THE NATURE OF MILL CREEK:
LANDSCAPE LITERACY AND DESIGN FOR ECOLOGICAL DEMOCRACY

Anne Whiston Spirn

10 July 2014

Nature is the word Raymond Williams called "perhaps the most complex word in the [English] language" (Williams, 1983, p. 219). In English, the word nature originally described a quality – the essential character of something. Williams identified two additional areas of meaning: "the inherent force which directs either the world or human beings or both" and "the material world itself, taken as including or not including human beings." Nature is an abstraction, writes Williams, a set of ideas for which many cultures have no one name, "a singular name for the real multiplicity of things and living processes." The abstraction of the word itself conceals radical differences in definition from culture to culture, even among individuals within the same culture (Spirn 1997).[1]

Language structures how one thinks, what kinds of things one is able to express, and how one acts. Language makes it possible to conceive ideas and see new meanings. It can also suppress thought, disguise meaning, and make people blind. Someone's definition of nature influences whether they think cities are part of the natural world, or separate from it, and how they act to shape cities. Someone who believes that the city has degraded "nature" is apt to see only pollution there. Someone who assumes that the city has destroyed or displaced "nature" is not likely to see the effects of the natural processes that still shape its landscape. Ideas of nature have profound effects on how cities are designed, built, and sustained (or not sustained) over time (Spirn, 1984 and 1997).

Given conflicting definitions and their consequences, I use the word *nature* sparingly, deliberately, and explicitly. For me, nature is not a place, like a park or a wilderness, and not a particular feature, like a tree or a river. For me, nature consists of the creative and life-sustaining processes that connect everything in the biological world and the physical universe, including humans. These chemical, physical, and biological processes interact with social, economic, political, and cultural processes, over time, to produce landscapes. I use the word *landscape* as freely as I use *nature* sparingly, for I hope to recover the original meanings of the word in Old English and Nordic languages: the mutual shaping of people and place (Olwig,

1996; Spirn, 1998). Landscape, in its original sense, is not mere scenery. It encompasses both the population of a place and its physical features: its topography, water flow, and plant life; its infrastructure of streets and sewers; its buildings and open spaces.

Individuals and societies inscribe their values, beliefs, ideas, and identity in the landscapes they create, leaving a legacy of stories: natural and cultural histories, landscapes of poetry, power, and prayer. Such stories are told and read through a language of landscape with its own elements, pragmatics, and poetics (Spirn, 1998). The language of landscape is a powerful tool. It permits people to perceive pasts they cannot otherwise experience, to anticipate the possible, to envision, choose, and shape the future landscape. Since 1987, West Philadelphia's Mill Creek watershed and neighborhood (among the poorest in Philadelphia) has been my laboratory to test and generate ideas about the landscape language, landscape literacy, and what Randolph Hester has called "ecological democracy," or how to restore urban ecosystems and rebuild community in synergistic ways (Spirn, 1998; Hester, 2010).[2] Landscape literacy enabled Mill Creek residents to read the environmental, social, economic, and political stories embedded in their local landscape and gave them a way to formulate new stories, to envision how to transform their neighborhood, to both challenge and work with public officials.[3] Just as verbal literacy was a cornerstone of the American civil rights movement of the 50s and 60s, landscape literacy empowered Mill Creek residents to recognize and redress injustices embodied in their landscape, to build pride and self confidence, and to promote ecological democracy.

Reading the Landscape of Mill Creek

The landscape of West Philadelphia's Mill Creek neighborhood is a catalogue of the failures of twentieth-century urban policy, planning, and design.[4] Some policies and projects were deliberate and insidious in their effects, most were well-intentioned but misguided. The US Federal Housing Administration's guidelines for underwriters, first spelled out in the 1930s, included the race of a neighborhood's population and the age of its buildings; these guidelines contributed to redlining, the banking practice of refusing to grant loans for the purchase of properties on the basis of location (Hillier, 2003). Urban renewal projects of the 1950s, such as the public housing towers inserted into this neighborhood of small-scale rowhouses, had devastating effects on the place they sought to improve and contributed to the

racial segregation of a neighborhood where blacks and whites had lived next door to one another, in identical rowhouses, for at least a century. New parks, playgrounds, and streetscapes built in the 1960s cracked and subsided within a few decades of construction, and a public housing project built in the 1950s was demolished recently.

The critics of modernist urban planning and redevelopment are now legion.[5] However, much recent development in Mill Creek may produce similar results. Like their predecessors, those responsible for planning Mill Creek often treat symptoms and fail to address the underlying processes that produce them. Planners too often concentrate on narrowly-defined problems and fail to see the connections among seemingly unrelated phenomena. Designers tend to focus on physical form and fail to account for the processes that will continue to shape their projects over time. These failings are not limited to planners and designers. To plan a neighborhood is both a spatial and a temporal undertaking, but planners' and designers' maps are usually static snapshots of current conditions, narrowly framed. Grassroots activists often concentrate on a specific local problem or a particular site and overlook how these fit into the larger neighborhood, city, and region. Some problems, though manifest locally, are phenomena set in motion outside the neighborhood and must be resolved in that context. Some features of the built landscape are clues to forces that continue to exert a decisive influence, while others are artifacts of processes now defunct. Some are amenable to change, others are not. Some are themselves dynamic agents that enable or constrain possibilities for subsequent development (Spirn, 2011).

Mill Creek is a place of many puzzles. It is among the poorest neighborhoods in Philadelphia, yet it is home to many well-educated, middle-class residents, almost all African-American. Boarded-up storefronts speak of failed ventures, but other institutions, like the numerous community gardens, flourish. Blocks of vacant land and wasted structures border blocks of well-tended houses and gardens. The amount of open land in Mill Creek is striking, especially in contrast to the dense fabric of small rowhouses. On some blocks, only one house or one small lot is vacant; in other areas, houses have sagging porches and crumbling foundations, and there are almost as many vacant lots as buildings. There are patterns to how and where abandonment occurs. Such patterns reveal the nature of Mill Creek and are key to its future (Spirn, Pollio, & Cameron, 1991). When those who plan and build the city disregard the significance of these patterns or fail to see them at all,

they waste resources, produce dangerous, expensive mistakes, and inflict grave injustice on all who live there.

There is an impulse, particularly among Mill Creek residents and local politicians, to build new homes on vacant land, but there is no housing shortage in the city of Philadelphia, whose stagnant population growth and large proportion of aging homeowners mean there will continue to be a surplus of houses for the foreseeable future (Ferrick, 1997).[6] However, there is substantial investment in the neighborhood by its residents, which could be recognized and strengthened by infill construction on vacant land within and adjacent to well-maintained blocks of homes. Certain vacant lots are appropriate candidates for new construction. There are, for example, many individual, scattered vacant properties, "missing teeth" in otherwise intact blocks of homes, the consequences of isolated events such as fire and death. Vacant corner lots are also common, the remains of the many corner stores that once served the neighborhood. They are artifacts of changing scales and modes of merchandising and the failure of new businesses to fill the gap. However, much of Mill Creek's vacant land was not produced by socio-economic processes alone. Some are the byproduct of natural processes and should not be built on.

The single feature of the Mill Creek landscape that has had the most significant, persistent, and devastating effect is the least recognized: the buried floodplain of the former creek (from which the neighborhood takes its name) and the hydrological processes that continue to shape it. And yet the strong pattern – the band of open land and deteriorating buildings –created by those processes is striking once recognized. This pattern extends throughout the entire length of the stream's former course. It is most prevalent in Mill Creek and adjacent neighborhoods to the north, where poverty is rife, but even in more affluent neighborhoods to the south and further north. Although the former creek bed is buried, the valley bottom still functions as a floodplain, where the soil is sometimes saturated.

The Mill Creek once drained about two-thirds of West Philadelphia, and its sewer still does. The creek itself once flowed above ground, the water's erosive force in main channel and tributaries cut valleys from its tributaries in the north to its mouth at the Schuylkill River. Mills powered by water operated along Mill Creek by 1711, and in the mid nineteenth century, steam-powered textile mills were prominent. Wealthy Philadelphians established country estates on the outskirts of the city in the eighteenth-century, such as Woodlands at the mouth of

Mill Creek and Paul Busti's Blockley Retreat of 240 acres, established in 1794, which overlooked the creek upstream. Busti's estate was purchased in 1836 to establish a hospital in the country for psychiatric patients. Mill Creek formed the boundary between the male and female wards and was an integral part of the grounds, which were designed as a pastoral landscape intended to provide a soothing environment for patients.[7]

The Hopkins Atlas of 1872 shows the creek, hospital, and mills within a grid of streets, houses, and platted (but undeveloped) properties. This is a landscape undergoing rapid change from countryside to street-car suburb. With picks and shovels and horse-drawn carts, armies of men levelled hills, filled in valleys, and buried streams in sewers. The level of new streets was twenty to thirty feet below the former hilltops and thirty to fifty feet above the old streambeds (Levine, 2012). The Bromley Atlas of 1895 no longer shows the creek, and rowhouses have replaced the mill buildings at 46th and Haverford. In 1923, Mill Creek Playground and Sulzberger Middle School, an imposing brick structure on 48th Street between Aspen and Fairmount, took up two of the last remaining open blocks. In the Bromley Atlas of 1927, almost all the land north of Haverford had been developed, and the sinuous line of the sewer beneath blocks of row houses is the only visible trace of Mill Creek.

Today, the seventeenth-century forest and the eighteenth- and nineteenth-century pastoral and industrial landscapes seem obliterated, but abundant traces remain. From the corner of 46th and Haverford, one can read several hundred years of history. A large block slopes upward toward the northeast. Once divided by streets and covered by homes, it was for many years a grassy meadow with a grove of ash and ailanthus trees, and is now a ball field, church, and apartment complex. On the northwest corner is an open lawn – the site of the Blundin Mill; one block to the south was the location of another mill, now also demolished. A high stone wall runs for seven blocks along the south side of Haverford Avenue; it was built in the mid-nineteenth century to enclose Pennsylvania Hospital's buildings, gardens, and inmates. The western branch of the hospital still functions as a psychiatric facility, but the eastern property was sold and its buildings demolished in 1959 to make way for the towers of West Park, a public housing project. Uphill to the east, behind the stone wall of the old hospital, the roof of the Busti mansion is visible. It is now the Lee Cultural Center, where basketball courts and a playground occupy the former gardens. Downslope, in the valley where the creek once flowed through the Blockley Retreat and hospital grounds, is an elementary school that was

built over the buried floodplain in the 1960s and an enclave of townhouses constructed there in the 1990s.

By the late nineteenth century, the creek was polluted by wastes from slaughterhouses, tanneries, and households. In the 1880s, it was buried in a sewer, its floodplain filled in and built upon, but it still drains the storm water and carries all the wastes from half of West Philadelphia and from suburbs upstream. Each new suburb built in the watershed poured more sewage and storm water into the sewer. The size of the pipe – about twenty feet in diameter – is now too small for the quantity of combined sewage and storm water it must convey after major rainstorms.

Over the course of the twentieth century, the ground fell in, here and there, along the line of the sewer. The creek undermined buildings and streets and slashed meandering diagonals of shifting foundations and vacant land across the urban landscape. Local newspapers chronicled the long series of broken pipes and cave-ins.[8] In the 1940s, 47 homes were demolished because they were "plagued with rats and filled with sewer vapor." In 1945, a neighborhood of small row homes built above the sewer on the site of the former Blundin Mill was destroyed when the sewer collapsed. In 1952, a 35-foot deep cave-in on Sansom Street swallowed two cars, and porches of three homes crumbled into the crater. On July 17, 1961, the sewer caved in beneath Funston Street near 50th. Initially, four houses were destroyed and three people killed; ultimately 111 homes were condemned and demolished, leaving hundreds homeless, and many others fearful of further collapse. "We haven't been ordered to leave. We're just too frightened to stay here," one person told a reporter. Months later, Philadelphia's *Evening Bulletin* described residents' complaints of sewer odors and their frustration at the city's slow response in repairing the thirty-foot chasm. By 1980 entire city blocks lay open within the buried floodplain. Young woodlands of ailanthus, sumac, and ash grew up on older lots, urban meadows on lots vacated more recently. Many community gardens in this part of West Philadelphia lie above the buried floodplain of Mill Creek; older gardeners remember when buildings sank, their foundations undermined by subsiding fill.

In 1945 Pennsylvania enacted enabling legislation for federally-funded redevelopment under the Urban Redevelopment Law. Three years later, the City designated the Mill Creek neighborhood as a redevelopment area and hired architect Louis Kahn to produce a plan. In 1950, following a sewer collapse near 47th and Fairmount Streets, Kahn was also

commissioned to design the Mill Creek Housing Project on several square blocks near the cave-in. Newspaper articles from the 1950s through the 1960s record protests by residents who opposed public housing, particularly the high-rise apartment blocks. The public housing was built, as were play fields and ball courts on other blocks that had fallen in. Land directly over the sewer pipe was maintained as open lawn or parking lots, but much of the public housing was built on the buried floodplain. There have been no major cave-ins in recent years, but sinking streets, playgrounds, and parking lots and shifting building foundations continue to plague the area. The elementary school built on the corner of 46th and Haverford in the 1960s, for example, sustained structural damage in the 1990s.

Between 1950 and 1970, the overall population of the Mill Creek neighborhood declined by 27 percent. Although the neighborhood's nineteenth-century residents had been predominantly Caucasian, "Blacks" and "Mulattos" lived side by side with "White" families in 1880.[9] By 1950, however, its population was about 27 percent Caucasian and 73 percent African American, and by 1960, the white population had dropped to about 13 percent, to 4 percent in 1970, and to less than 2 percent in 1990. There were local reasons for these demographic changes, but they are also part of a much larger story. The city of Philadelphia, as a whole, lost population during this period. While six suburban counties around Philadelphia grew by as much as 12 percent in the 1990s, Philadelphia lost 9 percent of its population during the same period (Diaz, 1999). This is a local manifestation of a national phenomenon, a massive migration from central cities to suburbs and exurban areas, which reshaped American rural and urban landscapes, consuming farmland and forests and destroying urban communities in the process (Jackson, 1985; Rome 2001).

Given the outward flow of population and capital and the inward flow of sewage and groundwater, the abundance of vacant land and deteriorating or abandoned properties in Mill Creek is not surprising. Burying the creek in a "combined" sewer that carries both sanitary sewage from homes and business and stormwater runoff caused another problem: combined sewer overflows. Normally, as rain falls, it flows quickly off roofs and across pavement to the sewer, then on to a sewage treatment plant for cleansing before discharge into the Schuylkill River. After a heavy rain, there is too much runoff, and a mixture of sanitary sewage and storm water flows directly into the river – a combined sewer overflow. Such overflows are a

significant source of water pollution, and, by the 1990s, the US Environmental Protection Agency threatened to fine the City of Philadelphia if they were not eliminated.

To read the landscape of Mill Creek permits the reader to see what is not immediate: the former store in a vacant corner lot; the future forest in today's meadow; water underground in the cracks of a building's foundation, the slumps in pavement. To read landscape is also to anticipate the possible, to envision, choose, and shape the future: to see, for example, the connections between buried, sewered stream, vacant land, and polluted river, and to imagine rebuilding a community while purifying its water.

The West Philadelphia Landscape Project

For nearly thirty years, I have worked in and studied Mill Creek, both the neighborhood and the larger watershed: first, from 1987-1991, as part of a larger landscape plan and "greening" project for West Philadelphia; then, since 1994, as the primary focus of my research. A key proposal of the West Philadelphia Landscape Project from the 1980s on has been to manage Mill Creek's buried floodplain as part of a broad approach to planning the city's watersheds to reduce combined sewer overflows and restore water quality and as a strategy to secure funds to rebuild the neighborhood (Spirn, 1991). The proposal calls for detaining stormwater runoff on low-lying vacant blocks in Mill Creek in order to eliminate combined sewer overflows from the watershed. It is not feasible to bring the creek back above ground; it is now a sewer that carries waste as well as storm water, but its presence as a green ribbon of parks and play fields would recall the creek, protect houses from flooding, and provide local open space for a variety of public and private uses. Even in 1987, this was not a radical proposal, but an application of well-accepted watershed-planning practice to an urban watershed.

By the end of the first phase of the West Philadelphia Landscape Project in 1991, my students, colleagues, and I had made proposals for the strategic reuse of vacant urban land in the Mill Creek watershed and had designed dozens of gardens (Spirn & Pollio, 1990, Spirn et al., 1991). During the first phase of the project (1987-1991), and for years following, I had hoped to convince the City Planning Commission and the Philadelphia Water Department that the buried creek was both a force to be reckoned with and a resource to be exploited, but, when the City's *Plan for West Philadelphia* was published in 1994, it failed to mention the buried

floodplain and the hazards it posed. That same year, the City donated a large parcel of vacant land for the construction of subsidized housing for first-time, low-income homeowners. This latter project was especially troubling, for the site was on the buried floodplain.

When the West Philadelphia Landscape Project began in 1987, I did not intend a long-term involvement. However, the City Planning Commission's disregard for the health, safety, and welfare of Mill Creek residents renewed my commitment. It also prompted new realizations that both sharpened and enlarged the questions my research sought to answer. Confronted with skepticism about the existence and dangers of the buried floodplain, I began to understand this resistance as a form of illiteracy – an inability on the part of public officials, developers, and even Mill Creek residents themselves to read the landscape.

I organized my teaching and research to explore these issues. From 1994-2001, students in my classes at the University of Pennsylvania and at the Massachusetts Institute of Technology analyzed the urban watershed, demonstrated how storm water could be collected in landscape projects that are also stormwater detention facilities, and created designs for wetlands, water gardens, and environmental study areas on vacant land in the Mill Creek neighborhood. When the West Philadelphia Landscape Project website was launched in early 1996, it featured the database, reports, and projects built from 1987-1991. Since then, it has been a showcase for ongoing work (www.wplp.net).

To reach a broad spectrum of the Mill Creek population, my students and I launched a program with a public school in the Mill Creek neighborhood. What began as a community-based, environmental education program organized around the urban watershed grew into a program on landscape literacy and community development. From 1996-2001, hundreds of children at Sulzberger and students at the University of Pennsylvania, learned to read the neighborhood's landscape; they traced its past, deciphered its stories, and told their stories about its future, some of which were built. The tools they used were their own eyes and imagination, the place itself, and historical documents such as maps, photographs, newspaper articles, census tables, and redevelopment plans. The program had four parts: reading landscape, proposing landscape change, building landscape improvements, and documenting these proposals and accomplishments. The first two parts were incorporated into university and middle-school curriculum during the academic year; all four were integrated in a four-week summer program.

The school's front doors look out on the high ground of the old floodplain terrace and face a small neighborhood of homes around a local community garden. The cafeteria and gym in the lower level are on the buried floodplain, so is the playground and, across the street, the Mill Creek Housing Project (now demolished). I was warned that Sulzberger was shunned by many teachers in the Philadelphia School District; its reputation seemed to stem from the students' weak performance on standardized tests (among the worst of middle schools in the city) and by the fact that the neighborhood had a dangerous reputation. Like the residents of Mill Creek, all the students (and most teachers) were African American. At the start of the first year of the expanded program in fall 1996, a Sulzberger teacher told me that her students called their neighborhood "The Bottom." So they already know it's in a floodplain? "No, they mean it's at the bottom." Both meanings of the word can be read in the area around the Sulzberger Middle School: standing water after rain; slumping streets and sidewalks; vacant house lots, rubble-strewn; whole square blocks of abandoned land, men standing around street corners on a workday afternoon, jobless.

The school's environmental curriculum treated at length such topics as tropical rain forests and exotic wildlife, while issues of local importance like watersheds and plant succession received scant attention or none at all. One popular science teacher took students once a year to an environmental study center in the suburbs to see and study "Nature." To change the teachers' and students' perceptions that the Mill Creek landscape was divorced from the natural world was quite a challenge. It was equally hard to persuade students that the neighborhood had ever been different or that it might be changed. When my students spoke of designs for change, the children told them all the reasons the proposals would fail. "It won't happen." "Someone will wreck it." Studying the history of the neighborhood proved to be the key that unlocked the students' imagination.

"You mean, there really was a <u>creek</u>!?" a thirteen-year-old exclaimed in April 1997 as she examined a photograph from 1880 showing stream, mill, workmen dwarfed by the huge sewer they were building, and new rowhouses in the distance. This breakthrough in her understanding came six months into the Mill Creek Project. The catalyst was a series of weekly classes taught by students in my seminar. Each of my students led a group of six or seven 12-13 year olds in a series of six 90-minute workshops. The sessions focused on particular time periods. My students brought in texts, tables of statistics, maps, and photographs, and then

asked the eighth-graders to describe and compare them. To help the children draw out meanings from the documents, they posed successive questions. By breaking up big questions into smaller questions to which the students could find answers, my students led them to develop a hypothesis and then to find further evidence to support it. Only after the children had identified potential explanations for what they had observed, did my students relate background information that they had gleaned from their own reading and from our seminar discussions. The idea was to encourage the children to form the habit of looking for significant detail, framing questions, and reasoning out possible answers. The goal was that, after reading these documents describing the history of their neighborhood, the students would transfer this process to the reading of the landscape itself.

The Sulzberger students' interest intensified as the time period under discussion got closer to the present. During one class, they compared maps from 1872, 1886, 1895, 1910, and 1927, which showed the rapid development of the neighborhood, and looked at photographs of the construction of the Mill Creek sewer. The class on the period from 1930 to 1970 was a turning point. My students were apprehensive, for they anticipated that the Sulzberger students would be angry to learn about the effects of redlining and urban renewal on the neighborhood. They asked the children to play the role of a neighborhood council in 1961; each group was a subcommittee charged with investigating an important issue. The groups presented their findings to the entire class and recommended actions to be taken, which then were discussed and voted on. One group investigated the origins of the 1961 cave-in and what was being done to prevent future catastrophes. They read newspaper articles, studied maps and photographs, and learned that the cave-in was one of many that had occurred along the Mill Creek sewer since the 1930s. A second group reviewed Louis Kahn's *Redevelopment Plan for Mill Creek* and his design for Mill Creek Public Housing (Kahn, 1954). They were particularly impressed to learn that Kahn was a famous architect. The students marked up a copy of Kahn's plan and coded it with different colors to illustrate their recommendations that the neighborhood council should support some features and oppose others, such as the construction of high-rise apartment blocks and the conversion of many through-streets to cul-de-sacs.

A third group looked into how homeowners and small businesses might obtain loans for mortgages and improvements. This group read the Home Owners Loan Corporation (HOLC) criteria for rating neighborhoods and studied the maps of Mill Creek in the *Philadelphia Real*

Property Survey of 1934, which showed every block, except for a few occupied by cemeteries and schools, as highest risk, and learned the meaning of redlining. The students' response to the HOLC report, maps, and lending practices surprised me. They showed no anger. Instead, their faces registered surprise, then relief, then determination to come up with an effective response: a city-wide march on city hall, a petition, and the establishment of a community bank.

The students' energy carried over into the next class, which focused on the present and planning for the future. Staff members from the West Philadelphia Empowerment Zone and the City Planning Commission and two gardeners from Aspen Farms visited the class. Sulzberger students asked the planners: "Why did you let those new houses be built on the buried floodplain? Did you warn the people who bought them?" "What are you doing about the Mill Creek sewer?" "What have you done about redlining?" "Why haven't you started a community bank?"

Landscape literacy entails more than reading, it means shaping landscape also. Each student made a proposal for how the creek might be transformed from a liability into a neighborhood asset. The essays and drawings were published at the end of the school year in a booklet with one-sentence reviews by the Mayor of Philadelphia, city councilmen, among others.[10] At the end of April, the Sulzberger students, together with their Penn mentors, gave a public presentation on the history of Mill Creek, illustrated with slides and posters, at a symposium held at the University of Pennsylvania.

At the beginning of the semester, Sulzberger students described their neighborhood in negative terms and said they would not live in Mill Creek if they had a choice. Only one student said she planned to attend college. Two months later, all but one student said the planned to attend college. The teacher reported that his students' performance in all subjects had improved dramatically. He attributed this to the Mill Creek Project: to the way that primary materials challenged and made history real for the children and to their growing perception of how their own lives and landscape were related to the larger city, region, and nation.

Teaching and studying the history and landscape of Mill Creek also caused learning to become real for my students. Most were unprepared for what they observed: the sheer extent of devastation in the Mill Creek landscape, for example, and the high level of intelligence among

the children. My students' weekly journals revealed their evolving understanding of nature, race, and place. After several visits to Sulzberger, many acknowledged their surprise that some of the Sulzberger students were smarter than they, and this led them to reflect on their own prejudice and privilege. They also reported that their experiences in Mill Creek challenged the assumptions and theories asserted by texts that they were reading for other courses.

The culmination of the year was a four-week summer program for Sulzberger students and teachers organized and led by my research assistants. In the mornings, the group met either at the community garden a block away, where they built a water garden and an outdoor classroom, or at Sulzberger, where they constructed a topographic model of the Mill Creek watershed and learned how to create a website. Two Sulzberger students from the eighth-grade class worked as junior counselors in the mornings and, in the afternoons, as research assistants at the university, where they wrote, illustrated, designed, and produced "SMS News," a series of webpages that were posted on the West Philadelphia Landscape Project website (www.wplp.net). The four Sulzberger teachers also spent afternoons at the university; one research assistant taught them web-authoring and how to use GIS (geographic information systems) software to map the neighborhood. At the end of the summer, one of these teachers was appointed to head the school's new computer program.

The computer teacher created an after-school computer club, and worked with the staff of Penn's Center for Community Partnerships to secure grants for the purchase of equipment and software. Within two years, members of the computer club were taking apart and building computers and writing computer code to adapt commercial software.

From 1998, Sulzberger Middle School and the Mill Creek Project received increasing local, national, and international recognition. The Sulzberger portion of the West Philadelphia Landscape Project website led Pennsylvania's governor to invite students from Sulzberger to make a five-minute presentation as part of his 1998 Budget Speech to the State Legislature; the students' presentation was televised, as was the legislature's response, a long, standing ovation. Later that year, the Philadelphia School District named Sulzberger "School of the Month" and produced a television documentary on the Mill Creek Project and the school's innovations. In 1999 Sulzberger was the subject of a report on NBC Evening News, a national television program. In 2000, President Bill Clinton visited the school.

Recognition for the Mill Creek Project and for Sulzberger teachers and students opened doors to other collaborations. In 1999, the Mill Creek Coalition, a group of neighborhood organizations, invited me to speak to their group about the creek and its impact on the community, and we embarked on a series of joint projects, including research on flooded basements and a course for residents on the history of Mill Creek's landscape.[11] From 1996 to 1999, there were over a million visits to the West Philadelphia Landscape Project website from more than 90 countries on six continents. Among those who visited were public officials. In fall 1996, staff of the US Environmental Protection Agency's regional water division, who were increasingly concerned about combined sewer overflows in Philadelphia, invited engineers at the Philadelphia Water Department to meet with me to discuss the potential of stormwater detention to reduce this type of pollution. In 1999, staff from the Philadelphia Water Department's newly-formed Office of Watersheds asked me to take a group of engineers on a field trip to Mill Creek. With nineteenth-century maps in hand, we walked and drove along the buried floodplain and looked at potential sites for stormwater detention projects. An immediate outcome of this trip was the decision to design and build demonstration projects associated with Sulzberger, which would detain stormwater and also function as an outdoor classroom for the school. The Water Department got a grant to fund the project in 2000 and pledged to work with teachers and students at Sulzberger. They hired one of my research assistants to work on the project and, in 2001, co-sponsored the summer program on the urban watershed with Sulzberger Middle School.[12] Later that year, the Philadelphia Water Department, Philadelphia Housing Authority, and the Philadelphia City Planning Commission submitted a proposal for $34.8 million to the US Department of Housing and Urban Development's Hope VI Program in order to redevelop Mill Creek Public Housing as a demonstration project that would provide an environmental study area for the school and integrate stormwater management measures to reduce combined sewer overflows. The proposal was successful, and the City cleared the site in November 2002 and broke ground in August 2003 on the project.

In 2001, I was confident that things were going well for Mill Creek. I had moved from the University of Pennsylvania to the Massachusetts Institute of Technology in fall 2000 and continued to work with teachers at Sulzberger. In 2002, the computer teacher at Sulzberger visited MIT in order to lay plans for further collaboration. Then, a few months later, the

Commonwealth of Pennsylvania took control of the Philadelphia School District and granted responsibility for the management of Sulzberger, among other schools to Edison, Inc., a corporation headquartered in New York. After trying to work with corporation staff that summer, the computer teacher and the other key teacher in the Mill Creek Program resigned in protest at certain new policies. In 2004, I learned that the water department's demonstration project in Mill Creek would not be built as envisioned. New houses would be built, but the program to integrate stormwater management to improve water quality was curtailed as was the collaboration with Sulzberger.

Putting Mill Creek on the map and keeping it there is not easy, whether the buried creek itself, the neighborhood, or the people who live there. Confronting these failures, I remembered the children's initial skepticism about prospects for change: "It won't happen....Someone will wreck it." Ten years later, in 2012, the Sulzberger teachers were still angry. "Things were going so well with this project…that we became part of the national spotlight," one teacher remembered. Why then, he reflected, was the school's Mill Creek Project abandoned and not replicated?[13] Why indeed.

Education, poverty, crime, transportation, housing: "There's no money in America in the 21st century to deal with those things," observed Howard Neukrug, who founded the Office of Watersheds in 1999 and was appointed Philadelphia Water Commissioner in 2011. "But, there is this money that we're spending to improve the quality of water…For whatever reason, as a nation, we've prioritized combined sewer overflows."[14] With the US Environmental Protection Agency threatening to levy major fines on the city for polluting water, Neukrug persuaded the Philadelphia Water Department to embark on a visionary plan for reducing combined sewer overflows using green infrastructure: *Green City, Clean Waters: Combined Sewer Long Term Control Plan Update* (2009). *Green City, Clean Waters* is now recognized as a national landmark of policy, planning, and engineering. It calls for reducing impervious surfaces in the city by 30% by 2020 in order to capture the first inch of rain to fall in a storm. If the plan works, it will save the city billions of dollars and has the potential to provide many other benefits, including jobs, education, and neighborhood development. But will it work (physically), and can it be done (economically, politically)?

To help test and refine Philadelphia's plan, in 2010 and 2011, my MIT students studied the ultra-urban Mill Creek Watershed from the headwaters of Mill Creek to its mouth and

found that mistakes of the past persist even as this visionary plan is put forward. Ironically, over the past decade, the City of Philadelphia built new houses on former vacant land in the Mill Creek neighborhood, including many on the buried floodplain of Mill Creek. The strong pattern of vacant land on the buried floodplain is no longer as clear as it was, and the opportunities for addressing the City's combined sewer overflow problem there have been diminished. Furthermore, few residents of the inner-city neighborhoods along the buried creek know about *Green City, Clean Waters*, and they lack the former Sulzberger students' landscape literacy. They do not read the intertwined stories their landscape tells of buried creek, undermined foundations, abandoned houses, vacant land, and community gardens. Without grasping those stories, it is difficult to envision how new landscapes might rebuild the neighborhood while purifying the city's water. During their fieldwork in the Mill Creek watershed, my students encountered many questions from residents who were curious about what they were doing. When the students described the *Green City, Clean Waters* program, people were skeptical. "No jobs, no hope," one man told them. His response inspired them to propose a program that connects low-income communities with "green-collar" jobs through education, job-training, and the construction of local prototypes.

Landscape Literacy, Environmental Justice, and City Planning and Design

Mill Creek is shaped by all the processes at work in inner-city America. The neighborhood was laid waste by the flow of water and capital and the violence of redevelopment and neglect. The correlation of a buried creek with deteriorated buildings and vacant lands in inner-city neighborhoods is not unique to Philadelphia; similar situations are found in Boston, New York, St. Louis, and many other American cities (Spirn, 1986 and 2000). Mill Creek is typical of many American inner-city neighborhoods where the residents are predominantly low-income people of color. Known locally as "The Bottom," it is one of many such bottoms, hollows, and flats in the US (Moga, 2010). They are at the bottom, both economically, socially, and topographically. Here, harsh socio-economic conditions and racial discrimination are exacerbated by health and safety hazards posed by a high water table and unstable ground.

Despite such conditions, the landscape and population of these communities embody resources as well as problems. In Mill Creek, the resources are many and varied. Flourishing

community gardens demonstrate the energy and determination of the gardeners who reclaimed them from abandoned lots; flowers planted along the sidewalk and bags of vegetables offered there express the gardeners' generosity. Blocks of homes with furniture on porches, with identical flower boxes, and with newly planted street trees are signs of existing social networks. Inside local schools, the drawings, models, and essays that decorate the halls speak of young people's intellect and vision. Even vacant blocks and the buried floodplain are potential resources. To recognize resources is not to deny the problems but to see each in the context of the other.

Twenty years ago, I thought that the worst effect of landscape illiteracy was to produce environmental injustice in the form of physical hazards to health and safety. The Sulzberger students showed me that there is an even greater injustice than inequitable exposure to harsh conditions: the internalization of shame for one's neighborhood. This is a particularly destructive form of injustice. To feel both at home in a place and ashamed of it is harmful. It saps self esteem and can engender a sense of guilt and resignation. Before the students at Sulzberger Middle School learned to read their landscape more fully, they read it partially. Without an understanding of how the neighborhood came to be, many believed that the poor conditions were the fault of those who lived there, a product of either incompetence or lack of care. Learning that there were other reasons sparked a sense of relief. Once they had the knowledge and skill to read the landscape's history, they began to see their home in a more positive light, came to appreciate the effort and vision that places like Aspen Farms represent, and to regard some adults, like the gardeners, as heroes. They came to consider the possibility of alternative futures and brimmed with ideas. Secure in their knowledge and their ability to reason, they challenged public officials with confidence and impressed them with articulate proposals. To read and shape landscape is to learn and teach: to know the world, to express ideas and to influence others.

Verbal literacy – the ability to read and write – is commonly acknowledged as an essential skill for the citizen to participate fully and effectively in a democratic society. Teaching literacy became a cornerstone of the American civil rights movement of the 1950s and 1960s. The "Citizenship School," which began as a means to increase voter registration through the promotion of literacy, evolved into a forum for discussion and catalyst for political action (Horton and Freire, 1990). When, in 1999, I first read about Myles Horton's work with

civil rights activists and Paolo Freire's with adult literacy programs in Brazil, I was struck by the many parallels to my experience with landscape literacy in Mill Creek.

Freire designed literacy programs that were tailored to what he calls the "word universe" of the learners. To extract the words specific to the universe of particular people and places and as a preparation for *reading* the word, he employed images of the surroundings. He found that "decodifying or reading the situations pictured leads [people] to a critical perception of the meaning of culture by leading them to understand how human practice or work transforms the world" (Freire and Macedo, 1987, p. 36). He believes that people should learn to read in the context of the "fundamental moments of their common history" and proposes that texts of local history be created for that purpose from transcripts of taped interviews with older inhabitants (Freire and Macedo, 1987, p. 45). In *Literacy: Reading the Word and the World*, Freier and Donaldo Macedo describe literacy as a form of cultural politics that either "serves to reproduce existing social formations" or "promotes democratic and emancipatory change" (Freire and Macedo, 1987, p. 141) They assert that knowledge of the world is a precondition for literacy and that understanding and transforming the world should be its goal. Reading, they say, "always involves critical perception, interpretation, and the *rewriting* of what is read" (Freire and Macedo, 1987, p. 36). Macedo suggests that "emancipatory literacy" has two dimensions: "On the one hand, students have to become literate about their histories, experiences, and the culture of their immediate environments. On the other hand, they must also appropriate those codes and cultures of the dominant spheres so they can transcend their own environments" (Freier and Macedo, 1987, p. 47).

Studying their neighborhood's natural and built features brought the place alive for the Sulzberger students. The understanding of their own landscape also opened wider vistas. It introduced them to broader social, political, and environmental issues and promoted other learning. In Freire's terms, it enabled the "students to develop a positive self-image before grappling with the type of knowledge that is outside their immediate world....It is only after they have a grasp on their world that they can begin to acquire other knowledge" (Freier and Macedo, 1987, p. 128).

Like verbal literacy, landscape literacy is a cultural practice that entails both understanding the world and transforming it. One difference between verbal literacy and landscape literacy, however, is that many professionals responsible for planning, designing,

and building the city are not landscape literate. After six weeks' investigation into the history of their neighborhood, the children were more literate than many professionals, and some of their proposals for the neighborhood were more astute. To be literate is to recognize both the problems in a place and its resources, to understand how they came about, by what means they are sustained, and how they are related. Landscape literacy is a prerequisite for what Randolph Hester has called "ecological democracy," which emphasizes people's "direct, hands-on involvement" in building community where "actions are guided by understanding natural processes and social relationships" within their own locality as well as in a larger environmental context (Hester, 2010, p. 4).

Landscape literacy should be a cornerstone of community development and of urban planning and design. To plan prudently is to transform problems into opportunities and liabilities into resources, and to intervene at an appropriate scale. To design wisely is to read ongoing dialogues in a place, to distinguish enduring stories from ephemeral ones, and to imagine how to join the conversation. The stakes are high for those who must live in the places professionals help create. Like literacy, urban planning and design are cultural practices that can either serve to perpetuate the inequities of existing social structures or to enable and promote democratic change.

Acknowledgements

This chapter is a substantial revision of two prior publications; each of these essays tells the story of West Philadelphia's Mill Creek with a slightly different emphasis. The first, "Restoring Mill Creek: Landscape Literacy, Environmental Justice, and City Planning and Design," was published in *Landscape Research* (July 2005) and reprinted in *Justice, Power, and the Political Landscap*e, edited by Kenneth Olwig and Don Mitchell (Routledge, 2009). The second, "Restoring Mill Creek: Landscape Literacy, Environmental History, and City Planning and Design," expanded on the history of Mill Creek and described developments between 2005 and 2011; it was published in *Nature's Entrepot: Philadelphia's Urban Sphere and Its Environmental Thresholds*, edited by Brian Black and Michael Chiarappa (University of Pittsburgh, 2012). The current version is shorter and places the Mill Creek work in the context of ideas of nature and Randolph Hester's idea of ecological democracy. Many debts are incurred during a project of such long duration, and it is impossible to acknowledge them all

here. The West Philadelphia Landscape Project website (http://www.wplp.net) lists sponsors and participants. The initial support of the J.N. Pew Charitable Trust from 1987-1991 made possible the foundation from which all later activities grew. Without the support of the Netter Center for Community Partnerships at the University of Pennsylvania, the work with Sulzberger Middle School would not have been possible: http://www.nettercenter.upenn.edu. For copies of publications about the West Philadelphia Landscape Project and to see photographs, plans, designs, course syllabi, and videos, visit www.annewhistonspirn.com and www.wplp.net.

References

Ferrick, T. (1997, September 15). "Graying homeowners, a new city woe," *Philadelphia Inquirer*.

Freire, P., and Macedo, D. (1987). *Literacy: Reading the word and the world*. South Hadley, MA: Bergin & Garvey.

Gans, H. (1962). The urban villagers. New York: Free Press.

Glazer, N. (2007). From a cause to a style: Modernist architecture's encounter with the American city. Princeton, NJ: Princeton University Press.

Hayden, D. (1995). The power of place: Urban landscape as public history. Cambridge, MA: MIT Press.

Hester, R. (2010). *Design for ecological democracy*. Cambridge, MA: MIT Press.

Hillier, A.E. (2003). "Spatial analysis of the historical redlining: A methodological approach," *Journal of Housing Research 14* (1), pp. 137-167.

Hillman, H. (1997). "Urban redevelopment and the Mill Creek neighborhood: 1930-1975." Unpublished paper for Urban Studies 320. Water, Schools, and History, University of Pennsylvania.

Horton, M., & Freire, P. (1990). *We make the road by walking: Conversations on education and social change*. Philadelphia: Temple University Press.

Jackson, K. (1985). *Crabgrass frontier*. New York: Oxford University Press.

Jacobs, J. (1961). Death and life of great American cities. New York: Random House.

Levine, A. (2012). "The grid versus nature: The history and legacy of topographic change in Philadelphia." In Brian Black and Michael Chiarappa (Eds.), *Nature's entrepot*. Pittsburgh, PA: University of Pittsburgh Press, pp. 139-159.

Lynch, K. (1964). Image of the city. Cambridge, MA: MIT Press.

Lynch, K. (1981). A theory of good city form. Cambridge, MA: MIT Press.

Mathur, A. & da Cunha, D. (2001). Mississippi floods: Designing a shifting landscape. New Haven, CT: Yale University Press.

Mathur, A. & da Cunha, D. (2009). Soak: Mumbai in an estuary. New Delhi: Rupa.

Moga, S. T. (2010). *Bottoms, hollows, and flats: Making and remaking the lower section of the American city* (Doctoral dissertation). http://hdl.handle.net/1721.1/62137.

Olwig, K. (1996). "Recovering the substantive nature of landscape." *Annals of the Association of American Geographers* 86 (4), pp. 630-53.

Orr, D. W. (1992). *Ecological literacy: Education and the transition to a postmodern world*. Albany, NY: State University of New York Press.

Kahn, L. (1954). *Mill Creek redevelopment area plan*. Philadelphia, PA: Philadelphia City Planning Commission.

Rome A. W. (2001). *The bulldozer in the countryside*. New York: Cambridge University Press.

Spirn, A.W. (1984). *The granite garden: Urban nature and human design*. New York: Basic Books.

Spirn, A.W. (1986). "Landscape planning and the city." *Landscape and Urban Planning 13*, pp. 433-441.

Spirn, A.W., & Pollio, M. (1990) "*This garden is a town*." Philadelphia: Department of Landscape Architecture, University of Pennsylvania. http://www.annewhistonspirn.com/pdf/spirn-wplp-garden_town

Spirn, A.W. (1991). *The West Philadelphia landscape plan: A framework for action*. Philadelphia: Department of Landscape Architecture, University of Pennsylvania. http://www.annewhistonspirn.com/pdf/spirn-wplp-plan.pdf

Spirn, A.W., Pollio, M., & Cameron, M. (1991) *Vacant land: A resource for reshaping urban neighborhoods*. Philadelphia: Department of Landscape Architecture, University of Pennsylvania. http://www.annewhistonspirn.com/pdf/spirn-wplp-vacant_land.pdf

Spirn, A.W. (1997). "The authority of nature." In J. Wolschke-Bulmahn (Ed.), *Nature and ideology*. Washington, DC: Dumbarton Oaks. http://www.annewhistonspirn.com/pdf/nature.pdf

Spirn, A.W. (1998). *The language of landscape*. New Haven, CT: Yale University Press.

Spirn A. W., & Ott, C. (1998, January 8). "Tracing the past, shaping the future: Urban redevelopment and West Philadelphia's Mill Creek." Paper presented at the American Historical Association Annual Meeting, Washington, DC.

Spirn, A.W. (2000) "Reclaiming common ground: Water, neighborhoods, and public spaces." In R. Fishman (Ed.), *The American planning tradition*. Baltimore, MD: Johns Hopkins University Press. http://www.annewhistonspirn.com/pdf/reclaiming-common-ground.pdf

Spirn, A. W. (2011). "Ecological urbanism." In T. Banerjee and A. Loukaitou-Sideris (Eds.), *Routledge Companion to Urban Design*. New York: Routledge. Revised version: http://www.annewhistonspirn.com/pdf/Spirn-EcoUrbanism-2012.pdf

Williams, R. (1983). *Keywords: A Vocabulary of Culture and Society*, rev. ed. New York: Oxford University Press.

Notes

[1] For nearly thirty years, I have asked my students (the majority are North American, with many others from South America, Asia, Europe, and the Middle East) for their personal definition of nature. Their responses have included the following. Nature was given as a trust to humans by God. Nature is trees and rocks, everything except humans and the things humans make. Nature is a place where one cannot see the hand of humans, a place to be alone. Nature consists of creative and life-sustaining processes which connect everything in the physical and biological worlds, including humans. Nature is a cultural construct with no meaning or existence outside human society. Nature is something that cannot be known. Nature is sacred. Nature is God.

[2] Ecological democracy, as defined by Hester, combines participatory and ecological approaches to design with the goal of creating places that are memorable, healthy, equitable, and well adapted to their natural environment (Hester, 2010).

[3] The idea of landscape literacy builds upon, but is distinctly different from the idea of environmental legibility as developed by Kevin Lynch (1964 and 1981) and others. It also differs from ideas of environmental or ecological literacy (Orr, 1992), primarily in its emphasis on human as well as natural history, on landscape language as a medium of action and expression, and its relevance to other issues beyond sustainability.

[4] This chapter draws from 27 years of fieldwork and of scholarly and participatory action research associated with the West Philadelphia Landscape Project, which I have directed since 1987. Sources include: historical documents such as census records, maps, plans, photographs, and newspaper articles; GIS maps, including the overlay of diverse data, such as topography, income, and vacant land; photographic documentation; interviews;

direct observation. Given the scope of the project and the limited length of this essay, it is impossible to cite the diverse evidence and many sources for the arguments made here. More detailed citations will be documented in my book-in-progress, with the working title, *Top-down/bottom-up: Restoring nature, rebuilding community, empowering youth*.

[5] See, for example, Jane Jacobs (1961), Herbert Gans (1962), and Nathan Glazer (2007). Protests to urban redevelopment in US cities in the 1950s and 60s gave rise to new approaches to participatory design and planning. See http://engagingcommunity.mit.edu for an overview of models, methods, and literature. For a critique of and alternatives to conventional mapping, see, for example, Mathur & da Cunha (2001 and 2012).

[6] Parts of Philadelphia recently experienced a modest population growth, but most neighborhoods in the city continued to lose population between 2000 and 2010.

[7] The history of the Mill Creek neighborhood was presented in Spirn and Ott (1998).

[8] These newspaper articles were collected and compiled in spring 1997 for my seminar at the University of Pennsylvania, "The Power of Place: Water, Schools, and History" (Hillman, 1997)

[9] US Census of 1880, Enumeration District 504 (handwritten census tables for the Mill Creek neighborhood document the age, race, occupation, health, and birthplace for all residing at each street address).

[10] *Power of Place: Essays about Our Mill Creek Neighborhood*. The texts and drawings of this report are on the WPLP website, as are the reflections of Sulzberger teacher Glen Campbell: http://web.mit.edu/wplp/sms/pub.htm. The name of the course was inspired by Dolores Hayden's book *Power of Place* (1995), which was required reading for the course.

[11] A description of these activities is of the WPLP website at http://web.mit.edu/wplp/project/mccoal.htm and http://web.mit.edu/4.243j/www/wplp/s-cornitcher.html.

[12] Sarah Williams reflects on that experience fourteen years later in two videos, *Green City, Clean Waters* (2014) and *Coming Full Circle* (2014). In 2012 I began to record oral histories from people who have participated in the West Philadelphia Landscape Project over the past twenty-seven years. Among those interviewed were research assistants, like Sarah, as well as teachers and children (now 30 years old) from Sulzberger Middle School, and the Philadelphia Water Commissioner. What they told me was revelatory. Hear their stories in multimedia videos at www.wplp.net/stories.

[13] Donald Armstead, personal communication, August, 2012. See three teachers' reflections in the video, *When Learning is Real* (2013) at www.wplp.net/stories.

[14] Howard Neukrug, personal communication, August 8, 2012. See *Green City, Clean Waters* at www.wplp.net/stories. The Clean Water Act of 1972 (amended in 1977 and 1987) gave the US Environmental Protection Agency the power to enforce water quality standards.