Fresh Fields

Using biosolids to eliminate Scotch broom, Swift & Company Landscape Architects reclaim Discovery Park as part of Seattle's Habitat Improvements Project.

BY MICHAEL LECCESE

Dressed in smart business clothes and knee-high waders, Barbara Swift, Associate, ASLA, stands on a bluff topped by a curved granite wall. The promontory overlooks tawny meadows rolling down to Puget Sound. It's a view that Swift, a veteran landscape architect and the chair of the Seattle Design Commission, has often enjoyed. For two years her firm has overseen the transformation of these prairies as part of the $1.1-million Habitat Improvements Project (HIP) in the city's Discovery Park.

In 1994 these fields were infested with a rangy weed called Scotch broom *(Cytisus scoparius).* The next year they were stripped of the shrub, tilled, and fertilized with biosolids, a sludge by-product. Finally, crews replanted primarily native species—with 1,900 tons of seeds, 17,000 shrubs, and 450 trees. The HIP also included measures to remove trails from delicate bluffs and to enhance small wetlands using runoff from paved areas.

And yet, "this isn't really a restoration," says Swift. Not all new plantings are native, and there's no attempt to re-create the look of some ancestral Discovery Park. "It's reclamation to some viable habitat. And it was tied to available maintenance funds. We weren't trying to re-create Northwest forest or prairie."

Although subtle, the results nonetheless represent an important ecological experiment for urban parks—places usually given over to bluegrass and flower beds. Swift's team focused on the landscape's function rather than on pure aesthetics. This team, which included ecologists and wetlands researchers, also sought to demystify restoration by proving that it can be almost as practical as building a playground.

As a designated urban wilderness Discovery Park affords a superb setting for this venture. Located north of downtown Seattle on a hilly peninsula jutting into Puget Sound, the 535-acre park features glacially formed bluffs that provide Olympic Range views. There are miles of tidal beaches; forests of alder, hazelnut, and maple; and sandy, prairielike meadows dotted with

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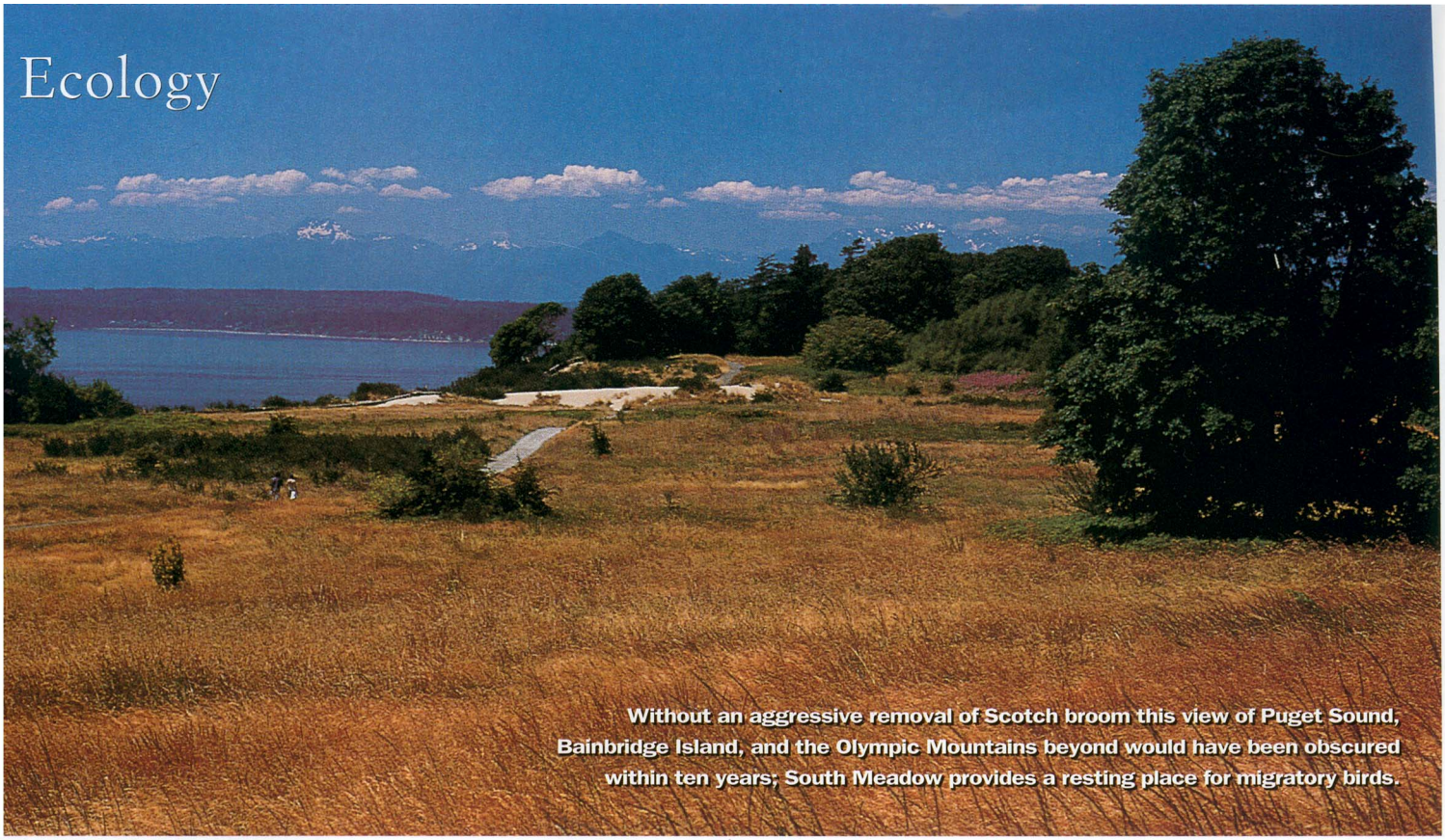

Without an aggressive removal of Scotch broom this view of Puget Sound, Bainbridge Island, and the Olympic Mountains beyond would have been obscured within ten years; South Meadow provides a resting place for migratory birds.

salal, snowberry, and other native shrubs. It is a place to which residents flock with a reasonable expectation of seeing a bald eagle, a seal colony—even a whale.

Discovery Park is also a highly damaged landscape. During the 1800s ninety percent of the land was logged and farmed. During most of the twentieth century the site was known as Fort Lawton, an Army post that grew to incorporate 1,000 buildings during World War II. In 1966 twenty acres at the peninsula's tip were dedicated to the West Point sewage-treatment plant. Since 1973, when the Army closed most of Fort Lawton and ceded 391 acres to Seattle, the Parks and Recreation Department has been slowly reclaiming and expanding the park.

One obvious problem is Scotch broom, which has invaded nearly one fifth of Discovery Park. Scotch broom was brought to the Northwest by railroad workers who planted it to stabilize sandy soils around tracks. It has spread to become one of the region's most invasive weeds. Each plant can produce 2,000 seeds in a single seed head. Broom seeds can remain inert in soil for eighty years before sprouting. In the tallgrass prairies that constitute the park's drier southern portions, broom has been winning the battle with natives. Aerial photos of Discovery Park reveal the plant's territory in washes of bright yellow. "It's old-growth Scotch broom," says Kevin Stoops, the project manager for Seattle Parks. "You can't mow it. We had stalks eight to ten feet high and thick as baseball bats."

In the early 1990s park planners studied the problem and circumscribed thirty-five acres of Discovery Park where broom was prevalent. Then Swift's team began the long process of counterattack. This group included consultants who had recently worked just outside of Discovery Park's boundary on the revegetation of the expanded and lidded-over West Point sewage plant. At West Point, a work-in-progress commenced in 1994, the $500-million budget included $10 million to purchase 200,000 nursery-grown native plants (see "Topographic Statement," *Landscape Architecture,* January 1992)—nine times the HIP budget for approximately half the acreage.

The HIP has, nevertheless, profited from West Point's proximity. During the 1980s

The Puget Sound lowland-forest mix of deciduous and evergreen species, *left,* was the starting point for a native-revegetation palette that would support wildlife. During construction, *right,* existing vegetation was protected and biosolids were applied to encourage growth that would block Scotch broom.

West Point's proposed expansion sparked an outcry from residents who thought the sewage plant should be moved away from the park's swimming beaches. To get the expansion permit approved the county sewage district agreed to dozens of mitigation measures. One involved creating the $30-million Shoreline Park Improvement Fund (SPIF). In a series of workshops citizens identified improvements to Discovery Park among 400 projects worthy of SPIF moneys to be administered through Seattle Parks' capital funding.

Because capital funds are usually earmarked for playgrounds or rest rooms Stoops needed to determine how habitat improvement could be budgeted like any other construction project. "To do a restoration project," he says, "we had to design, advertise, and bid the project so a contractor could do it. It gave us one shot to get a budget so we could do something in a big way. Swift & Company had to take a bunch of ideas related to restoration ecology and park management and put them into twenty-four-by-thirty-six-inch drawings that someone could put a bid on."

Next the team researched means by which to control broom. They found little agreement among experts. But when they walked the park, they came across nonnative grasslands that were holding fast against broom. These areas, it turned out, had been fertilized with biosolids in the early 1980s and reseeded. Given a nutritional boost, "about ten acres of meadows became so lush that broom could not get a toehold," says Swift, "and the parks department had to do no maintenance. The meadows were self-sustaining."

Again, Swift looked to West Point for opportunity. Each year the plant produces 16,000 dry-tons of biosolids, the rich by-product of sludge processing (see "From Waste to Product," *Landscape Architecture,* June 1996). To create biosolids the raw material is heated in a digester, then spin-dried in a centrifuge. About the consistency of peat, the final product is eighty percent water and six percent nitrogen—and safe enough to be used on some crops. The team inquired about intercepting a small amount to use at Discovery Park. Not only was King County's Water Pollution Control Division happy to donate truckloads, but the county also offered to till the material into the ground. "By taking it a half mile instead of one hundred fifty miles we probably saved thirty thousand dollars," says Roberta King, King County's biosolids project manager.

Before any biosolids could be spread, however, the county needed to obtain a local health-department permit. That meant satisfying the surrounding well-to-do neighborhood that no unpleasant odors or health hazards would surface. Stoops developed a fact sheet addressing such issues as odors, pathogens, and heavy metals and delivered it to one hundred households. His team also created a twenty-by-fifty-foot test planting patch in the park for the public to examine.

Once the biosolids permit was granted, crews began clearing fourteen acres of broom. Then some 600 dry-tons of biosolids were tilled into fourteen acres to depths of eighteen inches. Suddenly the prairies resembled freshly plowed fields surrounded by temporary fences to keep the public out. Closely advised by Ann Bettman, a landscape architect who teaches native-plants courses at the University of Oregon, Swift began to develop a planting plan. The team modeled this plan on combinations of flora found at similar sandy prairies at Tacoma's Fort Lewis. Execution required large-scale seeding and the direct planting of nursery-grown natives—as well as some daring experiments.

One such experiment involved growing woody natives from 800 pounds of seed. "This hasn't been done much in the Northwest," says Lisa Corry, a landscape architect with Swift & Company. "It hasn't proven that successful, and some of the seeds are jaw-dropping expensive—like thousands of dollars per pound. And [unlike nursery plants] they're not guaranteed. Then why did we do it? If it worked it would be cost-effective, and it seemed to make sense from intuitive and ecological perspectives—because you're really importing the seed bank of what would naturally occur there."

Among seed mixes applied in grasslands the team planted a "nurse crop" of sterile annual grasses designed to crowd out weeds until natives start to fill in. The team also hopes to nurture—from one-gallon pots—stands of Pacific madrone *(Arbutus menziesii),* the copper-colored trunks of which make it a signature tree of the Northwest.

To ensure that new plantings grow fast enough to compete with broom, Swift designed a $23,000 irrigation system that features 545 pop-up and post-mounted spray heads. Once natives are mature enough to survive on rainfall this system can be removed and rebuilt in another park. Swift also worked closely with the park's maintenance staff to be sure they understood the project's needs and goals.

Not every experiment succeeded. Pausing next to a maple forest, Swift observes a scraggly field. "This area received a biosolids application, some mulch, and a woody seed mix. We hoped that seeds would blow in from the forest to give succession a jump start. But when we came out in May, we were knee-high in chickweed." The lesson: "If you upgrade the soil, be aware there's a large dormant seed bank waiting for better conditions."

Is the HIP working? Researchers won't know until they survey flora and fauna for a few more years. Long-range success depends upon the effectiveness of broom suppression, which won't be apparent for a decade. Meanwhile, Swift hopes landscape architects will realize that habitat revival can be accomplished with a modest budget on a large canvas—and that generalists like herself can lead teams of ecological scientists. (Although this is Swift's first "eco" project, she's become experienced enough to publish an article on broom control in *Hortus West,* a respected native-plants journal.)

"What can be learned," she says, "it that it is possible to use an agricultural or forestry approach for park reclamation with native species. You can create an environment that's terribly evocative and powerful, usable by the public, and also functions as habitat." LA

PROJECT CREDITS

Team Leaders: Swift & Company Landscape Architects (Barbara Swift, Lisa Corry, Kent Dickson, Luanne Smith, David St. John), Seattle, Washington.

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Biosolids Consultant: Charles Henry, University of Washington Department of Forestry, Seattle, Washington.

Client: Seattle Department of Parks and Recreation.

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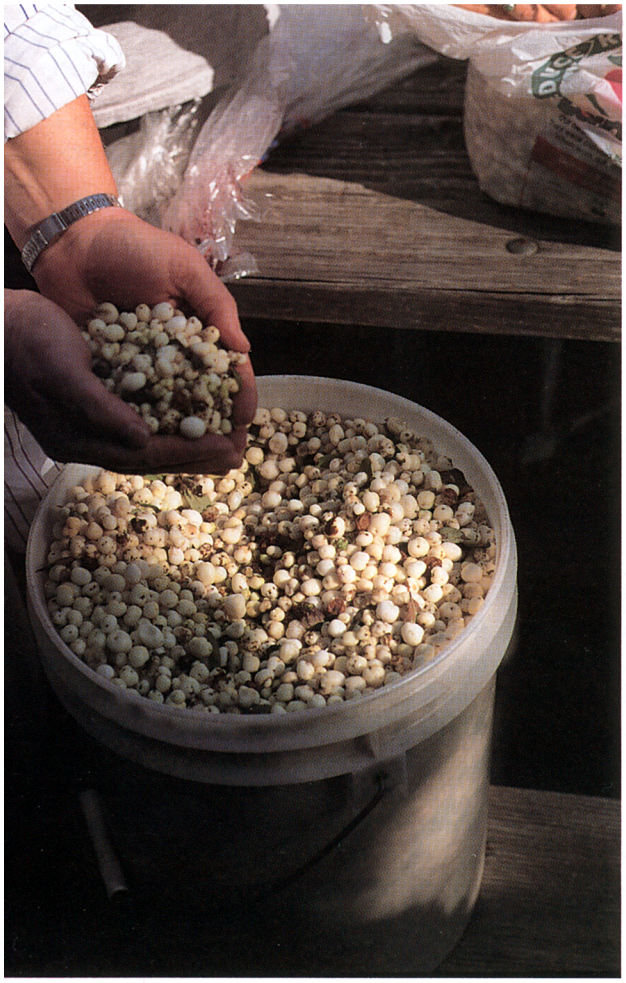

These snowberry seeds were harvested in Discovery Park at a public seed collecting workshop sponsored in part by Swift & Company. Thirty pounds of seeds of various native species were processed and replanted on site.

Project Update

Typically the light of publicity shines most brightly on a project at the time of completion. With a project like the Discovery Park Habitat Improvements, success should be measured in years and decades as the project takes on a life of it's own. Construction projects, with their limited control for a limited period of time, set in motion a new trajectory in the successional pattern of a landscape. Before the punch list is complete, nature is tempering the work of the project team. For instance, one forested wetland in the park is becoming a bog due to heavily compacted subgrade from earlier site use by the armed forces — not what we had planned, but a fine solution nonetheless.

In lean times and with limited funding for capital improvement projects, communities continue to look for innovative solutions to getting the job done. The Seattle Parks Department project manager Kevin Stoops exemplifies the creative public employee in his enlistment of volunteers to further the habitat enhancement effort.

Swift & Company will continue with phase two of the project, scheduled for late 1997. It includes the removal of the temporary irrigation system, the demolition of an old building compound site and its restoration to a wet mixed forest.

In our continued enthusiasm for complex projects and ecologically-based design, Swift & Company welcomes dialogue, and invites colleagues interested in this project or other projects to contact us.

Errata

While author Michael Leccese has the extraordinary ability to turn the rantings of over-enthused landscape architects into understandable prose, there is one factual error in the article which we would like to correct. While Scotch broom is a formidable opponent, each plant does not produce 2,000 seeds in a single seed head. Scotch Broom seed pods have 8 to 10 seeds each. Two thousand seeds can be found per square foot in the first four inches of the soil under a mature plant.

Project Team

Swift & Company would like to recognize the entire team for their contributions to this project.

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