

From Brown Liability to Green Opportunity: Reinventing Urban Landscapes

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Whether they are growing, shrinking, or just standing their ground, cities throughout the United States are looking for ways to reinvent and reinvigorate their urban landscapes. More and more, planners are employing urban greening strategies as tools to enhance the quality of life and create more sustainable metropolitan environments. This is especially true in places that have suffered the consequences of deindustrialization and economic decline over the past 50 years. This paper begins by briefly discussing the evolution of urban greening and the vast array of associated benefits. It then examines expanding efforts to use brownfield sites as opportunity spaces for greening, focusing on project types, planning activities, stakeholder involvement, and redevelopment outcomes. The paper ends with some key lessons from the field that can help planning professionals realize a greener future for our nation's cities.

It's Saturday morning. I wake up briskly, hop on the bed and look out the window. The fifth floor offers a great view of the green space outside. There is nobody in the playground, lawn, or soccer fields yet. There is movement in the Pit, a thickly wooded area surrounding the creek. There are always kids in the Pit. Maybe they're catching snakes, setting booby traps, jumping ramps, or raiding our fort.... Hmm, better get my boots on.

While the thought of green space called me to play as a child, it was the dilapidated stockyards and industrial buildings on my drive to school through the Weston Road and Junction industrial districts of Toronto that motivated my interest in brownfields. These decaying remnants of our industrial past were curiously majestic. No people, just large brick buildings trying to survive the elements and creeping foliage. Indeed, it seems that even Mother Nature favors greening as a reuse for these sites.

The list of socio-economic and environmental ills associated with brownfields is often long, but the list of benefits associated with green space is even greater. It is no wonder then that government officials, community activists, and even business leaders are increasingly contemplating

the role that greening can play in redeveloping urban brownfields, enhancing their attractiveness for business and housing, and improving human and ecological health (ICMA, 2002). I begin this article with a look at the evolution of urban greening and the benefits associated with it. I then examine efforts to turn brownfields green, in terms of project types, planning, stakeholder involvement, and outcomes. I end with some key lessons from the field that can help planners realize a greener future for our nation's brownfields (De Sousa, 2008).

The Urban Green (R)evolution

Urban greening is understood generally to mean

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the creation of green spaces within a city's built-up environment, which includes the production of parks, public spaces, gardens, outdoor athletic facilities, natural habitats, greenways, and children's playgrounds through redevelopment (Garven and Berens, 1997; Harnik, 2000; Bunster-Ossa, 2001). It can also refer to the preservation, protection, and enhancement of those natural areas within the urban environment that have been, for some reason or other, left undisturbed by municipalities, developers, or landowners. While the term greening is now being used more widely to refer to the incorporation of environmental ideas into business and development activity, I use the term more conventionally, but loosely, to refer to the preservation and development of parks, open space, and green space in urban areas, as well as the incorporation of "green" vegetation into "brown and grey" parts of cities.

Since the early nineteenth century, green space has played an important role in providing relief from an increasingly urban and industrialized America. The rapid shift from a primarily rural/agricultural to an urban/industrial economy brought tremendous growth in population, drawing workers from the periphery, as well as immigrants from abroad. Coinciding with this growth were the pollution and health problems of the congested city. Thus, the need for increased recreation, better public health conditions, and relief from the toils of industrial labor prompted initial calls for urban parks in the United States (Platt, 2008).

Beginning around 1850, civic advocates began to address the needs of urban citizens by calling for parks to be built in cities throughout the country. The first notions of the urban park were to be realized by a culturally elite group of leaders and designers such as Andrew Jackson Downing, Frederick Law Olmsted, and Calvert Vaux. The grand central park model of New York would be replicated in various American cities, including Philadelphia, Boston, Chicago, and San Francisco, throughout the second half of the nineteenth century.

As urban parks proliferated, the focus shifted from creating elite cultural spaces to providing services for families and children. The "Reform Park" movement (1900-1930) focused on play and recreation activities provided in smaller, more accessible green spaces located throughout cities (Cranz, 1982). Subsequently, the U.S. saw an increasing role in the technical function of park boards and commissions from the 1930s to the 1960s, which eventually led to a more formalized planning function of local governments via parks and recreation departments.

Post-war suburbanization not only took much of the interest in parks with it, but it also left cities poorer and struggling to maintain funding for urban park programs. Although this issue persists, there has recently been a resurgence of interest in urban parks because of their perceived role in helping to achieve more sustainable urban development (Beatley, 2000; Chiesura, 2004; Cranz and Boland, 2004). Indeed, city leaders from around

the world signed the so-called Urban Environmental Accords-Green Cities Declaration in 2005 with action items for enhancing urban nature, such as ensuring public park and recreation space within 0.5 kilometers of every city resident by 2015, 50% tree canopy coverage of all available sidewalk planting sites, and the protection of critical urban habitat from unsustainable development.

These three "urban nature" action items were part of 21 action items in seven environmental categories that cities must address to foster sustainable urban living and improve quality of life for urban dwellers (i.e., energy, waste reduction, urban design, urban nature, transportation, environmental health, and water). Parks are increasingly promoted as catalysts for urban revitalization, features for increasing property values, and measures for attracting employers, as well as ways to improve environmental integrity and community quality of life. Growing concern (and regulation) about climate change, stormwater management, transportation, shrinking cities, and public fitness will continue to boost interest and funding for urban greening. But does greening really make a city more sustainable? Empirical evidence increasingly shows that the presence of such space contributes to the social, economic, and environmental goals of sustainability in many ways.

Benefits of Urban Greening

To most, the main function of urban green space is recreation, which deals with the refreshment of the body via physical exercise and the mind via a place for relaxation, diversion, and enjoyment. In a survey (Shafer et al., 2000) of more than 500 users of greenway trails in Indianapolis, respondents considered the trails' impact on people's health and fitness to be extremely positive. This was the highest-ranked feature in the survey. A survey by Godbey et al. (1992) also found that those who used local parks frequently were more likely to report good health than those who did not. Another central benefit associated with greening the city is simply aesthetics. In a study of greenway-based trails in and around Chicago, Gobster (1995) found that more than anything else, people liked the trails for their scenic beauty.

An extensive body of research also finds that urban greening improves the social well-being of city residents in many ways. A park experience has been found to reduce stress (Ulrich, 1981), as well as to enhance contemplativeness, rejuvenate the city dweller, and provide a sense of peacefulness and tranquility. In a well-cited study, Ulrich (1984) found that hospital patients who could look out onto trees and nature from their windows recovered more quickly than those who did not. Kuo et al. (1998) found that greenery helps people to relax and it reduces aggression. Another study by Kuo and Sullivan (2001) found that residents living in greener surroundings report a lower level of fear, fewer incivilities, and less aggressive and violent behavior. Public health research has also found that contact with nature is associated with



Mill Ruins Park in Minneapolis, Minn. was transformed into the Mill District in 2001. *Photo courtesy of Christopher De Sousa.*

fewer sick call visits among prisoners (Moore, 1981); improved attention among children with attention deficit disorder (Faber et al., 2001); improved self discipline among inner-city girls (Faber et al., 2002); decreased mortality among senior citizens (Takano et al., 2002); and enhanced emotional, cognitive, and values-related development in children (Kellert, 2002).

Measuring the Economic Value of Green Spaces

The cost of developing and maintaining parks in urban areas has also raised questions about the economic benefits associated with such spaces. Indeed, as early as the 1850s, landscape architect Frederick Law Olmsted justified the purchase of land for New York's Central Park on the basis of it raising the value of adjacent property, producing enough in taxes to pay for the park. In a comprehensive review of 25 studies, Crompton (2001) found that in 20 of them, parks and open space did increase property values nearby. This effect is greatest for spaces that are natural or serve a passive recreation role (e.g., trails, picnic areas) versus an active one (e.g., ball fields, tennis courts, basketball courts). As for the magnitude of this effect, Crompton (2001, p. 62) suggests that:

A positive impact of twenty percent on property value abutting or fronting a passive park area is a reasonable starting point guideline. If the park

is large (say over 25 acres), well maintained, attractive, and its use is mainly passive, then this figure is likely to be low. If it is small and embraces some active use, then this guideline is likely to be high. If it is a heavily used park incorporating such recreational facilities as athletic fields or a swimming pool, then the proximate value increment may be minimal on abutting properties but may reach ten percent on properties two or three blocks away.

Many studies have also found that the presence of recreational and natural space is considered an important factor influencing the location decisions of business (Scanlon, 1984; Galbraith and DeNoble, 1988; Snepenger et al., 1995). A study by Crompton, Love, and Moore (1997), for example, found that decision makers in small companies (fewer than eight full-time personnel) ranked "recreation/parks/open space" as their highest priority when asked to identify quality-of-life elements influencing their business location decisions. Lerner and Poole (1999) contend that in addition to raising property values and attracting investment, greening projects in the U.S. also tend to reduce costs related to urban sprawl and infrastructure, invigorate local economies, boost tourism, preserve productive farmland, and prevent costly flood damage.

Reaping Environmental Dividends

In addition to the social and economic benefits accruing to humans, we are becoming more aware of the important ecological and biogeochemical services urban green space provides in terms of enhancing biological diversity, breaking down organic wastes, filtering pollutants from soil and water, managing air pollutants, moderating urban climate, controlling water, preserving genetic diversity, and pollinating plants. Simply put, open land provides the space for nature to perform life-sustaining services that would otherwise have to be provided technologically at great expense. Proponents of so-called green infrastructure argue that urban trees, forested woodlots, and wetlands are particularly valuable. The forestry organization American Forests, for example, estimates that trees in the nation's metropolitan areas contribute \$400 billion in stormwater retention by eliminating the need for expensive facilities (Lerner and Poole, 1999, p. 125). In addition, approximately 800 million tons of carbon is stored in U.S. urban forests, with a \$22 billion equivalent in control costs (Coder, 1996).

Converting Brownfields into City Parks

Emerging evidence about the importance of green space in cities should compel planners to inventory existing green space in their communities and identify new opportunities for greening. Since 2001, the Trust for Public Land, a national nonprofit, has compiled data on the quantity and management of urban green space in

U.S. cities through its Center for City Park Excellence. The most recent data (2008) show that green space represents 9.9% of city land area on average, with high-density cities having a greater percentage of their land area devoted to green (11.7%) than intermediate/high (9.6%), intermediate/low (9.1%), and low-density cities (9.1%). In all, the Center for City Park Excellence (2006) finds that some cities have plenty of parkland that is well distributed around town; others have enough parkland in total but an inequitable distribution; while others are short of even a basic amount of park space for their citizens. Merely considering the total percentage of green space is, therefore, not a good indicator of a successful park system, as many cities have ample inventories that may be concentrated in large central parks or along the waterfront and ravine valleys instead of in proximity to older and more populous localities. Those cities often considered to have excellent park systems – such as Minneapolis, Boston, and San Francisco – usually have comprehensive and well-funded park programs, extensive park inventories with many types of green space, and good access throughout the city (Erickson, 2006).

To remedy this situation, Harnik (2000), Garven and Berens (1997), and other prominent researchers and practitioners recommended cities take into serious consideration the greening of brownfields and other vacant lands in their planning schemes. This recommendation also seems to be consistent with what many urban dwellers actually desire (e.g., in a survey of more than 200 New



Phase I of the Ping Tom Memorial Park in Chicago, Ill. included converting 12 acres of brownfields into park land in 1999. *Photo courtesy of Christopher De Sousa.*

Jersey residents by Greenberg and Lewis (2000), 90% of respondents identified parks and play areas as an optimal end-use for brownfields). Unfortunately, there is no shortage of brownfields throughout the country. In the most recent U.S. Conference of Mayors' survey (2008), 188 cities reported more than 24,896 brownfields (with an average size of 13.92 acres) and 176 cities estimated having 83,949 acres of idle or abandoned property. In all, national estimates range from 450,000 to over one million brownfields sites.

Many cities throughout the country have already started to actively convert brownfields into green space – namely, Minneapolis-St. Paul, Chicago, Denver, Portland, New York, and Pittsburgh. The 2006 U.S. Conference of Mayors' report on brownfields identified 422 park projects, while the 2008 report states that brownfield sites have been redeveloped into “30,559 park land projects or acreage designated for park land.”¹

The most popular type of brownfields greening in the U.S. has been the construction of greenways and linear trails. These projects are built on former railway lines or on industrial and commercial properties located along waterways, where land often has to be painstakingly sewn together. Interest in greenways is widespread because they can connect many neighborhoods, serve multiple functions, and offer many benefits (e.g., active and passive recreation; aesthetically pleasant transportation routes for cyclists, pedestrians, and/or vehicles; habitat corridors; and stormwater management). Furthermore, these projects are often tied to a broader redevelopment strategy that sees residential and commercial development springing up along the greenway.

The city of Minneapolis, for example, has been proactively greening brownfields along the Mississippi River that cuts through the city. The Mill Ruins Park and Stone Arch Bridge project is the centerpiece of this green transformation. Once considered the largest milling district in the world, the city's industries and infrastructure fell victim to deindustrialization. The last train crossed the Stone Arch Bridge in 1978, and many buildings stood vacant including the former General Mills plant that was gutted by fire in 1991.

As with many greenway projects on brownfields, this one was carried out incrementally with the support of many partners. The Minnesota DOT began transforming the bridge into a pedestrian and bicycle trail in the early 1990s, while park redevelopment occurred in multiple phases (i.e., reopening the historic canal & links to the bridge in 2001, restoring the historic mill features in 2002, reconstructing a 650-foot wood plank trail in 2003, constructing pedestrian paths and interpretive features in 2005). Various management techniques and institutional controls were used to ensure that contaminants (PAH, Diesel Range Organics) on certain portions of the site are not disturbed in the future.

In 2004, the Minneapolis Park and Recreation Board estimated that the \$205 million invested in parks

(\$55 million) and public improvements (\$150 million) along the central riverfront (of which Mill Ruins is the centerpiece) had already helped generate over \$1.2 billion in private investment in the neighboring area, including the construction of more than 3,000 new residential dwellings (De Sousa, 2006). Indeed, a few developers told me that their projects went ahead once the city confirmed that the park project was moving forward.

Redevelopment along the river continues to take place in a contagious manner, spawning additional commercial, residential, retail, and even green space projects – like the eight-acre Gold Medal Park, constructed on a brownfield just southeast of Mill Ruins Park via a public-private partnership involving the City, a private foundation, and a prominent theater company. In 2003, a group of students and I surveyed almost 200 users and local residents about this project, and many reported visiting the site regularly from work and home to partake in an array of active and passive activities (De Sousa, 2006). Over 90% of the respondents felt the park was a good use for the site and noted the array of benefits it has brought to them personally and to the community, especially in terms of scenic beauty, neighborhood appeal, naturalness, and physical activity. I even lost five stubborn pounds administering surveys to lunchtime power walkers.

Small-Scale Projects Merit Attention

Many smaller communities, such as Baraboo (population 11,550) and La Crosse (population 51,840) in Wisconsin, are also looking to redevelop their riverfronts in an effort to revitalize their older core areas. The City of Baraboo has received funds from the EPA and the State of Wisconsin to plan and redevelop along the Baraboo River, which runs through the heart of the city and was once home to various textile and lumber-related industries. The city has prepared a comprehensive plan and design guidelines for the so-called Ringling Riverfront redevelopment area, which includes 37 brownfield sites. Despite being a lower-income area, the corridor is experiencing development pressure from surrounding communities, which it hopes to turn into development opportunities. In addition to proactively assessing the conditions of the brownfield properties, the city is also involved in many public improvements, such as constructing a riverwalk, restoring the riverbanks, enhancing the streetscape, constructing parks, and improving utilities.

Smaller park projects built on brownfields or vacant lots aim to provide active and/or passive recreation opportunities for older residential neighborhoods or users in downtown cores. Interestingly, many sessions at the 2009 Brownfields Conference in New Orleans also focused on the conversion of smaller urban brownfields into community gardens and urban farms (Goldstein, 2009). Chicago has been particularly proactive at converting such sites into community park spaces (e.g., Senka Park, Ping Tom Memorial Park, West Ogden Pocket Park). The Senka Park project, for example,

involved converting a former railroad yard into a park/schoolyard containing a baseball diamond, a soccer field, volleyball courts, a children's playground, a rollerblade hockey rink, basketball hoops, a trail, a water play area, a few "habitat" areas, and several tables for playing chess and other games. As in this case, the decision to construct a park is often reactive, with municipalities under severe pressure from local residents to increase park space in the area. Downtown pocket parks, on the other hand, are usually deliberately built with elaborate design schemes to enhance adjacent commercial and retail business. Chicago's 24-acre Millennium Park, while larger than a typical pocket park, provides a good example of a beautifully designed catalytic downtown public space, with the added revenue benefit of underground parking.

Large-Scale Park Development

Larger multiple-use parks, offering a wide range of passive and active uses to both local and city residents, have also been constructed in several cities and are often part of larger urban redevelopment schemes. Pittsburgh's Washington's Landing (42 acres) and Nine-Mile Run (244 acres) provide good examples. Once home to notoriously foul stockyards and industries, Washington's Landing now offers a marina, tennis courts (which also cap contaminants), walking and nature trails, as well as commercial space in the middle of the island and housing on the south end. When dumping ceased in the early 1970s, two large slag piles almost 200 feet high rose up sharply from the Nine-Mile Run Valley, with a heavily polluted stream running between and below them. Half of the site is now a residential development, while the other half involves park space and a restored aquatic ecosystem along two miles of stream. The project was sponsored by the Army Corps of Engineers and the City of Pittsburgh's Department of City Planning.

As in the Nine-Mile Run project, interest in the ecological revitalization of former brownfields has grown among environmental groups, community organizations, city planning and works departments, and even private corporations such as BP, Exxon Mobile, and Ford. While this has typically been popular for less marketable brownfields in rural areas (including superfund sites, mine lands, and landfills), projects seeking to restore wetlands, streams, and terrestrial ecosystems are also sprouting up in U.S. cities (Burger et al., 2004; Office of Solid Waste and Emergency Response, 2009).

My favorite example of urban ecological restoration, however, is taking place in Toronto, Canada along the Don River, which runs through the heart of the city (De Sousa, 2003). For over two decades, one of the key goals of the city, nonprofits, local stakeholders, and the Toronto Conservation Authority (mandated by the Ontario government to manage water, land and natural habitats) has been to restore the river's ecological functionality. Multiple brown-to-green projects have been carried out along the Don (e.g., Domtar Polysins, the Brick Works,

Chester Springs Marsh, Don Valley Park, and the Mouth of the Don), contributing to an extensive re-introduction of native flora, as well as improving water quality, increasing access to recreation, preserving the river's heritage, and improving the corridor for cyclists and pedestrians. Furthermore, the city and local community groups regularly monitor the ecological state of the individual greening projects, as well as the Don River as a whole.

Planning and Implementation

Partnerships for Urban Greening

While many cities have been successful at using their inventory of brownfields to create a diversity of green spaces, the planning and implementation process for greening urban brownfields is simply more complex than for most other brownfield projects, and it often requires the interaction of various levels of government, private-sector participants, non-governmental organizations, and community-based groups. In the projects I have examined, local governments are most often the ones taking the lead in coordinating the greening process, while upper levels of government (e.g., EPA, Army Corps of Engineers, National Parks Service) have also played an important role by providing land, funding, technical expertise, and assistance with project coordination. Developers, landowners, and other private-sector participants have been involved in slightly over half of the projects I have examined, both directly (via site construction or property donation) and indirectly (via coordination of projects), but their own development projects are typically tied to the success of the new green space in some way.

Nonprofits are also playing an increasingly active role in greening urban brownfields. Some groups, such as the Trust for Public Land and Groundwork USA, have developed broadly defined greening missions related to ensuring livable urban communities; others, such as the Rails-to-Trails Conservancy and Wildlife Habitat Council, have missions associated with a particular type of green space. These national-level nonprofits, all of which have regional or local branches, have found themselves at the forefront of greening brownfields in many respects (i.e., remediation, financing, planning and implementation, raising awareness, and post-development promotion). Their most notable role is often acting as a bridge between the public sector, the private sector, the local community, and even local nonprofits who may have initially requested their guidance. Many have become very experienced in dealing with risk (whether it is legal, financial, environmental, or technological) and creative in their ability to raise project funds from a variety of sources. Unlike the private sector, nonprofits can also engage in projects that do not bring about direct monetary benefits, but garner significant public benefits. They can also lobby government and businesses to keep funding or delivering public benefits with less fear of retribution. National nonprofits also have many technical skills (fundraising, lobbying, design, cleanup techniques, real

estate acquisition, etc.) that local governments, private companies, local nonprofits, and the community lack or cannot provide. For these reasons, their role will likely expand as governments broaden their brownfields efforts.

Another issue standing in contrast to other kinds of market-oriented brownfield redevelopment initiatives is the very important role communities play in greening projects (Eisen, 1999). Pressure for greening and decisions related to all aspects of redevelopment projects are typically influenced by community involvement and input. Such involvement comes about through various structures and in diverse contexts; for example, consultation forums, design charrettes, working groups, committees, site visitations, and educational tours. Community participation often continues beyond project planning and development, with residents and even businesses becoming involved in long-term management and maintenance of the parks (via planting events, walking tours, educational programs, monitoring of habitat, coordination of litter cleanup activities, etc.).

Overcoming Obstacles

The diverse array of partners and their desire to achieve multiple economic, social and environmental goals make planning and developing brown-to-green projects particularly challenging, requiring collaboration among various, and often adversarial, stakeholders (including those promoting alternative types of green space). For this reason, such projects take a long time to plan and bring to fruition, requiring from two to 13 years to complete for those I examined. As with any brownfields project, greening involves costs associated with site assessment and cleanup. I found the average cost of site preparation and remediation to be approximately \$163,000 per acre (\$80,500 median), representing 19% of total costs (based on 14 projects) (De Sousa, 2004). It should be noted, however, that these costs do vary considerably and have likely gone down over the last few years due to the use of risk-based techniques, capping, engineered barriers, landscape features, and institutional controls. Indeed, there is often a close link between park design and the management of contaminated soils, which sometimes makes it difficult to specify cleanup costs because a cap, for instance, can serve other functions in addition to contamination management (e.g. a road or parking lot for automobiles, soil for grading and planting, a tennis court, etc.). There is also growing interest in the use of phytoremediation, bioremediation, and natural attenuation in the greening process (Bradshaw, 2000).

Although exposure to contamination is a common fear traditionally associated with planning for and redeveloping brownfields, as reported by the literature, (U.S. EPA, 1999; Eisen, 1999; De Sousa, 2000; Greenberg et al., 2001a, 2001b; Greenberg, 2002), coordinators in the U.S. and abroad have often indicated to me that this issue generates little or no concern from community members. Indeed, in a recent study I carried out, only two of 476



The Spadina Quay Wetland in Toronto, Canada, completed in 1996, was a former parking lot. The site is adjacent to the Music Garden brownfield-to-park project. *Photo courtesy of Christopher De Sousa.*

respondents surveyed at three different projects mentioned contamination as an issue of concern (De Sousa, 2006). The reasons often given for this are that people spend relatively little time at these sites; the sites are publicly owned and managed; and the sites are safer and cleaner than they would otherwise be.

By far the most significant obstacle to greening brownfields is simply the fact that these projects have very real costs, while few generate any direct revenues. Indeed, the average total cost for the greening projects I examined in the U.S. was \$6.05 million (based on 18 projects; \$3.99 million median cost, or \$750,000 per acre). There is a high level of diversity in cost, however, given that projects can range from natural habitat restorations, to passive parks, to multi-sport complexes. Unfortunately, government has been responsible for covering virtually all of the costs involved in greening brownfields, whereas other types of brownfield redevelopment are able to leverage most development funding from the private sector. City governments have been generally responsible for funding neighborhood and pocket parks, while upper levels of government sponsor many of the larger parks and may assist with assessment and cleanup. Local governments are also on the hook for long-term management and maintenance, as well as land acquisition. An added challenge has been that brownfield funding programs from upper levels of government have been directed to projects that generate jobs and taxes, not green space.

Despite these obstacles, many cities continue to push forward with greening in order to realize the multiple benefits associated with it. In interviews, project implementers have highlighted the main benefits as being the provision of new recreational sites, economic



The Weston Quarry Gardens were opened in 1997 as the green space component of the Don Valley Brick Works in Toronto, Canada. *Photo courtesy of Christopher De Sousa.*

gains, aesthetics, and the creation of habitat. Other benefits often realized include the interconnection of the newly-formed green spaces to other parts of the city, the creation of new trails, new access points to water, flood control, infrastructure improvement, enhanced cohesion among neighborhood residents, historical restoration, and examples for future greening efforts. Research I have conducted on the outcomes of brownfields-to-green space projects supports these benefits. In a recent study, my colleagues and I found that brownfields converted to parks in Minneapolis and Milwaukee raised surrounding residential property values by 4.4% and 11.7%, respectively, and that this effect extended out 2,500 feet (De Sousa, Wu, and Westphal, 2009). In Milwaukee's 1,400-acre Menomonee River Valley, many of the dozen environmental benchmarks we are tracking related to water and air quality, habitat, flora, and fauna are already showing mild improvement as a result of initial redevelopment efforts. Moreover, the hundreds of respondents who completed surveys at three brownfield-to-green space projects in the Midwest (Ping Tom Memorial Park and Senka Park in Chicago and Mill Ruins Park/Stone Arch Bridge in Minneapolis) clearly understood the benefits these projects offered to

themselves personally and to the quality of life of the city. Perhaps the most inspiring outcome, however, occurred a few years back when my 11-year-old cousin beamed about an awesome Toronto-area nature camp he attended that "once was a pit where they used to make bricks."

Lessons from the Field

While tax dollars and jobs are integral to cities' economic sustainability, there is a growing sense among planners that a broader revitalization focus should be considered so as to bring a higher quality of life back to the city – which, in turn, will lure back investors and residents. Greening experiences show how brownfields can constitute valuable opportunity spaces for developing various types of green space in urban areas and thus contribute to this broader focus. Given that it is neither simple nor inexpensive to carry out, however, the greening of urban brownfields requires extensive stakeholder involvement and government commitment. Indeed, the financial challenges involved in cleaning up, constructing, and even justifying the expenditure of funds for greening projects is very difficult given the budgetary problems in which many cities and states currently find themselves. That said, I would like to end with a number of lessons from the field

that will hopefully assist those planners willing to take on the urban greening challenge (De Sousa, 2008):

- The greening of brownfields seems to be most feasible when tied to other forms of redevelopment, regardless of type, and when it is justified on the basis of human uses and benefits.
- Greening is particularly effective when all parties can link green space needs with brownfield site availability as part of a comprehensive revitalization strategy.
- The involvement of communities in the redevelopment process is crucial in both the short and long term.
- Potential funding sources must be identified and/or created through the involvement of public, private, and nonprofit groups.
- Municipal departments involved in the administration of parklands should be consulted and involved directly in all greening projects.
- Greening projects should be encouraged because they revitalize “blighted” neighborhoods, with an eye toward enhancing their economic and social appeal.
- An appropriate risk-based corrective action method that integrates elements of landscape design with available and emerging site remediation technology should be used to enhance the feasibility of greening projects.
- Greening projects present greater challenges than other forms of redevelopment in justifying end-use and project funding, but they are more graciously accepted by affected communities.

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Endnote

¹ Page 9 of the report points out that 95 cities, or 62 percent of respondents, said that a portion of their sites would be redeveloped into parks and open space sites comprising 3,520 acres of reclaimed land.