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The Ecological Underpinnings of Regional Design

Frederick Steiner

Prelude: Regional Design Before Ecology

Regions are large areas distinguished by common cultural, political, physical, and /or ecological characteristics and processes. Design involves the conception of positive futures.

Perhaps the most ambitious and successful plan for political regional design on a vast scale was Thomas Jefferson’s Northwest Ordinances (1784, 1785, 1787). Inspired by the European Enlightenment and classical proportion, his approach was efficient and, large rivers and lakes aside, oblivious to natural features and processes. As a result of Jefferson’s vision, the Old Northwest Territories from Ohio to Minnesota were divided into a giant, rectangular grid system of square townships (Figure 3.1). The land division system would subsequently be employed in other territories as the United States expanded westwards. In 1870, it was adapted for land division in the Canadian West too.

The American explorer and geologist John Wesley Powell saw the cultural and environmental weaknesses of Jefferson’s grid and, based on his careful observations of indigenous and Mormon settlements, proposed a dramatic alternate. Native people as well as the Latter Day Saints adapted their land uses to the water drainage systems that occurred naturally. Such adaptation is essential in lands with little rainfall. In 1878, Major Powell, who had lost his right arm during the Civil War, presented a strategy to the U.S. Senate for settling the arid region of the American West based on watersheds (Figure 3.2). Powell’s vision was more geological and hydrological than ecological, although the word “ecology” (Ökologie) had already been minted by the German biologist Ernst Haeckel in 1866 to describe the reciprocal relationships among organisms and between living creatures and their environments. The ecosystem concept would evolve to describe the spatial occurrence of those interactions and their processes.

The great American landscape architect Frederick Law Olmsted, Sr. also advanced regionalism through his park and parkway plans for Brooklyn and Buffalo. With his protégé Charles Eliot, their planning for the Boston Metropolitan Park System, called the “Emerald Necklace,” is clearly proto-ecological. This system of parks connected by parkways and water resulted from a massive effort to clean up marshy areas and control floods in and around Boston. In addition
to clean water and flood management, the Emerald Necklace provides recreational and open space amenities for the Boston region (Figure 3.3). Even before his work with Olmsted, Eliot, the son of Harvard’s president, organized his classmates to study the botany, geology, meteorology, marine life, ornithology, and entomology of Mount Desert Island in Maine in the 1880s. His approach had similarities to the regional surveys subsequently advocated by Patrick Geddes, Lewis Mumford, and Ian McHarg.

Meanwhile, the New World influenced the Old. The Englishman Ebenezer Howard worked in Chicago as a reporter where he became fascinated by Olmsted’s planned community, Riverside. Two miles (3 km) west of Chicago, Riverside is connected to the city by rail and was designed by Olmsted and his English-born partner Calvert Vaux in 1869 along the Des Plaines River. Howard returned to England where he initiated the garden city movement, a response to urban crowding and congestion that resulted from the Industrial Revolution. Howard’s regional vision was for a series of small new cities surrounded by rural, agricultural belts. This idea was pursued by architects, town planners, and businessmen who built the new towns such as Letchworth and Welwyn in Britain. Although truncated versions of Howard’s more ambitious visions, these garden towns had a global impact including design and planning in many countries. For instance, in The Netherlands the new towns and villages of the IJsselmeer polders display clear garden city design concepts. As we will explore further, Howard’s ideas continued to impact regional planning and design, as did Olmsted’s, as awareness about ecology expanded, influencing especially landscapes architects such as Martha Brookes Hutcheson, Jens Jensen, and Wilhelm Miller (Thoren 2018).
Origins: Designing with Nature

Charles Darwin fundamentally redefined how we see the world, including our views of regions and design. The Scottish biologist, sociologist, and town planner Patrick Geddes was influenced by Darwin through Thomas Huxley, his teacher at the Royal College of Mines in London,
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Figure 3.3      Frederick Law Olmsted and Charle Eliot's Emerald Necklace, Boston, Massachusetts
who observed organisms participate in their own evolution. With his long beard, the Dundee Professor Geddes posited that humans are engaged in our own evolution through planning. Geddes’ view of regions derived from the French geographer and anarchist Jacques Élisée Reclus as well as the French sociologist Frédéric Le Play.

Reclus developed the field of social geography and advanced ideas about climatic and economic regions. His studies emphasized economic populations in their natural boundaries of mountain and valley systems and water (Steele 2003). Reclus’s reading of Darwin “did not emphasise the evolution of the fittest through tooth and claw individualism but the value of ‘solidarity,’ … through the association of spontaneous, co-ordinated forces …” (Steele 2003, http://refractions.plusloin.org/spip.php?article352). Geddes’ “valley section” is a clear adaptation from Reclus as well as the German Alexander von Humboldt’s earlier transects (see Wulf 2015) (Figure 3.4). Likewise, Geddes’ emphasis on civics was developed from Reclus’ views of coordinated group action. Thus, their views departed from “environmental determinism” in their emphasis on “the role of human agency, especially cultural activity” (Steele 2003, http://refractions.plusloin.org/spip.php?article352). Their approach was ecological in their emphasis on interactions and processes beyond just physical conditions of the surroundings.

Lewis Mumford and Benton MacKaye furthered Geddes’ regionalism. They were part of the Regional Planning Association of America (RPAA), organized by the architect Clarence Stein in 1923. Mumford and MacKaye advanced ecology in regional planning and design in several ways. A forester and planner, MacKaye promoted the concept of the Appalachian Trail and wrote two books on regionalism (1928, 1969). MacKaye viewed the Appalachian Trail as a project for regional development that would enhance recreation, housing, and community architecture. He expanded Olmsted and Eliot’s Emerald Necklace to the outer reaches of metropolitan Boston through his Bay Circuit plan undertaken for the Trustees of Public Reservations in 1927. The proposed Bay Circuit was a 120-mile (193-km) semicircle around Boston. To illustrate his case, MacKaye used Geddes-inspired panoramas, transects with key geographic features including hills, rivers, and ponds. MacKaye’s 1940 article “Regional Planning and Ecology” provides a clear, succinct statement about how ecology, especially human ecology, relates to regionalism and regional planning. He declared: “Regional planning in short is applied to human ecology” (1940, 351).

MacKaye’s friend Lewis Mumford was one of the most influential American urbanists and design critics of the 20th century. Patrick Geddes was his intellectual role model. Mumford
adapted his mentor’s method for understanding places through regional surveys, that is, inventories of the environmental, social, and economic processes in a place. Geddes and Mumford viewed the survey as a step before action; a basis for shaping the physical form as the region (Neuman 2000). They advocated diagnosis before treatment so that the strengths of a region could be reinforced and the ills that a region suffered would determine the appropriate design remedies.

For Mumford, regions were grounded in the land, which he observed had been taken for granted especially in the United States. In 1927, he wrote: “For more than a century we have founded cities and built up industries and opened up new areas for trade and agriculture without paying attention to the land itself” (Mumford 1927, 277). Like Geddes, Mumford advocated surveys as a means to reveal the special ecological conditions and processes of a region in order to create forward-looking visions for human development. Mumford declared:

When we acquire the regional outlook … we think of the regional as a whole, and we realize that in each geographic area a certain balance of natural resources and human institutions is possible, for one finest development of the land and the people. … In this recognition of natural diversities lies one vital and unifying element in the regionalist movement. (1927, 279–80)

Mumford, MacKaye, and their RPAA colleagues moved from theory to action during Franklin Roosevelt’s New Deal of the 1930s. For instance, they influenced the Tennessee Valley Authority (TVA), perhaps the best example of regional design in the United States in the 20th century. The TVA helped transform a vast region through energy power production, flood control and reforestation, economic development, and environmental stewardship. The RPAA group also impacted New Deal housing policy as well as the greenbelt new towns and, furthermore, many other design and planning theorists who followed (Miller 1981, Alanen and Eden 1987). Beyond the United States, these ideas influenced international planning, such as the rebuilding of Europe after the devastating impacts of the Second World War. Mumford, specifically, encouraged the Scottish-American landscape architect and planner Ian McHarg (who was involved in post-World War planning in the United Kingdom in the early 1950s).

Mumford wrote the Introduction for McHarg’s landmark book Design with Nature, declaring that the “mixture of scientific insight and constructive environmental design, that this book makes its unique contribution” (1969, viii). Mumford noted that the preposition “with” in the title “implies human cooperation and biological partnership” (McHarg 1969, viii). In Design with Nature, McHarg presented a theory and a method to apply ecological knowledge in design. The resulting designs would then reflect regional ecological systems and processes.

His work in the Potomac River Basin and metropolitan Washington, DC was employed by McHarg to illustrate the approach in Design with Nature. His firm—Wallace, McHarg, Roberts, and Todd (WMRT)—worked with an American Institute of Architects task force on a regional vision for the Potomac (Potomac Planning Task Force 1967) (Figure 3.5). Its report’s subtitle captured much about the ethos of the time and McHarg’s regional-based strategy, that is “a report on its [the Potomac River Basin] imperiled future and a guide for its orderly development.” In his Introduction, Secretary of Interior Stewart L. Udall observed: “The Potomac is many things: it is a river, a watershed, a landscape, a hinterland” (Potomac Planning Task Force 1967, 5). McHarg’s team sought to bring order to those many things through ecology, regionalism, design, and planning.

In addition to professional projects from WMRT, McHarg drew on his landscape architecture studios at the University of Pennsylvania (Penn) for examples in Design with Nature. For many
years, McHarg focused on the vast Delaware River Basin from its New York headwaters to its Atlantic Ocean mouth between the states of New Jersey and Delaware in his academic studio. It is clear that the Delaware work informed the Potomac planning and vice versa. As documented in *Design with Nature*, McHarg used map overlays to represent specific phenomena, an established technique in landscape architecture since Olmsted and Eliot in the late 19th century, to identify opportunities and constraints for development and conservation. McHarg suggested organizing maps about the natural and social environment in a sequential manner from the oldest elements (rocks, terrain, and climate) to the youngest (plants, animals, people) in what he called a “layer cake” (a precursor to contemporary Geographic Information Systems or GIS) (Figure 3.6). This organization produced a slice in time based on the best existing information about a region’s climate, geology, physiography, hydrology, soils, vegetation, wildlife, and land use. McHarg and his colleagues used diagrams and other graphic devices to illustrate the process embodied in each of these layers.
One of McHarg’s contributions to regional surveys was the more explicit use of ecology. Like Geddes, McHarg was influenced by Darwin. As Geddes’ understanding was enhanced by Huxley, McHarg’s was by Lawrence Henderson, the Harvard physiologist, philosopher, and sociologist, who wrote about the importance of biocentric qualities of environments in determining fitness for life. For McHarg, regional surveys were organized as ecological inventories which led to the identification of the fittest places for specific land uses as well as dangerous areas to settle. He called this process a suitability analysis, that is, a determination of the prospects for potential, specific land uses and design strategies based on ecological interactions and processes. His method was adapted for environmental impact assessments that arose in the United States after the enactment of the National Environmental Policy Act in 1970 and spread around the world.
After the publication of *Design with Nature*, McHarg and WMRT were engaged in several regional plans, most notably those for the Twin Cities of Minnesota and the Front Range of Colorado. WMRT also undertook the regional ecological analysis that helped identify the location of the new capital city of Nigeria, Abuja. Similar work continued in the Penn studios and through the Center for Ecological Design and Planning. For instance, McHarg’s colleague Narendra Juneja coordinated the ecological inventory and suitability analysis for Medford, New Jersey (1974). The Medford study laid the foundation for the influential and successful New Jersey Pinelands National Reserve. Established by the U.S. Congress in 1978, the reserve encompasses over one million acres (404,686 ha) of a rich patchwork of farms, villages, wetlands, and forests, including the Pine Barrens (McPhee 1967). The plan helps protect rich groundwater resources, preserve valuable farmlands, and maintain a scenic landscape adjacent to the metropolitan regions of New York City and Philadelphia.

Meanwhile, McHarg sought to refine the understanding of human ecology, recruiting anthropologists and ethnographers to his department at Penn, joining faculty from design, planning, ecology, soil science, geology, and resource economics (Cohen 2019). In some ways, McHarg was creating an approach to study places and regions akin to the French *Annales* School. Founded by Lucien Febvre and Marc Bloch in the early 20th century, these historians focused on the everyday lives of ordinary people, in contrast to the “big man” approach. *Annales* scholars built on insights from anthropology and geography to understand how people inhabit places through time. For McHarg, the ecology of humans was essential to understand regionally in order to make appropriate designs and plans. Human ecology involves the ways social structures adapt to the qualities of the environment and various human groups and other organisms (Steiner 2002).

As McHarg advanced regionalism in landscape architecture, Kenneth Frampton (1983) played a similar role in architecture. The British-born, long-time Columbia faculty member, Frampton was a central figure in the postmodern design movement. Similar to Mumford, he advocated that buildings should respect and respond to their geographical context. Frampton observed: “Critical Regionalism necessarily involves a more directly dialectical relation with nature than the more abstract, formal traditions of modern avant-garde architecture allowed” (1983, 26). As with modernism, the style of postmodern architecture displays more interests in form than direct relationships with nature.

**Advances: New Ecological Regionalism at the Turn of the Century**

From the final decades of the 20th century into the early 21st, ecology continued to impact regionalism and design in many ways. Some ideas, like greenways, represented clear continuations from the past; other notions, such as landscape urbanism, while linked to precedent, offer fresh perspectives. Greenways are an extension of Olmsted’s parkway system plans as well as his and Eliot’s Emerald Necklace. They can also trace their heritage to England’s Green Belts (influenced by Howard’s garden cities) and elsewhere in Europe, notably Vienna and Kraków, where parks replaced fortifications around cities.

A greenway is a linear corridor or a network of protected areas “that are planned, designed, and managed for multiple purposes including ecological, recreational, cultural, aesthetic, and other purposes compatible with the concept of sustainable land use” (Ahern 1995, 134). During the late 20th century, the National Park Service (NPS) Rivers, Trails, and Conservation Program became a leading advocate of greenways in the United States. The foci of these efforts were on river and heritage corridors and as well as Rails-to-Trails programs, where abandoned railroad right-of-ways are transformed into biking and hiking paths.
With the rise of landscape ecology (Forman and Godron 1986), the greenway approach become even more connected with ecology (Ahern 1995, 2002). Landscape ecology is the study of interactions among the temporal and spatial aspects of landscape and the organisms within it. Led by the American ecologist Richard Forman and the French biologist Michel Godron, the landscape approach focuses on patterns such as patches, matrixes, corridors, barriers, and mosaics (Figure 3.7). Jack Ahern advocated that the greenway is an effective planning strategy, noting that the “patch and corridor” spatial concept from landscape ecology “includes corridors and stepping stones to connect isolated patches and thus help to counter the effect of fragmentation” (1995, 131). This approach benefits both people and wildlife.

As Forman advanced landscape ecology, other ecologists focused in biophysical interactions and processes in cities. Traditionally, ecological theory has been based largely on patterns and process in non-urban and less human-dominated environments. In 1997, the U.S. National Science Foundation (NSF) changed this by establishing two urban Long-Term Ecological Research (LTER) sites in Baltimore and Phoenix (Grimm et al. 2000). These two LTERs in biophysically different city-regions emphasized the need to integrate social and ecological methods and concepts to produce new urban theory. The LTER teams moved from ecology in
the city towards ecology of the city (Pickett et al. 2016). Especially the Baltimore LTER, led by Steward Pickett of the Cary Institute of Ecosystem Studies, engaged designers and undertook work to influence regional design (Grove et al. 2015). The Baltimore LTER has an urban design working group at Parsons New School that has focused on the Gwynns Falls Watershed.

Even before the NSF LTERs, McHarg was teaching a course “Ecology of the City” beginning in 1963 and, later, two of his former students Anne Whiston Spirn (1985) and Michael Hough (1984) pioneered the application of regional ecological understanding in urban design. Spirn had worked with McHarg at WMRT on regional-scale projects like the Front Range of Colorado. She was interested in making explicit link between natural processes—air, the earth, water, and living organisms—and cities. Spirn laid out an approach to both understand urban ecosystems and use that knowledge in design. Hough came to North America after architecture studies in Edinburgh, Scotland, and spent much of his career in Toronto. Like Spirn, he sought to connect natural processes to city form through design.

As landscape and urban ecology continued to advance, new ideas about regions, such as bioregions, ecoregions, and megaregions emerged. Bioregions and ecoregions are interrelated designations of large geographical territories. Both are defined by combinations of climate, geology, hydrology, plants, and animals. The World Wildlife Fund identifies bioregions as areas larger than ecoregions. Robert Bailey, a geographer with the U.S. Forest Service, undertook detailed mapping and definitions of ecoregions for North America and the world (Bailey 2014).

Meanwhile, megaregions concern economic, transportation, and demographic processes more than ecology. The concept evolved from Geddes, Mumford, and others but gained broad appeal, especially among academics as a result of the French geographer Jean Gottman’s 1961 Megalopolis: The Urbanized Northeast Seaboard of the United States. Conglomerations of metropolitan areas have recognized in policy by the European Union since its 1999 European Spatial Development Perspective and have also been explored in China and Japan (Dewar and Epstein 2007). In England, for example, the Northern Powerhouse is a megaregional strategy linking the metropolitan areas of Manchester, Leeds, Liverpool, and Sheffield through transportation. In between, the Peak District National Park encompasses 555 square miles (1,438 km²) and forms a “green heart” similar to the Randstad in The Netherlands and the Pinelands in New Jersey.

In 2004, Robert Yaro of the Regional Plan Association (RPA), urban design Professor Jonathan Barnett, and Armando Carbonell of the Lincoln Institute of Land Policy taught a Penn city and regional planning studio to explore the future of the United States. The studio identified ten megaregions where the bulk of the population and economic growth would occur through the 21st century. European concepts about megaregions, such as the French “Blue Banana” proved especially influential. Subsequently, RPA furthered the idea with 11 megaregions through its America 2050 initiative (Dewar and Epstein 2007). In addition to advocating alternative transportation options, especially high-speed rail, and urban patterns, RPA also advanced conservation measures for large landscapes, in the 13-state Northeast Megaregion. The RPA team forged strong connections with European and Asian planners and scholars to advance ideas about megaregions.

Elsewhere in the United States, parallel interest in regionalism was occurring in diverse places with a particular focus on scenario planning. Scenarios attempt to write “history of the future” (Hirschhorn 1980, 172). Peter Calthorpe is a leader in the New Urbanist movement with a strong interest in ecological design (see Calthorpe and Van der Ryn 1986); while John Fregonese was an influential Oregon planner, having directed planning for the Portland Metro regional government. Together, they led several regional futures plans beginning with Envision Utah in 1997. Calthrope and Fregonese developed four scenarios for the rapidly growing Salt Lake City metropolitan region between the Wasatch Mountain Range and the Great Salt Lake. They used GIS technology coupled with extensive public participation and design acumen to develop the
scenarios. The first scenario projected growth to continue in its current pattern, the second depended on state and local governments adhering to their existing plans, the third focused on more walkable communities and open space protection, and the final on even more focused growth, more open space and agricultural protection, and expanded transit. Envision Utah has been successful in enhancing regional planning and design in and around Salt Lake City and resulted in Fregonese and Calthorpe becoming involved in similar regional visioning efforts for Chicago; Austin, Texas; coastal Louisiana; and other regions.

Former Harvard landscape architecture professor Carl Steinitz is a GIS pioneer. As noted previously, his colleague Richard Forman led the development of landscape ecology. Together, Steinitz and Forman with a team of other landscape architects, planners, and scientists from Harvard, Utah State University, the U.S. National Biological Service, the U.S. Forest Service, the U.S. Environmental Protection Agency, and The Nature Conservancy, conducted a two-year study of alternative biodiversity futures for the region of the Camp Pendleton Marine Base in California (Steinitz et al. 1996). Many military bases have become valuable havens for wildlife and plants.

Steinitz, Forman, and their team explored how rapid urban growth between Los Angeles and San Diego might impact biodiversity in the region. They developed six possible futures for the region, all of which accommodated projected population growth. One scenario illustrated the build out of existing local and regional plans. The others explored other design possibilities to balance development and conservation (Steinitz et al. 1996). Their scenarios used concepts from landscape ecology, such as corridors, and employed GIS maps to illustrate possible futures.

Meanwhile in Western Australia, Richard Weller (2008a, 2009) laid out seven scenarios for the future of rapidly growing Perth (Figure 3.8). The region is facing escalating suburban sprawl...
and dwindling water supplies. Weller’s approach was grounded both in McHargian sieve mapping analysis as well as design culture. For instance, in addition to basing one model scenario on Ebenezer Howard’s garden city ideas, others were derived from Le Corbusier’s Radiant City and Frank Lloyd Wright’s Broadacre City. By focusing equally on urban form as well as landscape suitability, Weller presented these scenarios as a manifestation of the landscape urbanist discourse emerging at the time.

Influenced especially by Dutch design, Charles Waldheim, who advanced the term landscape urbanism, drew on McHarg’s approach for regional analysis. Waldheim was joined by others to further the landscape urbanism idea including James Corner, Nina-Marie Lister, Richard Weller, Chris Reed, and Mohsen Mostafavi. Their age-of-cities idea, with clear Geddes-Mumford-McHarg echoes, is for the design of the landscape, rather than buildings and roads, to be the fundamental determinant of urbanism (Weller 2008b). Of this group, especially Corner with his firm, Field Operations, is designing highly impactful projects such as the Freshkills Park, on the site of a massive landfill in Staten Island, to serve the metropolitan New York City region. The Freshkills design is derived from an understanding of regional ecological processes. In addition, the design uses time, change, and process as key drivers for the park’s evolution.

**Promise and Prospect: Ecology, Regionalism, and Design in the Anthropocene**

We are now an urban planet with most people in the world currently living in city-regions. We are also in the Anthropocene, the geological age where humanity has become a dominant force of nature. Regional design informed by wisdom from ecology through humanism has become a necessity. Some methods and ideas from the past continue to evolve such as regional ecological surveys and environmental impact assessments and some have new terminology, for instance, greenways have been broadened and are referred to as green or ecological infrastructure. GIS technologies continue to advance and are enhanced by three-dimensional modeling and robotics to enhance the capabilities of designers and planners to undertake surveys and to conceive designs. These techniques contribute to an emerging field called geodesign, led by Steinitz and Jack Dangermond (Steiner and Shearer 2016). Geodesign is a team-based approach involving large areas, such as regions, and complex issues that employ the powers of digital computing, algorithmic processes, and communications technologies (Ervin 2013).

As GIS has led to geodesign, greenways and green belts are the foundation for green and ecological infrastructure, an approach to water management that protects, restores, and/or mimics the natural hydrologic cycle much the way Olmsted and Eliot’s Emerald Necklace approached water management for the metropolitan Boston in the late 19th century. Green infrastructure is a multifunctional open space network (Rouse and Bunster-Ossa 2013). Ecological infrastructure addresses a broader agenda than water management, as has been promoted through green infrastructure by the U.S. Environmental Protection Agency and others. The more expansive term encompasses water management and goes beyond to address naturally functioning ecosystems that deliver valuable services to people and other species including climate regulation, soil development, and disaster risk reduction.

Ecological infrastructure is based on the emerging ecosystem services concept. Ecosystem services account for the benefits humans receive from nature (Millennium Ecosystem Assessment 2005). The idea is to make transparent and account for what is too often taken for granted. Ecosystems support our existence and provide the materials we eat and drink and use to build our habitat. In addition, ecosystems regulate fundamental processes, such as carbon sequestration and waste decomposition, while supplying recreational and educational benefits. Ecosystem services
hold the potential to strengthen and expand the ecological underpinnings of regional design, because many can be measured to illustrate the consequences of protecting and enhancing them.

In China, Kongjian Yu (2014) pulled together the many threads of thought about ecology in regionalism, design, and planning for his national security plan for the People’s Republic of China (Figure 3.9). The influences of Steinitz, Forman, and McHarg are apparent in his approach and his advocacy for ecological security. Yu and his team (from Peking University and Turenscape) identified critical landscape structures for safeguarding ecological and cultural processes nationwide. In the process, a wide range of ecosystem functions essential for sustaining human society could be secured. They also applied their approach to the regional and city scales. In planning for Beijing, for instance, Yu and colleagues used scenarios and ecosystem services to advance ecological infrastructure (Yu, Wang, and Li 2011).

One of the more imaginative rethinking of past ideas is Laurel McSherry and Rob Holmes’ update of John Wesley Powell’s proposal for the arid lands of the American West (https://aridlands.org/discover/video/drylands-design-conference-laurel-mcsherry-and-robert-holmes-drylands-design). Their regionalist scheme won the 2011 Arid Lands Institute’s Drylands Design Competition, which sought policy recommendations to address Western water scarcity. The landscape architecture educators McSherry and Holmes expanded Powell’s vision to the whole lower 48 states and proposed 86 drainage-basin-based commonwealths (Holmes 2012, Lokman 2016) (Figure 3.10). They used a careful analysis to provide a framework for improved
Figure 3.10  Laurel McSherry and Rob Holmes' Commonwealth drainage-basin approach for the United States
regional water management. McSherry and Holmes used the U.S. Geological Survey’s second-order watershed units as “a first-pass at aligning political geography with the movement of water” (Holmes 2012). The 86 commonwealths were further organized into 19 territories. For instance, Austin conveniently remains the capital of the proposed Texas Gulf Territory. McSherry and Holmes also created 36 trans-national commonwealths along the U.S.–Canada and U.S.–Mexico borders. Instead of walls, they envision hydrological and ecological connectivity between nations. McSherry and Holmes’ decentralized “Commonwealth Approach” refocused water management at the regional scale: “localized, place-specific, and less energy-intensive” (Holmes 2012).

The Commonwealth Approach shares much in common with Pope Francis’s call for an earth ministry grounded in human ecology in his 2015 *Laudato Si*. The Pope identified climate as a “common good” and the “human roots of the ecological crisis.” Furthermore, he advocated “integral ecology” as the appropriate response. He wrote: “Human ecology is inseparable from the notion of the common good, a central and unifying principle of social ethics” (Pope Francis 2015, 104). The Pope’s recognition of our common home has parallels with China President Xi Jinping’s call to build a “Beautiful China” with a clean environment and his pledge to fix toxic levels of air, water, and soil pollution for the public good.

**Conclusions**

Even before the field was named and developed, ecology played a role in regional design. As ecology has advanced, regionalists have been attracted to the knowledge generated by it to inform design and planning. The challenges of urban growth and climate change in the Anthropocene underscores the urgency and importance of an ecological underpinning for design.

Ecologically grounded design enables us to be more resilient, that is, to recover, to bounce back, from disaster. Furthermore, it can help us avoid or lessen the impacts of disasters. The health professions have a long interest in resilience. In medicine, resilience refers to how we respond to stress, grief, and trauma in healthy ways. Resilience helps individuals to prepare for and recover from life’s challenges.

In 1948, the World Health Organization (WHO) defined health as a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity. WHO updated the definition in 1984 as “the extent to which an individual or group is able to realize aspirations and satisfy needs and to change or cope with environment.” Health, according to the WHO, is a positive concept, emphasizing social and personal resources, as well as physical capacities. As a result, health is related to our ability to recover from injury and, thus, is related to our resilience.

Health is integral to the design and planning professions. In the United States, licensure in architecture and landscape architecture rests on the ability to protect public health, safety, and welfare. In addition, the legal justification for city and regional planning is built on the capability of plans to ensure the public health, safety, and welfare. The legal foundations for the design professions in other nations are also related to public health and safety. Architecture and related design fields have a long association with health. Some 20 centuries ago, the Roman Marco Vitruvius Pollio wrote in *On Architecture*:

> the architect should … have a knowledge of the study of medicine on account of the questions of climates, air, the healthiness and unhealthiness of sites, and the use of different waters. For without these considerations the healthiness of a dwelling cannot be assured. (1934, chapter 1, Section 10)
We certainly should follow Vitruvius’ guidance for dwellings and, in the Anthropocene, extend that wisdom to landscapes, regions, nations, and our planet. Increasingly, we have vast ecological information available about where we live. We should act based on ecology with thoughtful resilience-oriented and nature-based designs. In the process, we can heal the harms of the past, and go beyond, to prevent future environmental calamity and to design healthier regions.

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