

*Environmental Art as Eco-cultural Restoration*LILLIAN BALL WITH TIM COLLINS, REIKO GOTO,
AND BETSY DAMON*

Many artists concerned with the environment have created interventions dependant on the restoration of ecosystems. These artists not only comment on environmental issues, they also intercede to halt degradation and nurture environmental health. They are passionately involved in processes that restore a variety of ecosystems worldwide. They question assumptions about what is possible, and they work with scientists, government officials, and planners to bring their visions to fruition. These works aim to escape the confines of the “white box” to implement sustainable principles and actually influence policy. This chapter presents three projects that invited public interaction by initiating community projects. All have significant human dimensions of creativity and interaction within a restoration setting.

Although I have been an artist for thirty years, when I started activist efforts for wetland preservation and restoration seven years ago, art just seemed superfluous. It gradually dawned on me that the only artwork one could make had to concentrate on environmental issues. I had become an eco-artist, joining others who had been working this way, in many cases, for decades. The underlying concepts of science and community values had become indispensable to the success of any visual object. Quoting from the ecoartnetwork.org, this type of work “focuses attention on the web of interrelationships in our environment—the physical, biological, cultural, and historical aspects of ecological systems.” These working methods reflect principles of “Social Sculpture” established by Joseph Beuys, an artist and one of the founders of the German Green Party in the 1970s. His ideas about community involvement and activism used art as a vehicle—a concept now echoed by many eco-artists worldwide.

In 2007, I curated an exhibition entitled, “Called to Action: Environmental Restoration by Artists” at ArtSites Gallery in Riverhead, New York (Ball 2008). The exhibit included the work of twelve artist teams, collectives, or individuals. That exhibition and the roundtable discussion on opening day presented a wonderful opportunity to

*Lillian Ball introduces this chapter, which describes three projects wherein artists interact with the environment and the community in a restoration setting. Project authors are Tim Collins and Reiki Goto (Project I), Betsy Damon (Project II), and Lillian Ball (Project III).

see and acknowledge the restoration work done by other artists and to learn what strategies have been most effective.

Tim Collins and Reiko Goto's work from the 3 Rivers 2nd Nature project in Pittsburgh, Pennsylvania, was included in that exhibition. They showed a series of photos of a temporary "sand painting," done in the manner of Tibetan monks, from painstaking application to the final return of the sand to the river. Tim and Reiko created aerial views of the 3 Rivers area with colored sand in exquisite, minute detail. The artists spent five years on the project, working to reveal the forgotten realities and to redefine the emergent ecological values of the region. The result was a unique preservation, conservation, and restoration plan, prepared with, and developed for, citizen action.

While I was unaware of Betsy Damon's work when I was planning the exhibit, I soon heard how she had designed six acres of wetlands to restore the urban water quality of the Fu and Nan Rivers in Chengdu, China. Her Living Water Gardens are remediation systems that restore polluted rivers and canals using a concept called solar aquatics. Her designs incorporate wetland plants to clean the water, while sculptural forms aerate it. Her works also include public participation to educate local citizens.

In my own work, the GO ECO and GO Doñana interactive installations about wetland restoration engage players with informational videos that address issues in coastal areas around the world. While the WATERWASH(tm) prototype presented here is designed specifically for the Mattituck Inlet, its ecological principles of stormwater remediation can also apply to many waterfront locations.

A quote by Herbert Marcuse (1979) seems apropos here: "If art can't change the world, it can change the consciousness and drives of the women and men who would change the world." The very fact that these projects showcased here were accomplished with the cooperation of government entities establishes that these artistic processes do work, and they result in an engaging format. Although the path to completion may not be easy, the specific gifts of some artistic personalities lend themselves to this way of working. Tenacity is built in for those accustomed to a life choice requiring substantial sacrifices. With determined artists as the lead agents in these collaborative endeavors, there is extra value added—both in improved visual form and in enhanced ecological function.

PROJECT I: 3 RIVERS 2ND NATURE

Intent

The plan of 3 Rivers 2nd Nature (3R2N) was to focus on the idea of green infrastructure as a subject of a research-based, public art practice. The question was, Could artists bring about change in a postindustrial landscape? The methodology focused on aesthetics and integrated, interdisciplinary analysis and public discourse that would lead to a restored "green" infrastructure. Expanding on our specific interests, we focused on how artists can contribute to the recovery of a complex aesthetic of health and vitality. This is an exploration of an aesthetic sense of landscape health following

Nassauer (1997) and Eaton (1997). This extends ideas of integrated subject–object relationships that have been explored by the philosopher of environmental aesthetics, Arnold Berleant (1992).

Aesthetics

The 3R2N team decided to work from the principle that value and care are generated in direct relationship to experience, perception, and the potential for common interest. Our primary approach to experience was through an outreach and River Dialogue program. As part of this program, we would take thirty to fifty people out on the river in large, comfortable, glass-lined catamarans, which are used throughout the region as water taxis. We hired two to three boats for every event, typically twice a year. We also decided to address conceptualization through our expert scientific field reports and innovative maps. It was our hypothesis that these activities had the potential to reconfigure the community's aesthetic perception and valuation of the three rivers that are major features of the Pittsburgh, Pennsylvania, landscape—the Monongahela, Allegheny, and Ohio. The goal was to provide people with “on-the-water” experiences that they may not have had before. The view from any one of these rivers reveals the recovery of the natural landscape at the level of the floodplain and on the surrounding steep slopes that line the river valleys. While the view from the roads adjacent to the rivers remains predominantly postindustrial and architectonic, it is an aesthetic experience that overwhelms the river.

The Public Realm

As we began this initiative we had to develop an understanding of the regulation and oversight of infrastructure and land use, as well as have some familiarity with the individuals that had a vested interest in that regulation. Through work with the scientists, the project team developed a collective understanding of the failure of that infrastructure and its effects on the river ecosystems. We were most interested in the definition of the problem and the range of solutions. Two things were clear. First, there were very few data publicly available to inform decision making. Second, the advocacy and support for clean water and recovering ecosystems in the region were relatively non-existent despite the fact that the Allegheny County Sewage Authority was in a protracted legal battle with the U.S. Environmental Protection Agency to address decades of illegal sewage discharges into the three rivers (Hopey 2007). Furthermore, land-use regulation was not taking into account the recovering landscape ecologies and the long-term environmental and aesthetic potential. These were the fundamental points of public realm engagement for the project team.

Strategic Knowledge

The 3R2N Project (following the earlier Nine-Mile Run model) was designed to address environmental questions through strategic knowledge and platforms for

discourse. Strategic knowledge is information that was previously missing from public discussions; in this case, about land use and environmental protection. Carefully chosen strategic knowledge can transform the operative value systems that inform decision making. When publicly distributed, it has the potential to reinforce democratic process.

The work on 3R2N involved the development of platforms for discourse, in this case, “River Dialogues” with partners. We planned and organized four- to six-hour days, where citizens and decision makers assembled to participate in expert seminars about the rivers, then to experience and discuss the rivers on a boat. Upon returning to the dock, we would all eat together and then assemble around working tables for protracted, recorded, and illustrated conversations about a particular stretch of riverfront (fig. 21.1). Each table had a facilitator, an artist, a planner, a note taker, and one or more “drawers” (i.e., people who encouraged everyone to pick up pencils, pens, and markers) to unpack the day’s experience and record the opportunities and constraints connected to postindustrial use of our regional waterways and waterfront. The record from those sessions appeared in our yearly reports. They became the basis for a regional river trail plan.

Process

In the process of developing this body of work, we discovered that intimate proximity and sustained relationships with rivers, land, and natural systems was an essential pre-



FIGURE 21.1. A promotional postcard for 3R2N eco-art project by Tim Collins and Reiko Goto. (Photo courtesy of the artists)

cept for aesthetic interest and value. For those who enjoyed intimate and regular experience, the opportunity and its aesthetic condition are easily understood; at the same time there is limited understanding of the complex problems that affect these systems. We would argue that problems of natural systems in an urban setting cannot be defined by science alone. Elements of the water problems (e.g., fecal coliform counts as a sewage indicator or benthic organisms as indicators of ecological health), can be defined by science. To define the larger systems problems, the cause of these effects requires an interdisciplinary effort. To visualize it or conceptualize an issue like this, and its positive and negative effects, is a challenge worthy of an art and science collaboration. The questions are: In whose interest shall we labor on these questions? Who pays? Who benefits from the output? For those that manage the systems as infrastructure (water source, coolant, sewer, or sink) for industrial or municipal interest or for the intrinsic value of ecosystems and biodiversity? How about the subordinate recreational users and advocates of the natural elements of the system?

Product and Outcome

The 3R2N project was defined by evolving cultural research programs, the Monongahela Conferences and Residencies. It culminated in the “Groundworks: Environmental Collaborations in Contemporary Art” exhibition and catalogue, curated by Grant Kester (2005). There was also an evolving environmental research and planning program with numerous reports on various ecological issues related to water and land. This concluded with a published study of recovering ecosystems and the policies that constrained them: “Ecology and Recovery—Allegheny County” (Collins et al. 2006).

Critical Evaluation


Many of my friends and colleagues have offered me critical appraisal of the project. Some say that art isn’t intended to “do” anything. Others ask: Why abandon one discipline-specific context for another? Other colleagues felt that we were too far within the system, too deeply invested in the useful when the proper domain of the arts is the antithesis of utility. Indeed, many would claim that the intrinsic value of art is unto itself. Within this critical framework, there isn’t much room for issue-specific environmental art practice. However, Suzanne Lacy (1995) and Grant Kester (2004) do provide essential directions for an emergent critical consciousness that sees the aesthetic in dialogic exchange and discourse.

Conclusion


Our interactions were oriented toward the artistic development of an effective public realm through strategic knowledge and unique platforms for democratic discourse. The work demanded attention to the intellectual vulnerabilities that occur when citizens, decision makers, and art and science researchers come together. The challenge

was defined by a need for shared openness that can only come from strength and confidence in a discursive setting. Art, deeply invested in self-expression, has developed a range of practice that is moving away from the interests of the individual author toward shared creative authorship. This is significantly different in that it distributes responsibility, interest, and effort—at least in theory. Throughout this project, we understood that interest and effort are sustained through the rewards of meaningful experience and a sense of efficacy in participation. Responsibility was tied to a shift in values and care. The history, form, and function of contemporary art remain a mystery to many people today. In *Art's Claim to Truth*, Gianni Vattimo writes that the meaning of art is “the heightening of vital feelings” (Vattimo 1985, 40). The work that we have done on 3R2N is focused on the experiential and conceptual components of an aesthetic/environmental change and its effect on ideas of well-being—one of the many changes to come in this new century. A full set of reports and plans from 3 Rivers 2nd Nature is available for review at <http://3r2n.collinsandgoto.com>.

PROJECT II: LIVING WATER GARDEN



During the 1970s, when the possibility of sustainable design was in the air with Buckminster Fuller's geodesic domes and the *Whole Earth Catalog*, I was in the thick of the New York art world as a performance artist. I saw the performance art I was doing as a way to get people out of the gallery, into the street, and involved with and connected to community. In 1995, my desire to engage the public eventually led to my directing the first public art event for water quality in China. Local artists and I created a large-scale, public effort in Chengdu, Sichuan, to clean the Fu-Nan River. This led to an unexpected opportunity to design a six-acre (2.4-ha) Living Water Garden in Chengdu on the Fu-Nan River. Designed and built between 1996 and 1998, the garden serves as a model for integrating water cleaning, education, and entertainment, and is also an example of the wisdom of Lao Tze, who wrote, “The wise leader solves the problems of water first.” It consists of a seven-stage cleaning system in which sculptural forms aid the cleaning process and fill the park with running water and the motion of water. The form of the garden is a giant fish. In stage one, the eye of the fish is the settling pond, with a thirteen-foot (4-m) diameter, organically shaped, concrete fountain that disperses living water as the pupil. In the next stage, flow forms move the water in a vortex motion, providing aeration and regeneration. For stage three, the “wetlands” (fish scales), which consist of seven plants, microbes, and snails, and three filtering ponds, which are the fish's interior, polish the water before it goes through the tail and back to the river. Completing the sculpture, the steps into the river can be seen as the fish's fins.



My involvement with China began as a tourist in 1989. A biologist I met told me that a water site with strong curative powers would soon be sold. It was called the God Water. In 1993, I returned to China as the director of the nonprofit Keepers of the Waters, and I was determined to visit the God Water site. While visiting the God Water, I learned what water to drink for my heart, liver, or kidneys; where to wash; and where

not to drink. During this trip, I also happened upon an international environmental conference where the Chinese taught me that living water is water that goes up and down the mountain 10,000 times, which means it is highly activated by vortices, filtered, and oxygenated. I was told, for example, that the best water for your heart comes from the center of bamboo. We hatched the idea to do a Keepers of the Waters event on the Yangtze River.

I had no budget, as no foundations would fund a project done in China, but fate intervened in the form of an anonymous phone call that yielded \$15,000. With additional fund raising I returned in 1995 with my new assistant, Kristen Caskey. All of my money—\$23,000 in cash and traveler's checks—was in a money belt around my waist as China did not yet have a banking relationship with the rest of the world. Although I had no official invitation or sponsor, within one week of arriving in Chengdu I was engaged in discussions about the project.

Chengdu had evolved from a quiet city of two million, where remnants of ninth-century Tang Dynasty culture could be found, into a pulsing, urban center of nine million. The air was heavy from the increase of automobile exhaust and factories spewing pollutants. With unchecked sewage spills and larger piles of garbage, the river's stench was unbearable. All fifty-three species of fish had disappeared from the river.

While directing the event, I was contacted by the planning bureau. On a sweltering afternoon in late July, I was picked up at the university guesthouse where we were staying and taken to a quiet street. On the sidewalk outside an old Tang Dynasty pagoda, as a willow tree moved in a gentle breeze over putrid waters, I learned about the plans for Chengdu and the river revitalization—which were exceptional in light of the ecologically destructive design that was, and still is, pervasive in most of the world. The Green Necklace, as they called it, was executed from 1992 to 1997 and included creating twelve miles (19 km) of park along both sides of the rivers, rebuilding the flood walls, moving 100,000 citizens to better housing, and installing the infrastructure for treating the waste of two million people. I suggested that they make a park to show citizens how water could be cleaned using natural means. To my surprise, they asked me if I could do that. To my surprise, I said, yes. I was asked to abandon the public art event and design the park.

I returned to China in 1996 to present ideas for the park. We started with a meeting of fifty people sitting around a long table with the Chinese flags and flowers flowing down the middle. Present were academics, representatives from government bureaus, advisers, and the people's council. Shaking, I sat down next to this patrician-type engineer whom I had met in 1993. He whispered in my ear, "Don't worry, Betsy, you're among friends!" Knowing that there were no landscape architects in Chengdu who would understand my concepts, I had invited Margie Ruddick, a landscape architect, who generously agreed to come help. I had been imagining work like this but had never done anything on this scale. The meeting lasted three hours, then, after a large banquet, we visited a number of potential sites. We were dismissed and told that the bureau would get back to us in a week. Indeed, a week later, they said they would give us the largest piece of inner city land they had for our Living Water Garden.



Next, the officials asked what kind of professional help I needed. I responded that I needed a bioengineer/wetlands person, a landscape design company, and an artist to help me make the sculptures. They appointed the needed people and gave us food and housing but no salaries. The landscape design group assigned to us was the same group that had created a previous, but unaccepted, design. Unfortunately, but understandably, they had a little bit of resentment toward me.

Nonetheless, it turned out to be a collaborative process every step of the way. Haung Shida, the bioengineer, told us that a water cleaning process needed seven steps. Margie and I walked and walked the park site until in the third week she blurted out, "FISH!" and then began to rough out the size of the seven features. I stayed ten weeks, completing the conceptual design and making a model that was sent around the city for citizen response. Our design to remove the floodwalls to create places for fish to feed and to give people access to the river met with great resistance from the senior engineer. Nevertheless, after a very lengthy public and private approval process, I learned through e-mail that the park would be built. Quickly abandoning everything I was doing, I set off for Chengdu. There, I discovered that the blueprints were based solely on the concept plan with few or no accurate details. A two-month trip became a year as we designed the details in weekly meetings. We were the first foreigners to work within the government, and it was not easy. My son, Jon, worked as project director with me and a dedicated staff of four bilingual Chinese. Many Chinese wanted this park to be perfect, and an exceptional dialogue had been initiated with the public. Many people participated in the design, including a forester who persuaded the planning bureau to make a forest with more than one hundred species of plants and trees from nearby Mount Emei.

Construction began in February 1997 and was finished in April 1998. Five different Chinese companies worked together on the project. Halfway through the construction, when I asked directors of the companies if they knew what they were building, unbelievably, they said, "No." This precipitated a twelve-hour meeting that finished with food and dancing. The garden was built without any high technology. The head of construction said to me, "Look Betsy we are going to build this park so it works, we do not have money to make beautiful buildings, but we can make a plan that will be good for 200 years."

There were only two bioengineers in China. Miraculously, one, Huang Shida, was in Chengdu. He tested the wetlands plants and set up a lab overlooking the site to direct the construction for one year. He tested the garden's effluent for a year after completion, finding that the filthy river water was indeed returned to a drinkable quality. I learned after the garden was complete that he had written thirty-four letters to the mayor urging that the garden become a real biological system. I also learned that Zhang Jihai, the special assistant to the mayor, had said that he would risk jail to build the park, although the mayor said that he would not risk jail. That is how the park was built (fig. 21.2).

When we tested the system and it worked, everyone breathed audibly. Yu Guan Yuan, an eighty-three-year-old, revered intellectual and director of the Academy of Social Science in Beijing, asked to be carried around the park because he couldn't walk.





FIGURE 21.2. A portion of Betsy Damon's six-acre (2.4 ha) Living Water Garden in Chengdu, China—an urban space on the Fu-Nan River. (Photo courtesy of Betsy Damon)

He said, “Most people come to make money or take our culture. You’ve given China a future, now you have to do it in Beijing.” I burst into tears. The park was visited by most mayors of major cities and has been copied in various ways around the world. It demonstrates an integrated park design that serves the environment by cleaning water. Kingfishers returned to the site, it is cool and quiet inside the park, and many species have taken up residence in the trees and plants. For ten years it was the center of a national discussion about technology and nature. Now that discussion has changed, and wetlands are promoted, as are eco-solutions. The Beijing Olympic Forest Park has a complete biological water system that Margo Young of the Canadian landscape design company EDM and I designed from 2003 to 2005. Chengdu has become the greenest city in China.

Great generosity and cooperation from many people created the Living Water Garden. A person can now walk along the Fu-Nan River under cooling trees—where a gentle breeze follows the river for miles—finding tea houses, and people practicing tai chi, relaxing, and jogging.

Keepers of the Waters (www.keepersofthewaters.org) invites everyone to learn the principles of integrated living systems design and initiate projects in their community.

PROJECT III: WATERWASHING

Working to have a positive effect as an environmental artist and activist, I have thought long and hard about potential ways to make a difference. How can an appreciation of place engender public involvement? What kind of visual strategies reinforce the scientific values protecting natural spaces? The need for restoration and revitalization of areas challenged by stormwater issues is widespread on Long Island’s North Fork and in waterfront areas worldwide. The WATERWASH concept occurred to me

nearly full blown during a conversation with Mark Terry, principal town planner for Southold, which is a small town in northeastern Long Island, New York. I envisioned a vegetated swale with native plants, permeable pavement, and educational signage explaining the need for non-point-source stormwater management in private and public places. I felt the transformation of neglected spaces into public outreach parks could inspire community involvement with stormwater issues.

Mark called this merger of functional restoration and aesthetics my brainchild. This brainchild was not easy to bring to life, however, especially with an artist as lead agent. It was a continuing process, taking more than two years to complete. Two new WATERWASH projects (WATERWASH ABC on the Bronx River and WATERWASH Goldsmith Inlet) are in the planning stages now and will likely take even longer.

Initially, I had planned to focus on Great Pond and its wetlands, a maritime freshwater interdunal swale area near my home in Southold. In 2005, I led a successful community effort to preserve the area and prevent further development. Subsequently, I was appointed to serve on the town's land preservation committee. Harper Preserve, a twelve-acre site near Great Pond, was the subject of "Leap of Faith," an ecological video installation and my first body of artwork with serious environmental content. The native cranberries (*Vaccinium* spp.) and threatened slender blue iris (*Iris prismatica*) found there provided source material for GO ECO, an interactive, educational tool based on the ancient Asian game of Go. Preservation and restoration processes also helped structure another "serious learning game," GO Doñana, about the UNESCO wetlands south of Seville, Spain (see chap. 6, this volume).

However, the worst stormwater spots around Great Pond were on private property and were not widely accessible for outreach opportunities. I met with the stormwater committee and visited many sites before settling on a town-owned boat ramp on the Mattituck Inlet, which feeds into Long Island Sound. It had a serious grading problem that allowed County Route 48 road runoff to scour ditches alongside the boat ramp, flowing directly into the inlet and washing out the smooth cordgrass (*Spartina alterniflora*) growing there. Common reed (*Phragmites australis*) was overtaking the disturbed shoreline, further degrading the area.

I approached many local scientists and stormwater experts with the WATERWASH(tm) concept and found solid response to my ideas. Previous projects using the ecological restoration approach had proven the validity of low-tech solutions carefully applied to specific stormwater problems. Scientists from Cornell Cooperative Extension, the Natural Resources Conservation Service, and the New York State Department of Environmental Conservation (DEC) Restoration, Stormwater, and Shellfish departments all contributed to developing the site plan and interpretive signage.

Many meetings with town officials and the stormwater committee resulted in only lukewarm reception because there were places with more serious stormwater problems. But there was enough support from the town board to approve our application with its MS4 educational component for a matching grant from the Long Island Sound Study. When we actually received the grant, the challenges intensified. Eventually, the town admitted it could not fulfill its matching obligations in the midst of economic meltdown. Fortunately, Group for the East End (GEE), an environmental

advocacy organization for eastern Long Island, was willing to take over as fiscal sponsor. They were included in the grant proposal originally to provide the native plants and volunteer coordination. They planned to cover costs from nearby Glover Perennials, growers of the native plants, some even from locally collected seed. With a mountain of paperwork and help from the National Fish and Wildlife Foundation assistant regional director, Lynn Dwyer, we were able to switch the federal grant from the town to the GEE. The permitting process was one that challenged my abilities, since the skill to negotiate bureaucracy is rarely found in an artist's toolbox. In addition, I spent a long time researching permeable pavement options and meeting installers to find a company on a similar wavelength. Bob Govanale, owner of Excav Services, has a degree in geology and experience with environmental restoration, so he was not the usual "earth mover." He followed through enthusiastically with all our challenges and agreed to do it, "just this once," for the funds we had budgeted, far less than his usual fee. He also discovered the Filterpave permeable pavement—a new recycled glass material that appealed to us both for several reasons, including the fact that it would allow more varied design opportunities than porous pavers and because it uses glass that would otherwise be landfilled. At a preapproval meeting, the DEC asked us questions about the suggested yearly vacuum maintenance and the flow-through rate that was lower than usually required. Allowances were made considering the entire scope of WATERWASH. After all, it is a total system with three buffer zones beyond the parking area: the vegetated swale, a steel weir adequate to distribute overflow evenly in a five-year storm, and the sizable strip of common reed that would be harvested quarterly. When we actually submitted the paperwork, asking for speedy processing due to grant scheduling, the DEC permit was obtained in record time.

The five-member Southold Board of Trustees, which owns the park and has jurisdiction over all construction within one hundred feet (30.5 m) of the waterfront, also had to issue a permit. Trustee president, Jim King, a lobsterman residing on the inlet, was initially skeptical, thinking it would contribute little to water quality improvement. Although he had seen the drawings and engineering plans, he seemed to have a hard time visualizing the proposal until it was nearly finished. But I persisted in calling him to discuss progress and eventually provoked his participation by incorporating his suggestions into the "Wildlife Habitat" sign. This was one of three filmstrip-format signs (along with "Stormwater Solutions" and "Native Plants") designed to engage viewers who might not normally be drawn to reading interpretive signage. In the end, Jim's incredible knowledge about the local fishery helped draw a contrast between an area widely recognized in the nineteenth century as a prime source of the tastiest oysters and an area that has been closed to shellfishing in recent decades.

After convincing the trustees, we had to gain final permission from the town board who still had reservations about liability and other issues even though the project would actually cost them nothing. I came prepared with a letter from the DEC designating WATERWASH as the first MS4 federally compliant project in Southold. With the support of supervisor Scott Russell, the town board greenlighted the project.

The area was graded and some of the resulting clean sand was used to restore the ditch beside the boat ramp and the scoured spot behind the swale. Both saltmeadow cordgrass (*Spartina patens*) and smooth cordgrass were planted there within the jute

and hay netting and secured by substantial chinked bluestones. Swale planting was rushed into action in early July, with the native plant survival courtesy of neighboring Mattituck Park District's water (the boat ramp had no facilities). Although it was a bit late for planting warm-season grasses, like switchgrass (*Panicum virgatum*) and little bluestem (*Schizachyrium scoparium*), they went in at the top of swale. For the bottom of the swale, rosemallow (*Hibiscus moscheutos*) was used since it thrives in our freshwater wetlands along with contrasting white turtlehead (*Chelone glabra*). Volunteers from Mattituck High School helped with the plantings and cutting common reed. Community support became even more apparent: a site survey was donated, Woodwrights, a local business, offered us wood for the Leopold benches, and free dumpsters appeared from Mattituck Sanitation (fig. 21.3).

We continued developing the final buffer zone plans and curvaceous wave form with the contractors. I wanted every detail curved to look more natural, which was novel for the installers, who are used to angular engineering designs. Great care was taken to engineer adequate uptake across the site with specific pavement percolation through the sand substrate and upper layer of local, pea gravel. The Filterpave mixture of recycled glass and urethane was applied in several sections by a crew working with it for the first time—this being the first use of Filterpave(tm) in the northeastern



FIGURE 21.3. The boat ramp area, complete with Leopold benches and native plantings, at Lillian Ball's WATERWASH project in Southold, a small town in northeastern Long Island, New York, USA. (Photo courtesy of Lillian Ball)

United States. In subsequent months, the material spalled or shed loose glass for a variety of reasons. Fortunately, Filterpave improved the technology and agreed to redo it. The original wave design was finally executed with glass trucked from Albany, well within the five-hundred-mile requirement for Leadership in Energy and Environmental Design (LEED) certification. A new method of tinting the urethane allows for more uniform color control and actually improves the reflective qualities that contribute to less carbon dioxide absorption.

The final piece of the puzzle has not been easy to implement. Water-quality testing is integral to gauging the success of the stormwater remediation. Prior to construction, the DEC Shellfish Unit tested two locations in southern Mattituck Creek and will continue to test after significant storms. Their samples are collected within twenty-four hours of the rain event and test for fecal coliform only. At this point, it is too early to expect much improvement. Lorne Broussard, water quality expert from Cornell, and John Bredemeyer, Suffolk County Health, concluded that the boat-ramp area is too diffuse for effective testing. Subsequent designs with a budget for stormwater-in/filtered-water-out testing will result in more accurate data. Both WATERWASH ABC on the Bronx River and the WATERWASH Goldsmith Inlet grants are structured to include this type of monitoring.

November 9, 2009, the opening press event, attended by more than seventy people, was a satisfying finale to the saga. Public officials applauded the progressive nature of WATERWASH and asked if we would work on several other very difficult sites. Interest remains high, so the cost-benefit questions we answered from visitors on site still continue long after completion. I realize the actual investment in time and energy means future sites must be carefully chosen. So many of the predicaments we are asked to look at arise from unsuccessful previous attempts, engineering miscalculations, or landscaping that masks real problems. Final impacts cannot be assessed without considering cultural relationships or until ecological processes are truly embraced.

How can we possibly measure a place's value to the inhabitants inspired by it? When I watch the schoolchildren reading the WATERWASH signs, or see a boat returning with happy fisherfolk, or catch kayakers lunching on the benches adapted from Aldo Leopold's plans, I see the landscape in action. There, between form and function, lies an opportunity for artist and scientist alike to involve the community in restoring natural resources. For more information about WATERWASH projects, see www.waterwash.info.

Postscript

The reality is that many artists are uniquely prepared to follow through in the face of adversity. Given their sensitive position as cultural innovators, artists have the right personality type for facing complex challenges, not to mention their ability to think creatively outside the box. Without an artistic blend of tenacity and mental agility, I wonder how anything can be accomplished when working in the web of bureaucracy that surrounds green infrastructure and public restoration projects.

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