevallos; Harvard Graduate School of Design: Aisling O'Carroll, Conor O'Shea. *Contracting authority:* Municipal Planning Authority of the City of Medellín. *Cooperation partners:* Fundación CIPAV, Fundación Sumapaz, Aníbal Gaviria Correa, Jorge Pérez Jaramillo, Juan Manuel Patino M., Paola Andrea López P., Sergio Mario Jaramillo V., David Emilio Restrepo C., Mario Flores, John Cuartas, María Alejandra Rodríguez N. *Participating project specialist:* Eva Hacker, soil bioengineering; Marco Gamboa, geology; Michel Hermelin, geology; Iván Rendon, sociology; Tatiana Zuluaga, urban planning. *Duration:* 2011–today.

Ecology, Scarcity, and the Global South

By Jillian Walliss

After identifying projects to profile in Design with Nature Now, the editors asked leading scholars and practitioners to provide relevant commentary and analysis. The following essay is one of nine such commentaries that appear in the volume.

A NATION'S ECONOMIC GROWTH and ecological values are closely linked—a factor well demonstrated in *Design with Nature*, which Ian McHarg wrote during a period of unprecedented economic growth. Writing in the 1960s, McHarg observed that the United States, now emancipated “from oppression, slavery, peonage and serfdom,” was at a place “where an unparalleled wealth has been widely distributed.”¹ It was against this rare background of shared prosperity that McHarg honed his argument for setting limits to development through a greater understanding of ecological systems across the three scales of the city, suburb, and countryside.

Rotate the globe during the 1960s to the Global South and a very different economic story was unfolding. The Cultural Revolution was only beginning in China, where the population was still largely agrarian; many African and Southeast Asian countries were just emerging from the control of European colonizers. And notably, the subsequent transition of these nations into greater economic prosperity through processes of industrialization and modernity relied largely on their own resources. The implications for ecological values were considerable.

The significant effects of this 20th-century economic disparity between the Global North and South are rarely acknowledged in the ecological discourse of landscape architecture, where instead design projects tend to be presented in an apolitical scientific or artistic manner. In adopting the lens of “scarcity,” this essay explores new critiques of large-scale environmental projects in Africa and China, which acknowledge distinctive economic conditions. Scarcity is commonly defined as a shortage or a lack. However, many scholars identify its value for revealing influential social and political attitudes toward environmental resources such as water, soils, and forests.

I adopt scarcity as a heuristic device for moving beyond generic ideas of sustainability to develop understandings of large-scale landscape systems that recognize the intertwining dynamics of ecology and economic growth.

THE GLOBAL SOUTH

Encompassing Africa, Latin America, China, and developing countries in Southeast Asia, the term Global South emerged as a post-Cold War alternative to the third world, and has since expanded to include “spaces and peoples negatively impacted by contemporary capitalist globalization.”² Whereas the Global North has achieved economic prosperity from resources (labor and physical) accessed through processes

of colonization and globalization, the Global South is largely dependent on its own resources. This factor, along with the Global South's later transition into modernity, is given scant attention in Western landscape discourse. Considered against the unfolding complexities of climate change and globalization, this oversight is problematic. As David Harvey concludes, "If you think that you can solve the environmental question, of global warming and all that kind of stuff, without actually confronting the whole question of who determines the value structure. . . . then you have to be kidding yourself."³

Bridging economic and ecological domains, the concept of scarcity offers a valuable lens for revealing underlying values implicated in large-scale landscape systems designs. With connections to economic theory, scarcity is used extensively as a factor in formulating development and environmental policies by governments, nongovernmental organizations (NGOs), investors, and international agencies throughout the Global South.⁴ Within economic and ecological contexts, scarcity is inherently about limits, and at its simplest can be considered in two ways. Absolute scarcity posits that there is an impassable limit to resources, as reflected in concepts such as carrying capacity and controlling population

growth.⁵ Conversely, relative scarcity claims that political and technical factors influence the availability of resources.⁶ With these framings as a starting point, this essay considers three large-scale ecological designs, beginning with Africa's Great Green Wall.

SCARCITY AND COLONIZATION

At almost 8,000 kilometers (5,000 miles) long, and stretching from Senegal to Djibouti, Africa's Great Green Wall (GGW) aims to combat desertification. In 2005, the idea was ratified, with all countries of the Sahel signing the Convention Creating the Pan African Agency for the GGW.⁷ Like many African environmental projects, the vision is funded by multiple national and international parties, including the European Union, the United Nations (Convention to Combat Desertification), and the African Union Commission partner countries.⁸ At face value, this ambitious project is admirable. However, a closer investigation reveals a legacy of agricultural and conservation agendas grounded in colonial assessments of resource scarcity.

The GGW encompasses the semiarid region of the Sahel—a specific ecological transition zone between the Sahara and the Sudanian savanna. By 1914, all eleven countries of the Sahel had been colonized by European nations, which

Chad, Mao, Kanem region. Oasis in the Lake Chad Basin, October 13, 2012. Women from the local village help to reforest the oasis by planting indigenous plants with the Great Green Wall program. Credit: Andrea Borgarello for TerrAfrica /World Bank.



quickly introduced policies to address agriculture production, soil degradation, and desertification.⁹ Conceived by European-trained scientists, foresters, and administrators, these policies were shaped by assessments of dry lands ecology. For instance, France (with fourteen African colonies under its control) introduced policies that declared trees to be a scarce commodity. Any trees found on farmers' properties became the property of the government (farmers were threatened with fines and jail for removing or damaging trees). Simultaneously, separate forest plantations were established.¹⁰ This separation of trees from agriculture produced clear fields, and farmers were encouraged to plough, fertilize, and plant improved species. An emphasis on increased food production also led to the adoption of animal husbandry, which contributed to a decrease in nomadic herding practices.

Within the Sahel environment, these introduced practices devastated traditional agricultural practices, such as brush firing, digging deep planting pits for water retention, and using tree shelter for crops, and led to poor yields and the loss of topsoil.¹¹ Commonplace throughout Africa in the 20th century, these policies constructed the environment as a problem and led to the application of "environmental solutions" that ignored established social, economic, and ecological relationships.¹² In addition, the idea of "desertification" introduced by European scientists in the 1920s claimed that the Sahara was encroaching south into the savanna—a concept now disputed by ecologists.¹³ This assumption of encroachment forms the genesis for the proposal to plant a continuous barrier of trees across the Sahel to moderate winds and soil erosion temperatures, and to improve humidity levels for agricultural production.¹⁴

The earliest version of the GGW continued the colonial policies of compartmentalization, presenting a plantation of trees segregated from nearby villages. Its initial focus was on the technical challenge of tree planting in the desert, with a slew of foreign experts offering advice on appropriate tree species and planting techniques.

No longer a continuous band of trees, the Great Green Wall intersects with villages and agriculture areas to encourage more sustainable development of land resources and better living conditions for the local population. Early indications suggest that this approach is offering promising outcomes.

Dutchman Pieter Hoff, for instance, proposed the "Waterboxx," a small round tank designed to provide environmental protection and water to a seedling, but at a high unit cost.¹⁵

Over time, the GGW has been significantly revised from a forest plantation into "a mosaic of interventions," shaped by stronger economic and ecological ambitions.¹⁶ No longer a continuous band of trees, the GGW intersects with villages and agriculture areas to encourage more sustainable development of land resources and better living conditions for the local population. Early indications suggest that this approach is offering promising outcomes. In Senegal, for instance, communal gardens managed by women's associations provide members with fresh food, with the excess sold at market rate and profits invested in a common fund available to provide microcredit.¹⁷

A review of contemporary scientific and ecological reports, however, presents a confusing picture of how the GGW and other environmental projects are changing the Sahel environment. It is unclear whether the Sahel is in fact greening or browning, or whether droughts are persisting. This ambiguity reflects differing conceptual definitions of land degradation, as well as methodological and disciplinary biases.¹⁸

For example, working at the continental scale, the Global Drylands Assessment (2015–2016) uses satellite images to document tree-cover density over the drylands, identifying potential for restoration and investment.¹⁹ Numerous researchers warn of the limitations of

such coarse-resolution Earth observation data to inform policies. Hannelore Kusserow, for instance, demonstrates that the analysis of data sets covering the period from the 1970s droughts to the present gives the sense of greening, whereas including predrought data imaging would suggest browning.²⁰ Similarly Kjeld Rasmussen and coauthors warn that “large-scale and long-term trends do not say much about environment change processes at micro-scale and over shorter periods.”²¹

For instance, initiatives in Niger include strategies for empowering small landholders to manage natural regeneration and return to indigenous land use techniques such as *zai*—a grid of planting pits that improve water retention and infiltration.²² Establishing a balance between clearing land for agriculture and regeneration has improved soil conditions with little investment. And most important, in an era of climate change, this approach has demonstrated that in the Niger context rainfall is not the limiting factor. Instead, the real issue is changing the farmers’ perception and management of trees, attitudes and practices that can be traced back to colonization.²³

Therefore, how disciplines, NGOs, governments, and communities define indicators of land degradation in the Sahel is fluid and reflects attitudes toward resources. Natural scientists tend to emphasize biophysical reasons (absolute), social scientists focus on human causes (relative), and villages often elevate vulnerability to attract international aid (relative).²⁴ Further, aerial satellite images construct representations of scarcity and abundances of land, water, and vegetation, independent of how land is owned and used.²⁵ Consequently, balancing local economic gains with longer-term ecological outcomes is difficult, with tensions arising over the marginalization of local people in decision making.²⁶ For example, large-scale planting to combat desertification may have the economic potential of substantial carbon sequestration but at the same time results in the loss of productive land, puts stress

on the water system, and has negative implications for food security. The challenges of the Sahel and the GGW are therefore interdisciplinary and multiscale and require the explicit identification of methods and values to best inform development and environmental policies.

Turning to China, we find a very different framing of scarcity. Rather than impose limits, the socialist government adopted scarcity as a powerful mobilizer of economic growth.

SCARCITY AND SOCIALISM (WITH CHINESE CHARACTERISTICS)

In the period since 2010, there has been a proliferation of large-scale ecological projects in China designed by local and international landscape practices, yet rarely are they contextualized within China’s unique political and cultural environment.

From the outside, postreform China is particularly difficult to comprehend, presenting a mix of third-world and first-world elements, socialist and capitalist.²⁷ However, scarcity offers a valuable lens for understanding China’s evolving relationship between ecology and economic growth. Numerous Chinese scholars highlight the role scarcity has played in China’s economic development.²⁸ For instance, post-Cold War embargoes and blockades imposed by the West excluded China from the world trade system, while notions of scarcity operated as a mobilizing force for the new socialist economic system in its industrialization of an agrarian society. China’s progression toward an industrial modernity has been shaped by perpetual conditions of scarcity and austerity, which Lu describes as the transition from “a state of being less to a state of being lacking.”²⁹

Critically, Mao Zedong considered people to be China’s greatest resource, with population growth vital for increasing production and building status in order to compete with Soviet Russia and the West. Although China has limited environmental resources, most notably water, a new socialist order was considered the liberating

mechanism that would provide for all people.³⁰ In a clear demonstration of relative scarcity, China's path to modernity was not to be limited by resource availability; rather, technology (often with Soviet influences), human power, and socialist ideology, including a war against nature,³¹ were considered the path to industrial growth. Consequently, resource scarcity was a mobilizer rather than a limit, inspiring monumental technological visions such as China's South-North Water Diversion Project (SNWDP). The origins of the project are traced to Mao, who stated in 1952, "Water is abundant in the south and scarce in the north, so why not borrow a little from the south if possible?"³² Covering over 1,200 kilometers (745 miles), this canal built between Yangtze and Beijing is considered one of the world's most expensive infrastructures, and on completion it will transfer up to 7 percent of China's yearly water consumption.³³

Britt Crow-Miller highlights how concepts of excess and limitations are used to validate the SNWDP, constructing water scarcity as a "natural phenomenon" related to droughts and climate change as distinct from "extreme anthropogenic pressures" on the North China Plain.³⁴ This framing of water scarcity is not specific to SNWDP, but common for many large-scale water projects internationally, serving to shift attention from regional issues, uneven financial distribution, and longer-term impacts. By the late 1970s, Mao's vision for population growth (to increase the population from 540 million in 1949 to over 940 million in 1976) had become a major issue. Interventions such as the one-child policy limited population growth and, notes Jiahua Pan, provided a major impetus for the adoption of environmental protection policies and more sustainable development approaches.³⁵ The declaration of an "ecological civilization" at the 18th National Congress of the Chinese Communist Party in 2012 elevated these environmental ambitions to the level of national policy. Maurizio Marinelli traces the origins of the term "ecocivilization" to agricultural economist Ye Qianji, who in the 1980s proposed a more sustainable

approach to agricultural production.³⁶ In language reminiscent of McHarg's, Ye declared:

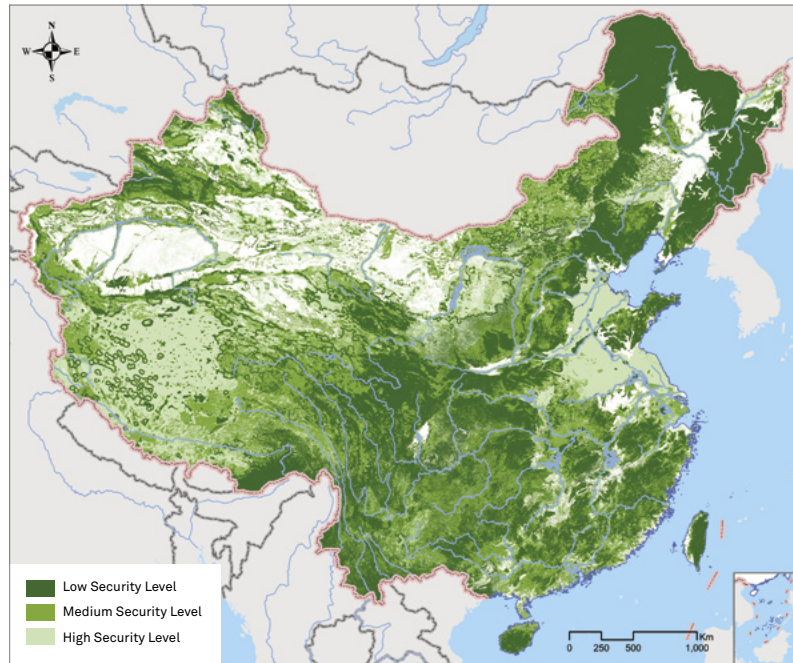
"Humanity can both benefit from nature, and also act in the interest of nature: while humanity has a transforming effect on nature, humanity also has to protect nature, since this is the only way for man and nature to maintain a harmonious and unified relationship."³⁷

This political recognition of a more ecologically responsive economic development, inclusive of limits, was driven by extensive scientific research and debates over the previous decade. Kongjian Yu's influential "National Ecological Security Pattern Study" (2006–2011) was an important contribution.

Commissioned by the Ministry of Cultural Heritages and the Ministry of Environmental Protection, the pilot project of the Graduate School of Landscape Architecture at Peking University in association with Yu's office, Turenscape, established a nationwide strategy for balancing economic development with ecological systems.³⁸ With lineage to McHargian thinking and Richard Forman's ecological language, the research method draws on Yu's Harvard Graduate School of Design doctoral thesis, "Security Patterns in Landscape Planning." Facilitated by geographic information systems, spatial patterns (SP—also known as security patterns) identified ecological conditions that influence ecological security. Mixing quantitative and qualitative parameters, classifications such as buffer zones, intersource linkages, radiating routes, and strategic points are combined with ecological habitats to establish ecological spatial patterns ranked according to three security levels. This spatial expression of absolute limits based on ecological processes presented the Chinese government with a systematic articulation of national ecological values and has subsequently been influential in reshaping Chinese development policy.³⁹

Closely intertwined with the ambition for an "ecological civilization" is the "Beautiful China" vision, which introduces ecojustice concepts such as environmental rights, responsibility to future

The overall National Ecological Security Pattern Plan is a composite of five primary maps, each of which comprises four to six map sublayers. Credit: Kongjian Yu, Peking University Graduate School of Landscape Architecture.



generations, and the interests of the citizens. This “new era of socialist ecological progress” has been a boon for landscape projects, particularly those involving water.⁴⁰ Weishan Wetland Park located in the northern Shandong Province, constructed on part of the eastern route of the SNWDP, offers one such example. Championed by the designers AECOM as “a new paradigm for large parklands and the balance between water remediation, wetland conservation and tourism development,” the park was completed in 2013.⁴¹ The scheme operates at two scales. A series of treatment wetlands, bioswales, and rain gardens, along with restored agricultural fields and marshes, form an important water purification and ecological barrier between urbanized areas to the north and the extensive Weishan Lake to the south. At the urban scale, six wetland fingers extend into the new town, offering a water-driven open-space typology. In addition to purifying water, the wetland is conceived with a strong aesthetic. The carefully designed human access, a biological habitat network that encourages animal and bird diversity, and the dramatic seasonal transformation of the wetlands facilitate many educational, tourism, and

recreational opportunities.⁴² A regionally significant park, the Weishan Wetland Park is an exemplar for “socialist ecological progress,” offering a development model encompassing the ecological and the beautiful.

Starting from a position of relative scarcity, China’s late 20th-century transition to an industrialized economy was rapid, with devastating environmental and social consequences. However, as Pan observes, China is now in a new period of slowing economic growth, almost zero population growth, an aging population, a relatively high level of social wealth acceptance, and an improving ecological environment.⁴³ No longer at war against nature, the environment is increasingly protected from unregulated economic development by laws and regulation, a move to renewable energies and emissions trading, and ecological conservation strategies.⁴⁴ Whether the slowing of the economy will lessen China’s ecological progress is yet to be seen. However, optimistic commentators suggest that China’s ecological reform could extend beyond its own borders to assume a major role in the global challenges of climate change.

CONCLUSION

This essay emerged from an invitation to write about a series of projects considered to exemplify what it means to design with nature now.

Because I live in the Southern Hemisphere, I chose to explore projects outside North America and Europe, a decision that led to the task of identifying an appropriate lens through which to consider the work. Although a limited exploration, this engagement with characteristics of the Global South and the concept of scarcity has revealed the importance of scrutinizing values in conservation and ecological design, such as the setting of limits (absolute) and social, political, and technical dimensions that influence the availability of resources (relative).

This investigation touches on the realm of political ecology. Emerging as a discrete field in the 1980s, political ecology most broadly examines the relationship between society and land-based resources. In a major difference from Ian McHarg's 1960s context, our ecological questions are transnational, with solutions found in negotiations among international organizations, governments, NGOs, communities, and industries. With an increasingly global design practice, landscape architecture would be well served to move beyond general ideas about sustainability and ecological design to engage with core concerns of political ecology such as abundance and degradation, security and vulnerability, and prosperity and marginalization.⁴⁵ To design with nature in 2019, and into the future, is to work within global ecological and political contexts; it will require a more comprehensive engagement with the considerable populations living within the developing countries of the Global South. □

Jillian Walliss is a senior lecturer at the University of Melbourne, where she teaches landscape theory and design studio. Her extensively published research explores the relationship between technology, culture, and contemporary design.

- ¹ Ian L. McHarg, *Design with Nature* (Garden City, NY: Doubleday/Natural History Press, 1969), 24.
- ² Anne Garland Mahler, "Global South," www.oxfordbibliographies.com/view/document/obo-9780190221911/obo-9780190221911-0055.xml.
- ³ Geographer David Harvey, cited in Jon Goodbun, Jeremy Till, and Deljana Iossifova, eds., "Themes of Scarcity," in *Scarcity: Architecture in an Age of Depleting Resources* (New York: John Wiley, 2012), 9.
- ⁴ I. Scoones et al., *Narratives of Scarcity: Understanding the "Global Resource Grab"* (Brighton, UK: Institute for Poverty, Land and Agrarian Studies, 2014).
- ⁵ Absolute scarcity has origins in the writings of Thomas Robert Malthus, an English scholar influential in political economy, who claimed that natural resources are limited and are subject to increasing demands from human society. Malthus's 1798 *Essay on the Principle of Population* proposed that society's increase in wealth and abundance tended to support population growth rather than maintaining a higher standard of living, a concept that became known as the "Malthusian trap."
- ⁶ Relative scarcity can be considered in two forms, as resource scarcity and as political scarcity. First, society's potential for transformation (through technological innovation) can replace or substitute for scarce resources through strategies such as recycling, extraction of lower-quality resources, or technological innovation. This concept is traced to classical economists such as David Ricardo who, writing in the early 19th century, observed that agricultural productivity was related to land quality, the level of financial capital, and the ingenuity and skills of the farmer. In contrast, political scarcity has origins in the work of Karl Marx, who argued that scarcity is perceived and manufactured to suit particular interests. Political scarcity is therefore tied to the impact of colonization, globalization, capitalism, and elite power in controlling access to and distribution of resources.
- ⁷ The partner countries of the Great Green Wall are: Algeria, Burkina Faso, Chad, Djibouti, Egypt, the Gambia, Mauritania, Niger, Nigeria, Senegal, and the Sudan.
- ⁸ David O'Connor and James Ford, "Increasing the Effectiveness of the 'Great Green Wall' as an Adaptation to the Effects of Climate Change and Desertification in the Sahel," *Sustainability* 6, no. 10 (2014): 7143–7154.
- ⁹ Wieteke Aster Holthuijzen, "Dry, Hot and Brutal: Climate Change and Desertification," *Journal of Sustainable Development in Africa* 13, no. 7 (2011): 245–268.
- ¹⁰ Burkhard Bilger, "The Great Oasis: Can a Wall of Trees Stop the Sahara from Spreading?," *New Yorker*, December 19 and 26, 2011.
- ¹¹ Hannelore Kusserow, "Desertification, Resilience, and Re-Greening in the African Sahel—A Matter of the Observation Period?," *Earth Science Dynamics* 8 (2017): 1141–1170.

- ¹² Piers Blaikie, *The Political Economy of Soil Erosion in Developing Countries* (London: Routledge, 2016).
- ¹³ According to the United Nations Convention to Combat Desertification, desertification is defined as “land degradation in arid, semiarid and dry sub-humid areas resulting from various factors, including climatic variations and human activities,” [www.csf-desertification.eu/combating-desertification-and-land-degradation-trend-indicators](http://www.csf-desertification.eu/combating-desertification/item/desertification-and-land-degradation-trend-indicators).
- ¹⁴ O'Connor and Ford, “Increasing the Effectiveness of the ‘Great Green Wall.’”
- ¹⁵ Bilger, “The Great Oasis.”
- ¹⁶ Food and Agriculture Organisation of the United Nations, “Great Green Wall for the Sahara and the Sahel Initiative,” www.fao.org/docrep/016/ap603e/ap603e.pdf.
- ¹⁷ Lea Billen and Deborah Goffner, “Gardening the Sahel,” September 30, 2016, <https://goodanthropocenes.net/2016/09/30/gardening-the-sahel/>.
- ¹⁸ Kjeld Rasmussen et al., “Environmental Change in the Sahel: Reconstructing Contrasting Evidence and Interpretations,” *Regulating Environmental Change* (February 2015): 1–8.
- ¹⁹ Food and Agriculture Organisation of the United Nations, Green Growth Knowledge Platform, “Building Africa’s Great Green Wall: Restoring Degraded Drylands for Stronger and More Resilient Communities,” www.greengrowthknowledge.org/resource/building-africa%E2%80%99s-great-green-wall-restoring-degraded-drylands-stronger-and-more-resilient/.
- ²⁰ Kusserow, “Desertification, Resilience, and Re-Greening in the African Sahel,” 1163.
- ²¹ Rasmussen et al., “Environmental Change in the Sahel,” 6.
- ²² R. Bellefontaine et al., “The African Great Green Wall Project: What Advice Can Scientists Provide?,” ed. I. Amsellem and S. Jauffret (Montpellier: French Scientific Committee on Desertification, 2011).
- ²³ Jim Morrison, “The ‘Great Green Wall’ Didn’t Stop Desertification, but It Evolved into Something That Might,” *Smithsonian.com*, August 23, 2016, www.smithsonianmag.com/science-nature/great-green-wall-stop-desertification-not-so-much-180960171/.
- ²⁴ Rasmussen et al., “Environmental Change in the Sahel.”
- ²⁵ Scoones et al., “Narratives of Scarcity.”
- ²⁶ O'Connor and Ford, “Increasing the Effectiveness of the ‘Great Green Wall,’” 6.
- ²⁷ Duanfang Lu, *Remaking Chinese Urban Form: Modernity, Scarcity and Space, 1949–2005* (London: Routledge, 2006).
- ²⁸ Ibid.; Damien Ma and William Adams, *In Line Behind a Billion People: How Scarcity Will Define China’s Ascent in the Next Decade* (Upper Saddle River, N.J.: FT Press, 2014).
- ²⁹ Lu, *Remaking Chinese Urban Form*, 10.
- ³⁰ Judith Shapiro, *China’s Environmental Challenges* (New York: John Wiley, 2016).
- ³¹ It is important to note that Mao’s attitudes toward the environment were not all driven by socialist ideology. Judith Shapiro argues that on some levels his views represented “an extreme form of a philosophical and behavioural tendency that has roots in traditional Confucian culture” (ibid., 8). In 2001, Shapiro published *Mao’s War Against Nature: Politics and the Environment in Revolutionary China* (Cambridge, UK: Cambridge University Press).
- ³² Britt Crow-Miller, “Discourses of Deflection: The Politics of Framing China’s South-North Water Transfer Project,” *Water Alternatives* 8, no. 2 (2015): 180.
- ³³ *The Economist*, “China Has Built the World’s Largest Water-Diversion Project,” April 5, 2018, www.economist.com/china/2018/04/05/china-has-built-the-worlds-largest-water-diversion-project.
- ³⁴ Crow-Miller, “Discourses of Deflection,” 180.
- ³⁵ Jiahua Pan, *China’s Environmental Governing and Ecological Civilization* (Heidelberg: Springer-Verlag, 2016).
- ³⁶ In 1982, Ye’s dissertation, “Shengtai nongye—Woguo nongyede yici luse geming” (Ecological Agriculture—A Green Revolution in My Country’s Agriculture), was published as *Ecological Agriculture: The Future of Agriculture* (Chongqing: Chongqing Chubanshe).
- ³⁷ Ye is quoted by Maurizio Marinelli in “How to Build a ‘Beautiful China’ in the Anthropocene. The Political Discourse and the Intellectual Debate on Ecological Civilization,” *Journal of Chinese Political Science* (February 22, 2018): 9.
- ³⁸ Kongjian Yu, “Projects Leading Policy: Water Urbanism Across Scales,” in *Water Urbanism East*, ed. Kelly Shannon and Bruno De Meulder (Zurich: Park Books, 2013).
- ³⁹ Kongjian Yu, Sisi Wand, and Dihua Li, “The Negative Approach to Urban Growth Planning of Beijing, China,” *Journal of Environmental Planning and Management* 54, no. 9 (2012): 1209–1236.
- ⁴⁰ Marinelli, “How to Build a ‘Beautiful China’ in the Anthropocene,” 15.
- ⁴¹ America Society of Landscape Architects (ASLA), Weishan Wetland Park submission (2015), www.asla.org/2015awards/96363.html.
- ⁴² Lian Tao, “Weishan Lake National Park, Shandong,” *Landscape Architecture Frontier* 4, no. 3 (2016).
- ⁴³ Pan, *China’s Environmental Governing and Ecological Civilization*.
- ⁴⁴ United Nations Environment Programme, “Green Is Gold: The Strategy and Actions of China’s Ecological Civilization,” May 26, 2016, <https://reliefweb.int/report/china/green-gold-strategy-and-actions-chinas-ecological-civilization>.
- ⁴⁵ Marcus Taylor, *The Political Ecology of Climate Change Adaptation* (New York: Routledge, 2014).

Traverse Before Transect

By Anuradha Mathur

IAN MCHARG INTRODUCED ME to the ecological transect. It situated me uniquely in the land to which I had recently arrived as a student from India, 12,000 kilometers (7,500 miles) away. I was not just in Philadelphia; I was on a line drawn from the Appalachian Mountains across the Piedmont Plateau down to the Coastal Plain and the Atlantic Ocean. Having learned about Patrick Geddes's Valley Section from his work in India in the 1910s, the transect resonated with me. In Geddes's words, it was "that general slope from mountain to sea which we find everywhere in the world."¹

The transect, however, not only situated me; it also gave the students of my class, who hailed from five different continents, a common ground. It cultivated an eye for seeing landscape that we could carry wherever we went. For many of us that meant back home.

Each week we set out to a point on the transect—the coal mines near Scranton, the boulder field in the Poconos area, the forests of the Wissahickon, the meadows near Valley Forge, the falls at Manayunk, the bogs and waterways of the Pine Barrens, and the dunes along the Jersey Shore. We dug soil pits, identified vegetation, searched for clues to what lay above and below the Earth's surface, and in our field notes pieced together the sectional history of the land. In studio, we worked in groups, familiarizing ourselves with particular sites on the transect. Each site was an area of 65 square kilometers (25 square miles), represented by a topographical map on which we called out diverse soils, vegetation, land uses, slopes, and geology.

We highlighted the lines of streams, floodplains, wetlands, and aquifers, constructing clear distinctions between features that belonged to land and those that belonged to water. Although the base maps were the same each year, using a scale of 1 centimeter to 60 meters (1 inch to 500 feet), we took particular pride in choosing our palette of colors, which extended into subtle gradients of green, blue, and brown, perhaps in an attempt to dissolve boundaries constituted by the map that did not correspond with our experience on the ground. It was inevitable, however, that the transect on the ground would recede into distant memory as the map took over as the primary site of analysis and design. After all, it allowed the layering of information from multiple disciplines onto the same geographic surface. The map is what we, as students of design and planning, were tasked to respond to. This was our experience in the 501 studio at Penn in 1989, the foundational landscape studio initiated by Ian McHarg and Narendra Juneja in one of its last years.

A decade later it was my turn to teach the foundational landscape studio.² I took students not to the transect of my student days but to a place from which they could construct their own transect. They carried measuring tapes, string, improvised spirit levels, pencils, newsprint, index cards, and charcoal. They did not carry maps to orient themselves, only the blank pages of their sketch books as they began to negotiate an unfamiliar terrain. I urged them to walk not so much to find their way, but to *make* their way. Some made their way from creek to ridge, others

from forest to industrial remnants, yet others from wetlands to infrastructural corridors. Like route surveyors at the head of armies charged with mapping unknown terrains, they triangulated between points, connecting these points with lines of sight and measurement. They learned to be attentive to their selection of points. Some were fixed; others were ephemeral. They also learned to appreciate the lines that connected them, paying particular attention to the line between land and water. This line was fraught with controversy. It was known to shift daily and seasonally; but in a land of settlers, it was also shifted at will. They learned to appreciate wetness everywhere—in the ground, air, plants, rocks, creatures—rather than accept the presence of water as it was indicated on maps. The terrain was not exhausted in a single walk. It was walked differently each time. Once they triangulated, students sketched, sectioned, and photographed with an eye and ear tuned to meter and movement, material and horizon, continuity and rupture. Distinctions and boundaries that they had been cultured to see dissolved, and they began to articulate new relationships and limits.

Students were learning what it took to make a map. They were also learning what it took to construct a transect. It took traversing, traversing being the act of journeying across a terrain with the objective of recording findings as much as imposing a new imagination on place. In this sense, they were already designing while constructing a transect. Design was in the eyes with which they were seeing, the legs with which they were striding, the choices that they were making, the instruments with which they were measuring. They were learning what Geddes and McHarg knew all too well, that landscape and design emerge simultaneously in the act of traversing to construct a transect.

The work on the walls and on student desks drew a smile and characteristic sharp inhale from McHarg every time he walked into my 501 studio, expressing an appreciation for the graphite sections and triangulations being drafted, photographic montages being made, and plaster castings being worked. It was an

appreciation that could only come from someone who knew what the transect owed to the traverse.

Today I take students in more advanced studios to places of conflict, poverty, and unfolding tragedy such as Mumbai, Bangalore, the Western Ghats of India, the deserts of Rajasthan, Jerusalem, and Tijuana. These are places on slopes from mountain to sea of their own, slopes that Geddes and McHarg believed to be “everywhere in the world.” But I am acutely conscious, as they would be, that these “transects” are products of traverses by “designers” before us—surveyors, explorers, colonizers, conquerors. Their extraordinary transgressions articulated the landscapes that have become the ordinary in these places, including what is taken for granted as natural and cultural, land and water, urban and rural. In short, they created today’s ground of conflict. Surely the least we can do in the spirit of McHarg and Geddes is to traverse these places again, to venture a new imagination aimed not necessarily at solving problems, but at keeping the transect alive as an agent of change. □

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NOTES

- ¹ Patrick Geddes, “The Valley Plan of Civilization,” *Survey* 54 (1925): 288–290.
- ² I taught the 501 studio, the foundational design studio in the Landscape Architecture Department at the University of Pennsylvania, from 1994 to 2014, with a few breaks here and there. During this time, I had the opportunity to coteach with Katherine Gleason, Mei Wu, Dennis Playdon, and from 2003 with my partner Dilip da Cunha. I owe much to these colleagues, particularly to Dennis and Dilip, who brought structure, profound insights, and a high level of skill to 501 and taught me what it really meant to traverse.

In Praise of *Design with Nature Now*

Ian McHarg would be heartened to see the range and quality of thinking he's inspired. Each of these essays will leave you with an enlarged sense of possibility, which is a great gift in a constrained world.

— **Bill McKibben**, author of *Falter: Has the Human Game Begun to Play Itself Out?*



Ian McHarg with the first bound copy of *Design with Nature*, printed by Falcon Press, Philadelphia, April 18, 1969. Credit: Ian L. McHarg Collection, Architectural Archives, University of Pennsylvania.

One of the most overlooked aspects of dealing with our environment, climate change, sustainable water supply, and clean air is land use planning. Where and how we build have an enormous impact on our health and the world around us. We must help nature do what she does best.

— **Christine Todd Whitman**, former United States Environmental Protection Agency administrator and New Jersey governor; founder and president, The Whitman Strategy Group

This crucial book shows that McHarg's work is central to making this urban century a sustainable and thriving time for people and nature. Planners and environmentalists are racing to design cities of the future. Design with Nature Now reminds us that we need to revive McHarg's passion for big, bold ideas if we are to win that race.

— **Rob McDonald**, lead scientist, Global Cities Program, The Nature Conservancy

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"Like Ian McHarg's classic Design with Nature, this beautiful and fulsome reprise of his earlier work inspires us with its sheer virtuosity. Yes, it looks back at the pioneering work of McHarg but, much more, it elucidates contemporary challenges with boldness and precision. . . . A true manual for spaceship Earth!"

— Jerry Brown, former four-term governor, California