

Ecologically Performative Landscapes and Water Management

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Nature in Complex Cultural Environments

Performative theory has been applied to many facets of social theory including economic theory, sexual orientation, and regionalism in architecture. Simply stated, it is the notion that a thing becomes what it purports to be through actions and behaviors.¹ The term is applied here to landscapes in complex cultural environments with environmental features that are used to mitigate or even to enhance the environmental footprint of the landscape. These landscapes are a recognition that designers should no longer separate "natural" areas from the places where people actually live and work.

"Idealizing a distant wilderness too often means not idealizing the environment in which we actually live, the landscape that for better or for worse we call home. Most of our most serious environmental problems start right here, at home, and if we are to solve those problems we need an environmental ethic that tells us as much about using nature as about not using it."²

In a performative landscape, the designer creates what Michael Pollan has called "second nature".³ It is a man-centered nature that seeks ecological balance but recognizes that any natural ecological system in a complex urban environment is "man centered" and subject to all the decisions involved in its inception. The projects illustrated in this paper take an incremental approach to environmental benefits with a design of man created nature that is self-examining and self-questioning.

Addressing the actual conditions of our lives means that any, including small, movements towards future viable practices are environmental benefits worth pursuing. Peter Berg refers to the frame of mind necessary to address these actual conditions as "living in place" and "reinhabitation". Living in place means keeping a balance between "human lives, other living things, and the processes of the planet"...⁴ Reinhabitation means working with and restoring the ecological relationships of a place and establishing a socially and environmentally future viable landscape. Berg considers this type of landscape the minimum requirement for a long-term strategy of survival.

"Reinhabitation means learning to live in place in an area that has been disrupted and injured through past exploitation. It involves becoming native to a place by becoming aware of the particular ecological relationships that operate within and around it... It involves applying for membership in a biotic community and ceasing to be its exploiter."⁵

Dodge believes that the most important issues in ecologically performative design are "practice and engagement" and not endless theories and debate.⁶ He understands that while theory sets the parameters, it is the difficult and uncertain realities of practice that determine the outcome. The examples and principles of performative landscapes in this research are extracted from designs that are on the ground and testing their assumptions every day.

Examples of Performative Practices

There have been innumerable books, magazine articles and internet sites devoted to the design details that work together to create performative landscapes. The few examples presented here show best practices that are becoming common in various areas around the country, but have been slow to find acceptance in North Texas where I live and work.

For example, The five items below illustrate the interrelated nature of performative systems as they address the movement of water in the landscape.

1. Rain falls first on the smallest amount practical of pervious paving or upon an extensive green roof.
2. After saturation, the overflow travels to rain gardens filled with native plants that thrive under conditions of both drought and periodic inundation.
3. The rain gardens are connected to each other and to retention or detention areas by bioswales.
4. Bioswales flow to retention/detention areas that are populated with native flora and fauna.
5. Any excess capacity beyond this point moves to wetlands or streams that can accommodate the flow without changing their pre-development watershed profile.

Using any one of these elements will have a significant effect on stormwater volume and quality. By using more than one, the effect is multiplied. Performative landscapes take advantage of these systems in new and creative ways within the constraints of their complex social functions.

Permeable Paving

The first goal of a performative landscape with regard to stormwater management is to encourage as much infiltration as possible by using as little paving as possible and by using permeable hardscape surfaces where paving must occur. This will allow water to enter the soil profile thereby reducing flooding and

irrigation needs, maintaining soil structure and groundwater recharge for wells and aquifers, keeping base level flow in creeks more stable, preventing erosion, improving water quality, enhancing fish and wildlife habitat, and generally making the land more ecologically resilient and aesthetically pleasing.⁷

Designers are finding an ever increasing variety of techniques and materials for paving that permit infiltration of water. This variety assures that permeability need not be the controlling aesthetic criteria for paving design. For example, in the Philadelphia area permeable paving materials range from formal granite pavers set in sand in the streetscape near the Liberty Bell to the more prosaic look of porous asphalt at the Morris Arboretum.

Green Roofs

Extensive green roofs are just beginning to find their way into environmentally intentioned projects in Texas. Green roofs have been slow to establish in Texas due to the problematic growing conditions caused by wide swings in temperature and rainfall, and the lack of research into their use under these conditions. The first extensive green roof in North Texas, on top of the UT-Arlington Life Sciences Building, was not installed until 2008. The lessons learned from the UT-Arlington green roof have been applied to a small number of roofs in the DFW area including the new Forest Park Medical Center in Southlake, installed in 2013.

Rain gardens and Stormwater Planters

One of the ways to mitigate pervious paving and roof runoff is to build permeable pathways into water courses and then link them at multiple scales. An increasingly used option is to reverse the normal street/curb profile and create rain gardens and/or stormwater planters. These structures reduce run-off through infiltration, evaporation, transpiration and storage.⁸ This technique is finding wide acceptance in areas such as Denver, Colorado where it is being written into development guidelines. Figure 1 shows the rain gardens at the redevelopment of Stapleton Airport in Denver.



Figure 1 Rain garden in Stapleton Redevelopment, Denver, Colorado

The cistern steps on Vine Street in Seattle, Washington designed by Charles Anderson, FASLA are a good example of stormwater planters. These planters stair step down the side of several steep streets capturing roof runoff into gravel and plant stormwater basins. The rectangular concrete basins flow into each other as they, in turn, fill up with water. They are intentioned to treat and detain water runoff, increase urban green space and to reintroduce the hydrologic cycle into urban lives.

Bioswales

Bioswales are drainage structures designed to move runoff water, reduce total runoff and flow rate, and remove silt and pollution.⁹ They slow the water down to allow silt to precipitate and to foster phytoremediation (removal of pollutants by bacteria growing on plants, especially their roots). Bioswales are particularly important in urban areas where water storage and permeable paving is not an option, and in sites that are being remediated from the pollution caused by previous uses.

Figure 2 shows a large bioswale that captures and transports water from a former sewage treatment plant redesigned as a new park by Bill Wenk and Associates in Denver. The bioswale helps control the rate of water flow and processes contaminants. This helps prevent the kind of pollution problems caused by runoff at other adaptively reused industrial

sites such as the celebrated Gasworks Park in Seattle.



Figure 2 Northside Park Bioswale, Denver, Colorado

Performative Retention and Detention Ponds

In the Dallas/Fort Worth Metroplex, there are very expensive retention and detention ponds designed as amenities for residential subdivisions, corporate business parks, etc. Figure 3 shows a beautifully designed detention pond in a subdivision in Colleyville, Texas. Notice that while it meets the code requirements for the volume of detained water, there is Bermuda grass down to the water's edge. This grass will eventually contribute to erosion problems and does not perform for phytoremediation of stormwater pollutants, mosquito predator habitat, or to improve species diversity the way that bog and marginal plants would. Second, the pond will require constant effort and expenditure of resources to resist the natural forces relentlessly at work on its lifecycle in order to maintain its pristine look. The pond is fighting what Baer calls the landscape as a living creature that must be "fed, brought up, looked after and cared for, and as a consequence... wander, get bigger, lie down, and then disappear again"¹⁰. Third, the pond is a pictorial vision of nature without the performative aspects. This contributes to normative practice of romantic ecological design that supports commercial expectations rather than encouraging the aesthetics of what a performative pond might *actually* look like. Finally, the pond loses the didactic benefits of

access to nature, particularly as they relate to the evolution of landscape over time and species diversity.



Figure 3-Detention pond in Colleyville, Texas

Figure 4 shows an alternative vision of water impoundment that is both pictorial and ecologically performative. The ponds and stream are part of the redevelopment of Hastings Park in Vancouver, Canada. The project was designed by Phillips, Farevaag & Smallemberg (Vancouver), and completed in 1999. The ponds capture and filter storm water from the 167-acre site and surrounding neighborhoods. The pictures show verdant natural scenes that are a very small percentage of the area of the park, but have a significant impact on the park's environmental footprint. The park includes an active 'people area' in the form of 'Il Giardino Italiano,' (a modern adaptation of a classic Italian garden theme complete with opera walk) as well as sculptures, rain gardens, play-fountains and picnic tables, an allée of plane trees, a Japanese garden, a children's area, a skateboard rink, bocce, basketball and tennis courts, and sports fields. This entire array of cultural features drains into the ponds and wetlands shown.

The ecologically performative aspects of the project have the additional benefit of contributing to the social cohesiveness of the surrounding community. Volunteers conduct educational tours of the natural features for schoolchildren, and environment watch groups carefully monitor plant growth, birdlife and over-all functioning of the natural area (including garbage, dogwatch, repairs and safety issues).¹¹ In a very short time, wildlife and birds have returned to the area.



Figure 4 Hastings Park Wetland

The pond in Colleyville was not the product of extensive public involvement, as were the ponds in Hastings Park. Nevertheless, the cost and effort to transform it into a viable ecosystem are trivial compared to the cost of the pictorial aspects of the amenity. This raises the question: Were performative aspects considered and if so, why is this idea such a hard sell in Texas? Furthermore, are there ways that designers can make these concepts more palatable to developers, homeowners, and business people?

Examples of Performative Landscapes and Development Strategies

The projects below illustrate a few of the many strategies that are being employed by landscape architects to address the problem of how designers can find acceptance in the development process of as many performative features as possible. These ideas permit the creation of a new urban ecology that works with nature and the city to control stormwater, create species diversity for both plants and animals, and provide areas for human use and enjoyment.

The Roxhill Bog

The Roxhill Bog is a good example of the goal of the creation of a new urban ecology with an impact on both water flow and water quality. Charles Anderson, FASLA, designed The Roxhill Bog at the headwaters of the Longfellow Creek Legacy Trail in West Seattle, Washington. During renovation of a neighborhood park, peat was discovered under several feet of fill



Figure 5: Roxhill Bog, Designed by Charles Anderson, FASLA: showing soccer field, open lawn, and bog beyond, West Seattle, Washington

soil. This led to the decision to “daylight” a peat bog that had been covered in soil since the 1960’s. The restoration of the bog was intended to improve water quality and water flow along Longfellow Creek, restore natural habitat, provide an educational resource, enhance the aesthetics of the creek, contribute to the economic revitalization of the area with an attractive amenity, and improve salmon habitat. The bog accepts untreated stormwater from both the landscape in the park and the surrounding street grid, mitigates extreme swings in flow rates, and removes silt, hydrocarbons, and other pollutants before they enter the headwaters of Longfellow creek and begin their flow to Puget Sound. One of the most innovative performative aspects of the project is the approach to irrigation of the soccer field at the site. During Seattle’s long yearly summer drought, the sandy soil of the perfectly level soccer field is irrigated on a regular basis. The irrigation water travels through the soil and is captured in an impermeable rubber liner that is sloped underground towards a drain that empties into the bog. In this way, a portion of the bog receives the irrigation runoff and remains green year-round. The new urban ecology of the Roxhill Bog has contributed to the economic revitalization of the surrounding neighborhood in a disadvantaged area of West Seattle.

Nature/Culture Alternatives

A Study of performative landscapes and interviews with their designers has revealed

the following three principles that have helped the projects come to fruition. These principles can be applied in Texas and the southwest as performative landscapes become a more typical part of normative practice. The first principle is:

Provide a careful delineation of the boundaries between more natural and more cultivated areas in order to provide clear nature/culture alternatives.

The projects that are most successful in terms of human use in urbanized areas allow people to find their comfort level with natural features through nature/culture alternatives. Just as landscape architects provide sun-shade alternatives, and prospect-refuge alternatives, it is important to recognize that some people enjoy being immersed in natural settings, some people enjoy proximity, as long as they are what they consider a safe distance away, and some people only enjoy nature in a pictorial way from a distance.

John Davis, an urban wildlife expert with Texas Parks and Wildlife assigned to the Dallas area, has stated that he often receives calls from urban dwellers complaining about such things as rats in pocket prairies or tall ornamental grasses. When people are questioned whether they have actually *seen* the rats, they often admit that they have not, but that the rats must be in there since it is a “wild” area. This is an example of the difficulty in finding widespread acceptance of bogs and grasslands versus forests and mountains. Designers are

solving this problem with both nature/culture alternatives and clearly defined and controlled edges for pockets of natural features. Figure 5 shows the Roxhill Bog behind the open lawn space and soccer field. Another example of a hard edge between the natural and cultivated landscape occurs at the Jefferson County Court House landscape near Denver, Colorado designed by Design Workshop. The designers placed a seatwall between carefully tended lawn and a dry land prairie that marks a clear boundary between the cultivated landscape of the courthouse and the "wild" landscape beyond.

Build Natural Areas First

Design Workshop also designed a "Reading Garden" in Denver with carefully manicured geometric forms juxtaposed with naturalistic plantings. The nature/culture alternatives in this small neighborhood park introduce another important principle that is helpful in the acceptance of performative landscape elements:

Develop natural area first so that residents accept them as part of the landscape.

It is much more difficult to find the consensus needed to retrofit environmental features into existing developments, particularly in residential areas, than to build them at the beginning of the project. The "Reading Garden" in the former Lowry Air Force Base redevelopment in Denver, was built before construction started on the houses. The naturalistic performative elements were thus seen by new homeowners as an organic part of their new environment. This principle was crucial for the most controversial element of the base redesign. The over 3000 foot long by 90 foot wide median in the former main runway that was planted as linear prairie rather than as a traditional open lawn more typical for this type of feature in many older Denver neighborhoods. Several designers who were involved in the design and implementation of the project attested that the prairie project has received a mixed reception from the residents and would probably not have been approved if it was not an established fact before the housing was built.

The large amount of prairie vegetation in the Stapleton redevelopment is one of the factors

that contribute to the ability to "daylight" many of the underground drainage structures from the earlier airport drainage design. Prairies are the ultimate performative landscapes in areas where they are the climax vegetation community. For example, prairie thatch help prevent excessive runoff by capturing up to the first inch of rainfall.

The Aesthetics of Ecology

The final principle illustrated that will help move stormwater management from a mechanical paradigm to a performative paradigm is to adopt the aesthetics of ecology as a guiding principle for all projects. Ecology then becomes an element of resistance where the designer is constantly pushing projects in the direction of ecological performance.

In the Dallas/Fort Worth area the entire development infrastructure is slowly moving towards an awareness of both the expressive and the future viable potential of environmental aesthetics. From traveling across The United States looking at projects, it is evident that Texas is ten to twenty years behind many other areas in terms of acceptance of future viable practices for landscape development. Possible reasons for this include:

1. a prairie ecology that is alien to the people who have moved to Texas from other places,
2. the *inherent* difficulty in aesthetic appreciating of the native prairie ecosystem,
3. the early stage of cultural development where economic development is the overriding priority,
4. the relatively cheap and plentiful supply of land coupled with a very rapid rate of development,
5. the mobile population that discourages taking long-term responsibility for local ecology,
6. the focus on personal decisions over land use versus group effort, and

7. the continued emphasis on formalist principles over aesthetics and ecology by design schools in the area and nationwide.

The ecosystems in Texas that have the greatest impact on water flow and water quality are prairie, wetlands, and riparian ecology. The prairie has always been a tough sell from an aesthetic standpoint. There still is not a national park in the United States devoted to this once ubiquitous ecosystem. Everglades National Park, the first national park consisting primarily of large wetlands, did not officially open until 1947.

I propose that ecological aesthetics must be considered as a separate aesthetic category by designers. As a matter of personal aesthetic preference, an individual may respond more favorably to cultural environments and may show a total lack of interest or even a strong dislike for natural environments. This could be, and indeed is, the personal aesthetic of many individuals. I argue that as designers, we no longer have the option of ignoring local natural systems. If natural systems are a key to the survival, or at the very least, the quality of life of our species, then the aesthetics of the environment must be part of our design aesthetics and our design vocabulary. Becoming "grounded" in the bioregion, then, becomes an important aspect of our design personality and the coming to grips with the actual conditions of life.

The best regionalist architects address environmental issues related to thermal loading, shade, orientation, natural versus artificial light, storm water management, etc. This response to climate and terrain will have an impact on both the pictorial and "tactile" experience of dwelling in the buildings. Landscape architects have the opportunity to go much deeper in studying and designing landscapes that can mitigate or even enhance the ecology and environmental footprint of dense cultural environments. These performative landscapes enhance aesthetics to the degree that the environmental performance is expressed for users to experience. Thus, the innate human responses to nature, the cultural values of nature, and the personal appreciation of nature are used to enhance and intensify the experience of the landscape.

We all have personal preferences for what we intuitively feel are the most beautiful natural conditions. Some people are entranced by shady forest environments and others are captivated by the stark sculptural qualities of deserts. These predilections can be seen as innate responses to nature, culturally ascribed preferences, or personal idiosyncrasies. However, any ecological area can become part of a personal design aesthetic through an aesthetic appropriation by the designer. It is important for designers who work in diverse ecological areas to transcend their biases and learn to rapidly assimilate the ecological aesthetics of the various environments where their projects are located.

There must be a type of aesthetic surrender or communion, almost in a religious sense, with the experience of the natural features of a given area in order to absorb them into a personal design aesthetic that is adapted to the region. Literature is replete with poetic writers who have found this type of experience in diverse regions of the world. Edward Wilson, a Harvard entomologist, coined the term 'Biophilia' which translates as the 'love of living things'.¹² Biophilia helps a designer become more flexible in the appreciation and subsequent design of diverse natural environments. Once this type of communion is attained in a given location, it becomes progressively easier to find the emotional connection to a wide variety of ecosystems and natural features. The natural environment of a given area becomes what Kant has called the symbol of the moral and as such is seen as a positive aesthetic opportunity. The local ecology is considered, along with cultural influences, as aesthetically qualified material and is engaged by the design process producing new creative solutions for designs that embrace ecological aesthetics.¹³

Opportunities for the Future

Performative landscapes are not simply a new ecological functionalism. They offer new expressive opportunities for designers to enhance the experience of landscapes and architecture. Landscape architects such as Charles Anderson, Chris Phillips, the firm Design Workshop, and Bill Wenk, are showing how performative features can work to create a new vision of nature in cultural environments in a wide variety of projects and at a variety of

scales. It is imperative for all Texas design professionals to adapt their examples and the ever increasing body of knowledge of performative landscape features to the rapidly urbanizing areas of Texas.

...“we dream of cities rooted to their landscape, cities where one can feel the slope of a hill, sense the freshness of valleys, follow the flow of water and the cycle of the seasons, ...in which night truly falls, in which time is inscribed on the earth, on the skin of the landscape. To get back its dignity, landscape architecture must learn to fight back...and struggle”.¹⁴

¹ Judith Butler, *Gender Trouble: Feminism and the Subversion of Identity* (New York: Routledge, 1990).

² William Cronon, *Uncommon Ground: Toward Reinventing Nature* (New York: W.W. Norton & Company, 1995), 83.

³ Michael Pollan, *Second Nature* (New York: Dell Publishing, 1991).

⁴ Peter Berg and Raymond Dasman. “Reinhabiting California” In *Architectural Regionalism: Collected Writings on Place, Identity, Modernity, and Tradition*, edited by Vincent B. Canizaro, (New York: Princeton Architectural Press, 2007), 355.

⁵ Ibid, 355

⁶ Jim Dodge. “Living by Life: Some Bioregional Theory and Practice” In *Architectural Regionalism: Collected Writings on Place, Identity, Modernity, and Tradition*, edited by Vincent B. Canizaro, (New York: Princeton Architectural Press, 2007), 341-349.

⁷ Robert L. Thayer Jr., *Life Place: Bioregional Thought and Practice* (Berkeley: University of California Press, 2003).

⁸ Nigel Dunnett and Andy Clayton. *Rain Gardens: Managing Water Sustainably in the Garden and Designed Landscape* (Portland Oregon: Timber Press, 2007).

⁹ Ibid

¹⁰ Franz Xavier Baer quoted in Udi Weilacher, “Ecological Aesthetics in Landscape Architecture Today” In *Ecological Aesthetics: Art in Environmental Design: Theory and Practice* edited by Heike Strelow

in cooperation with Vera David, (Birkhauser: Boston, 2004), 118

¹¹ Mariken van Nimwegen, “Hastings Park” [cited July, 2007]; Available online from http://www.pps.org/great_public_spaces/one?public_place_id=517

¹² Edward O. Wilson, *Biophilia: the Human Bond with Other Species* (Cambridge: Harvard University Press, 1984).

¹³ John Dewey, *Art as Experience* (New York: Perigree Books, 1980).

¹⁴ Michael Desvigne and Christine Dalnosky, quoted in Sebastien Marot, “The Reclaiming of Sites” In *Recovering Landscape: Essays in Contemporary Landscape Architecture* edited by James Corner, (New York: Princeton Architectural Press, 1999), 55.