

# EARTH WORKS

From recycling urine and testing algae to creating animal habitats and transforming landfills into parks, artists are finding novel and sometimes quirky ways to heal the world

BY LAMAR CLARKSON

**B**ritta Riley reached into a small fishbowl and plucked out a strand of sprouting watercress. “Should I eat it?” she wondered. The sprouts were growing with the help of struvite, a common fertilizer, but this struvite was special: Riley and fellow artist Rebecca Bray had made it just days before in Riley’s apartment—from their own urine. She held the sprout aloft and hesitated. “Am I really going to eat this thing that I just grew with my own pee?” she asked herself.

Urine is rich in phosphorus and nitrogen, both of which are important nutrients on land but pollutants in waterways, where they encourage the growth of oxygen-depleting algae that shock marine life. To help turn a burden into a benefit, Bray and Riley developed a home kit that allows people to make plant fertilizer from their own urine, in a reaction that ultimately yields two tablespoonfuls of concentrated struvite crystals and water. This spring, as the show “Feedback” was about to open at Eyebeam, the experimental art and technology lab in New York, Bray and Riley were assembling 40 of the kits, which were going on sale for \$15 apiece. They also created an installation, *DrinkPeeDrinkPeeDrinkPee* (2008), to map the basic path of urine through the water cycle, starting with a toilet and ending with a water fountain, like a diagram in 3-D. By sitting on the toilet facing the fountain, the viewer completes the circuit, demonstrating, in a jarring and droll visual shorthand, the essential paradox of waste “disposal”—waste never really goes away; it just comes back in different forms. We’re always, in effect, drinking our own pee.

Even so, after contemplating the sprout, Riley blushed and faltered. She wiped the sprout on her jeans. “This is really testing my boundaries,” she said.

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Rebecca Bray and Britta Riley's *DrinkPeeDrinkPeeDrinkPee*, 2008, installed at Eyebeam's show "Feedback," uses urine and lights to illustrate the path of wastewater through the ecosystem. The artists liken the glowing yellow tubing to a giant digestive system.



Bray and Riley are part of an activist breed of artists using the tools of science and engineering to make works that propose solutions to environmental problems. From solar-powered lights and alternative-fuel testing kits to urban animal habitats and plant-based wastewater-treatment facilities, these projects suggest novel ways to help heal the world. They include Amy Franceschini and the artist collective Futurefarmers' easy-assembly solar ovens made from found materials, as well as artist-inventor Natalie Jeremijenko's R&D-heavy *Urban Space Station* (2008), a rooftop air-filtering greenhouse souped up with space-age materials. Stephanie Smith, curator of contemporary art at the University of Chicago's Smart Museum of Art, who organized the traveling show "Beyond Green: Toward a Sustainable Art" with Independent Curators International, notes that these artists are creating an arena for small-scale social experiments that could potentially influence the larger culture. "If you have enough of these microgestures and they start to link up, they could really make a difference," says Smith. The show is currently on view at the University of Hartford's Joseloff Gallery.

Jeremijenko, for one, is dissatisfied with the clichés of environmental consciousness—recycling, letter-writing campaigns, soapboxing celebrities—and the slow pace of change. "When I hear people talk about raising awareness, I reach for my gun," she says. "It took 30 years to make an agreement to clean up one of the worst Superfund sites, the Hudson River." On several Saturdays during the Eyebeam show, she was holding office hours at the gallery for the xdesign Environmental Health Clinic, which is a kind of performance work in itself and a home base for collaborator-students who implement projects she develops. Jeremijenko, who has a Ph.D. in computer science and electrical engineering and teaches computer science, environmental studies, and art at New York University, considers the clinic model a way to frame the environmental debate as a personal health issue. In this way, she shifts responsibility onto individuals, who must monitor their environmental health in the same way they do their own physical health. The artist thus administers to her "impatiens"—so called because they refuse to wait for legislative change—by giving them "prescriptions" designed to improve their environmental fitness.

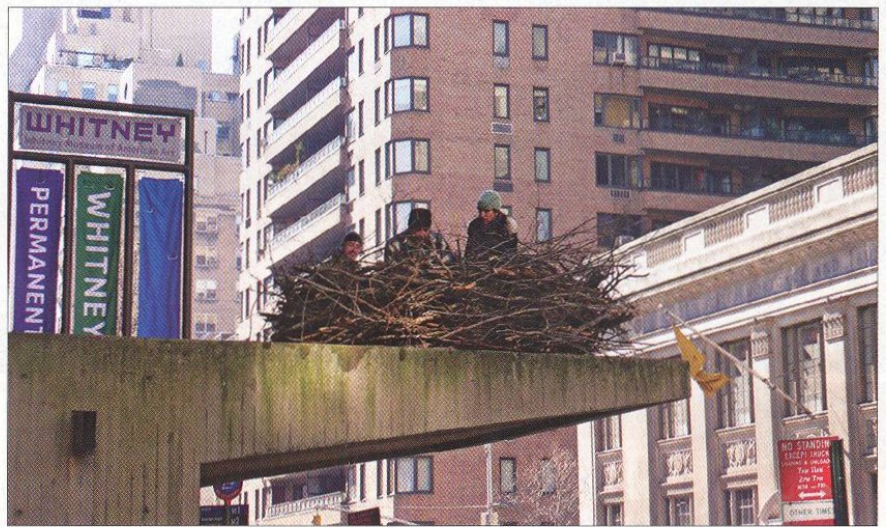
One of these treatments is *GreenLight*, a solar-powered, window-mounted lamp whose light gets diffused through plants that filter the air. A more ambitious work is the rooftop greenhouse, *Urban Space Station*—a compact white pod loaded with greens that can clean building exhaust and later be harvested as food. The piece is slated to debut atop the art department building at NYU this summer. "It will look like a parasite has landed on the roof," says Jeremijenko.

One of the best-known urban interventionists is self-described maintenance artist Mierle Laderman Ukeles. Since the late

1970s she has conceived landfill-transformation projects, which she calls urban Earthworks, to inspire awe and a sense of social connectedness in city dwellers. Her largest undertaking is Staten Island's planned Fresh Kills Park. Over the next 30 years, the landscape architecture firm Field Operations will transform 2,200 acres of sealed-off trash mounds into a public park with sports fields, playgrounds, and art projects designed by Ukeles. The artist signed on to the park plan in 1989, when the site was still an active landfill. In 2010 the north section of the park will open to the public.

As the New York City Department of Sanitation's artist in residence since 1977, Ukeles has long sought to call attention to often overlooked forms of caretaking, from sanitation to motherhood, as art. To help render these social ties more visible, one of her proposed works for the Fresh Kills site, *Safe Visitor Passageways*, would take viewers deep inside the trash mounds. Descending via enclosed glass or acrylic tunnels, they would

**OPPOSITE** Natalie Jeremijenko's xdesign Environmental Health Clinic, open for business at Eyebeam. The clinic frames the environmental debate as a personal health issue. **RIGHT** Fritz Haeg built a bald eagle's nest on the canopy of the Whitney Museum as part of "Animal Estates 1.0: New York City," commissioned for this year's Biennial.



witness the operations of normally off-limits leachate and gas plants. It's a radical and expensive proposal, since the public's safety, as well as the integrity of the plants' work, must be ensured. "When engineers hear something like this, they get hysterical," Ukeles says. "They're very nervous that people would screw it up." But, she emphasizes, dumps are public places, after all: "they belong to us." She continues, "The park should not just be about playing ball on the surface, but understanding the basis of our culture, which is to make waste and then figure out how to dismantle it and bring it back into safe use."

Patricia Johanson, too, is turning waste treatment into something of a public event. Since 2000 she has been collaborating with Carollo Engineers in Petaluma, California, to design a sewage-treatment plant that doubles as a park; it should be completed within a year. "Normally, these places have a chain-link fence around them," Johanson says. Not so at the Ellis Creek Water Recycling Facility and Petaluma Wetlands Park, where the water will be treated in a system of ponds integrated into the design of the park. These will be surrounded by trails and dotted with islands hosting wildlife habitats; they will clean the water naturally. Wastewater will move through them by gravity, allowing the plant to consume very little power. The waste will first pass through ten oxidation ponds for heavy-duty cleaning, and then through "polishing" wetlands filled with toxin-consuming plants and microbes. The treated wastewater will



irrigate farms in the surrounding Sonoma County wine region, including, Johanson says, “some very famous vineyards.” As for the source of water, she adds, “I don’t know if they’ll be flaunting it.”

Artist and critic Lucy Lippard, who curated “Weather Report: Art and Climate Change” last fall at the Boulder Museum of Contemporary Art, notes that she sees a lot of younger artists adopting a smaller-scale model that favors interventions on the individual level. “But in a funny way it’s not actually smaller, in that you’re spreading the word and networking instead of making one big lump of a thing,” she says.

True to this model, Fritz Haeg’s new project, “Animal Estates,” will establish wildlife habitats in eight cities over the next year. Like his ongoing “Edible Estates” series promoting home gardens, “Animal Estates” aims to turn the decorative front lawn into a useful part of the ecosystem—this time by inviting displaced wild animals back into cities and suburbs. In each area Haeg will call for volunteers to host habitats for animal “clients” native to the area, hoping to lure back ousted species. Several New York habitats, shown together at the Whitney Biennial before they were reinstalled around the city, are designed for animals that would have populated Manhattan 400 years ago. Made for the most part of black-stained wood, the homes were set up in the courtyard at the Whitney. There were white hollowed-out gourds for purple martins; a pond designed to accommodate eastern tiger salamanders, beavers, and wood ducks; and a Sonotube—a black paper form for pouring concrete columns—repurposed as a hideaway for a bobcat.

As Haeg sat in the museum café, dressed for an urban safari in khaki and olive green garb with matching green Crocs, he looked out at the courtyard. “They’re very sculptural,” he said of the teardrop-shaped gourds. “I like that the people in here don’t necessarily know they have a function.” To encourage people to build their own animal homes, the artist maintains a Web site with links to basic instructions available on the Internet. “When I leave a city, hopefully all these homes will be popping up,” he said. “Not just the ones I created, but ones others have made as well.”

Whereas Haeg calls on individuals across the country to replicate his projects, Franceschini taps into the energy of a population to solve a problem—a sort of crowd-sourcing for change. With collaborators from Futurefarmers and the U.S. Department of Energy’s National Renewable Energy Laboratory, she and NREL’s Jonathan Meuser developed *Lunchbox Laboratory* (2007), a prototype for a kit that would help determine which of the millions of algae strains are the most efficient producers of hydrogen for use as fuel. “There are so many strains. Scientists

would have to spend so much time testing them,” says the artist, who is a professor of art at the University of San Francisco. To render the process more manageable, the kit would divvy up the work among the nation’s chemistry students, making them, in effect, satellite researchers for the government.

The prototype, on view in New York this spring, in the Museum of Modern Art’s “Design and the Elastic Mind” show, is a retro-chic hunk of recycled plastic and wood. Designwise, its chunky rounded shape and beige and kelly green color scheme place it somewhere between a Playskool toolbox and a first-generation PC. Each kit would contain seven strains of algae to be tested under different conditions, as well as test tubes outfitted with chemically treated sensors that turn blue in the pres-

**OPPOSITE, TOP** This wastewater treatment pond in Patricia Johanson’s Petaluma, California, park is shaped like the salt marsh harvest mouse, one of the region’s endangered species. The two islands form the eyes. **OPPOSITE, BOTTOM** Scientist Jonathan Meuser, of the National Renewable Energy Laboratory, building a homemade algae-powered hydrogen reactor at the University of the Pacific.

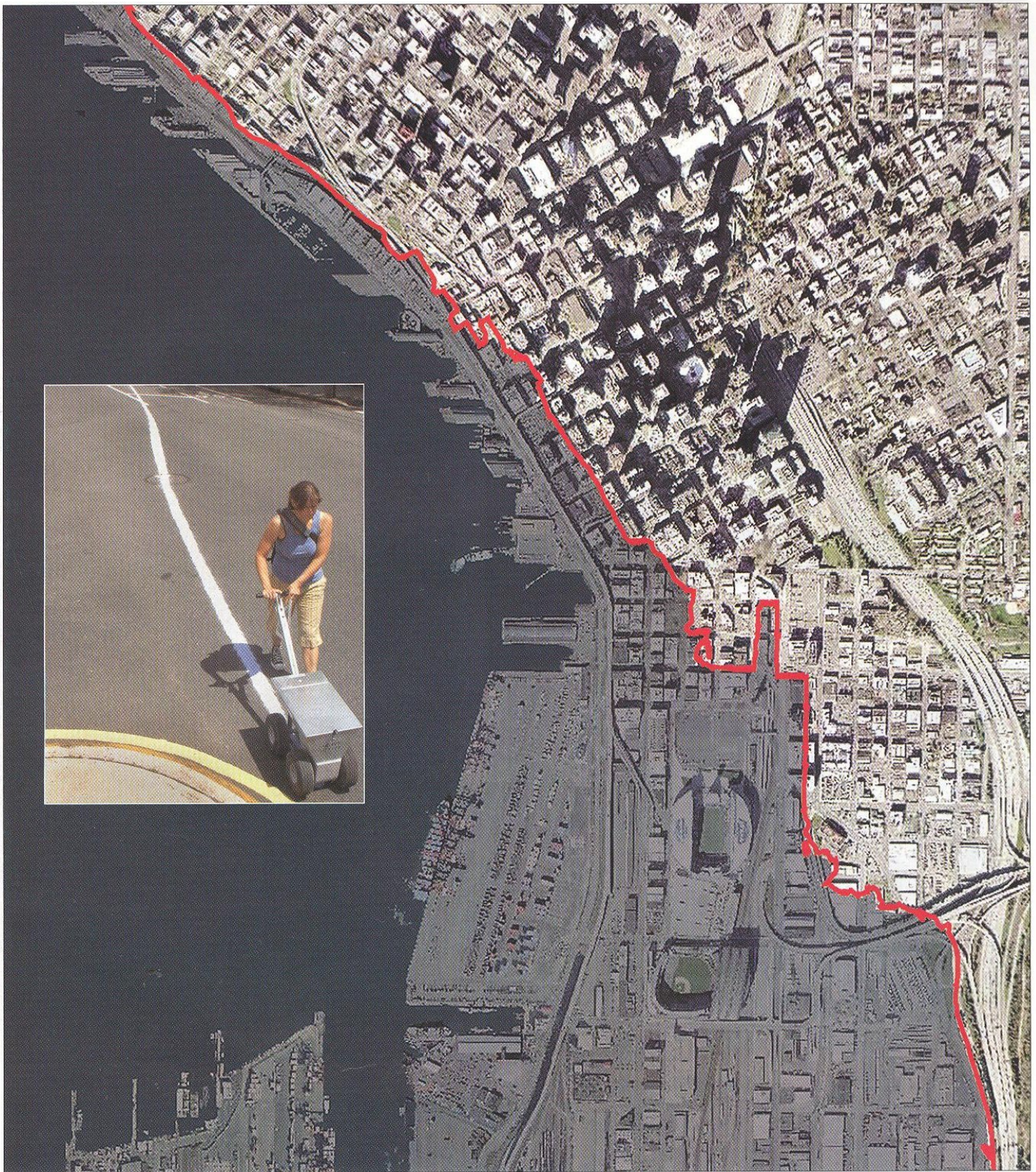
**RIGHT** Amy Franceschini sets up a film screening at Pasadena City College Gallery, during Futurefarmers’ residency there this spring.



ence of hydrogen. Cheap, portable, and easy to use, the sensor, which was invented by NREL’s Michael Seibert and colleagues just for the lunchbox, will also simplify future government research.

Franceschini was inspired to work on the problem after she saw Meuser rig up a “quick and dirty” algae-based hydrogen reactor in his backyard. “All you need is water and algae and a gas sensor and a pump, and you can do this,” she says. “I asked him, ‘If this is so easy, how come we’re not doing it everywhere?’” With the right strains of algae, they could. That’s where the lunchbox kit comes in. Since the MoMA show, Franceschini has gotten calls from several interested schools. But, she adds, “NREL says, ‘Whoa, we’re not ready to distribute it yet.’” ■





**Eve Mosher** spent last summer laying down a chalk line—the sort used on baseball diamonds—to mark the changes that scientists predict for New York City’s shoreline as storm and flood patterns are altered by global warming. **HighWaterLine**, as the project was called, indicated that some apartments might eventually have waterfront views, while nearby schools and front stoops could be declared aquatic habitats. But the real point of the piece was to interact with the public. As she pushed her chalk dispenser 70 miles, from Brooklyn through Manhattan to Queens, Mosher would stop and explain what the gloomy forecasts will mean for the city blocks she was passing through. “I’m not a scientist, but I can connect with people in their neighborhoods,” the artist says.