

LOVING ORPHANED SPACE



the art and science of belonging to earth

Mrill Ingram

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The Art and Science of Belonging to Earth

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Gas Station Alchemy and Cultural Heritage in South Chicago

The dirt says, “I know how to go about
unsettling settlement . . .”

—JD PLUECKER, *The Unsettlements*¹

Surrounded by sagging chain-link fence, the corner lot rests quietly under its cracked and crumpling blanket of asphalt. Soil, accumulated over decades in the fissures and depressions, hosts pockets of plant assemblages: marestalk, broadleaf plantain, prostrate knotweed, crabgrass, and dandelion. They are colonizing, their roots expanding the cracks, their growth and decay building up more organic matter and making soft landing spaces for new seeds blown in to take root. The occasional ragweed presents a taller flourish. This orphaned space, somewhere in South Chicago, once hosted a gas station. With the owner bankrupt and long gone and in a neighborhood with low real estate pressure, it has remained here for decades, mostly quiet, in a slowly expanding conversation with “weeds.”

Underneath the plants and asphalt lie benzene, toluene, xylene, and ethylbenzene, all elements of hydrocarbon compounds from tank leaks and fuel spills. The chemicals are included in octane boosters like MTBE and BTEX. There are also diesel fuels, solvents, and degreasers in varying concentrations and depths in the soil. These “lenses” of contaminants have existed here for decades under



Figure 3.1 A project aimed at addressing the “typology” of abandoned gas stations, *Slow Cleanup* piloted the use of ornamental, flowering, and fruiting plants in remediating polluted soil in sites like this one. A collaboration of the artist, the City of Chicago, and academic, community, and conservation partners, the project established field trials of 80 previously untested horticultural plant species along with a parallel greenhouse trial at Purdue University. (Reprinted by permission of Frances Whitehead.)

their protective cap of asphalt, changing only if an underground flow of water shifts things around.

Plots like these are a common sight: the fence, asphalt, cement islands, colonizing plants, and contaminated soil are found at hundreds of thousands of abandoned gas stations—all nodes in a vast network enabling the culture and technology of the automobile. Shuttered gas stations are testament to a multifaceted and common story of small business owners and large oil and gas corporations; faulty fuel-storage technology and off-loaded economic risk; massive pollution of underground aquifers and drinking water supplies; and sweeping environmental regulations unevenly implemented. Along with the inestimable costs of poisoned ground water and blighted communities, federal, state, and local governments have spent billions over the past four decades chasing underground pollution from leaky gasoline storage tanks, with the associated costs driving many

small gas stations out of business and leading to many properties sitting abandoned for decades.

It's a common sight, yes, but strangely out of focus given its ubiquity and the toxicity of what is underneath. Following the first condition to reject the void, I'm curious about the history here. What happened? And what kinds of ecologies and politics maintain this orphan?

The gas station is as American as apple pie, an icon and facilitator of the "open road" as highways unfurled across the nation, especially after World War II. Gas stations powered the American car culture, enabling millions to get the hell out of Dodge, Go West, or just get to work. In the 1970s and 1980s, gas station franchises supported millions of small business owners, including many immigrants, all taking advantage of available credit and low down payments to open up mom-and-pop gas stations.

But an insidious problem was slowly developing underground. During the early 1980s, it became clear that the underground storage tanks, many now decades old, were failing, leaking fuel into the surrounding soil. The slowly migrating toxins began to appear in groundwater-sourced drinking water supplies across the country and to produce gaseous emissions that made people sick. Many of the tanks, composed of single-walled bare steel, had begun to corrode, especially along the pipes connecting the tanks to the pumps. The practice of "dipsticking"—dropping long rods to the bottom of a tank to determine the fuel level—was found to weaken and over time puncture the steel tanks, which then leaked fuel into the soil. One 1984 report indicated that 75,000 to 100,000 USTs, or underground storage tanks, were leaking and that as many as 350,000 USTs would start to leak in the following five years. Worse, in what appears to have been an effort to avert liability, many oil companies had divested tanks to station operators, especially in the late 1970s and early 1980s, leaving small business owners holding the—well—tank. Oil companies had at least some knowledge of tank leakage issues as early as the 1930s and had begun developing new technologies to avoid the problems. Rather than retrofit or replace aging equipment at the many stations at which they owned tanks, however, oil companies appear to have programmatically divested themselves of many tank systems during the late 1970s and early 1980s, often for nomi-

nal sums. The average cost of site cleanup was \$85,000 in 1989 and \$135,000 in 1990.²

Underground storage tanks (which were installed not only at gas stations but also at taxi and construction companies, marinas, airports, fire departments, and other agencies) began to leak and became a hidden and ever-expanding menace, a nationwide problem that continues to endanger drinking water supplies in every state. Their history exposes a lack of regulatory teeth to protect drinking water as well as a vastly inequitable regulatory system especially taxing for small business owners and communities of color.³ Successive waves of legislation were created at the state and federal levels to prevent contamination and then to deal with abandoned sites when bankrupted owners, unable to meet regulations, gave up.

The scope of the problem and its human impacts are encapsulated in remarks made by New York congressman Thomas Downey at Superfund reauthorization hearings in March of 1985. Noting the vast nature of the problem as well as the lack of regulatory oversight, he stated:

In mid-1983, nearly 100,000 gallons of gasoline, from storage tanks belonging to a gasoline station in the Bluebell Lane neighborhood [of North Babylon, New Jersey], leaked into the ground. As a result, the neighborhood has been inundated with fumes containing benzene, toluene, and xylene. These chemicals are dangerously toxic. . . . I requested assistance from the Environmental Protection Agency for the residents on two occasions and was denied both times. The responses I received clearly depicted an Agency bound by legal shackles. The Federal Superfund program explicitly excludes petroleum in its definition of hazardous substances. Therefore, EPA could not provide any assistance to the people of Bluebell Lane. . . . While the precise number of gasoline storage tanks range from 1.2 million up to 10 million, some have suggested that between 20 and 40 percent of all tanks are leaking.⁴

Nationwide, revelations of leaking underground storage tanks and contaminated drinking water led to the EPA Office of Underground

Storage Tanks (OUST) in 1985, and a 1988 rule (40 CFR Part 280) setting minimum standards for new tanks and requiring owners and operators of existing tanks to upgrade, replace, or close them. When the Leaking Underground Storage Tank (LUST) program began, there were approximately 2.1 million systems to regulate in the United States. The 1988 regulation set deadlines for owners and operators to meet the new requirements.⁵ MTBE, the acronym for a common octane booster and a deadly carcinogen, was almost a household word.

The increased requirements of equipment and recording processes and fines levied for leaky tanks led to increased rates of gas station abandonment. In 1998, there were 800,000 noncompliant USTs, often because owners could not afford to investigate and clean up the contamination present. This, in turn, led to another wave of closures. At the beginning of 2002, President Bush signed the Brownfields Revitalization Act, with \$50 million a year in grants and other resources for the cleanup of abandoned stations and other petroleum-contaminated sites. In concert with federal money and mandates, state and local governments continued the long slog of locating and cleaning up the underground petroleum mess.

By 2015, releases from tanks were far less frequent, although releases from piping and spills and overfills associated with deliveries emerged as more common problems. As of September 2019, the EPA reported that it regulated roughly 546,000 petroleum tanks and a total of 1.9 million had been permanently closed down.⁶ But even after their removal, the legacy of those tanks remains, their sheer numbers staggering, not to mention the ongoing challenges for the municipalities of every size resting on top of sometimes thousands of small hot spots of chemically contaminated soil, threatening drinking water aquifers and stymieing new development.⁷

This larger story illuminates some of the forces driving the ubiquitous typology of abandoned gas station lots. Returning to South Chicago, other questions emerge. The lot has lain quiet for decades, the bankrupt owner long gone, the ownership defaulted to the city. The tank has been pulled, but the hydrocarbon molecules remain, lying heavy in the soil. Similar lots in other parts of town have been excavated and redeveloped. But not here. There's not a lot of money in this part of town for new development.⁸ An orphaned gas station

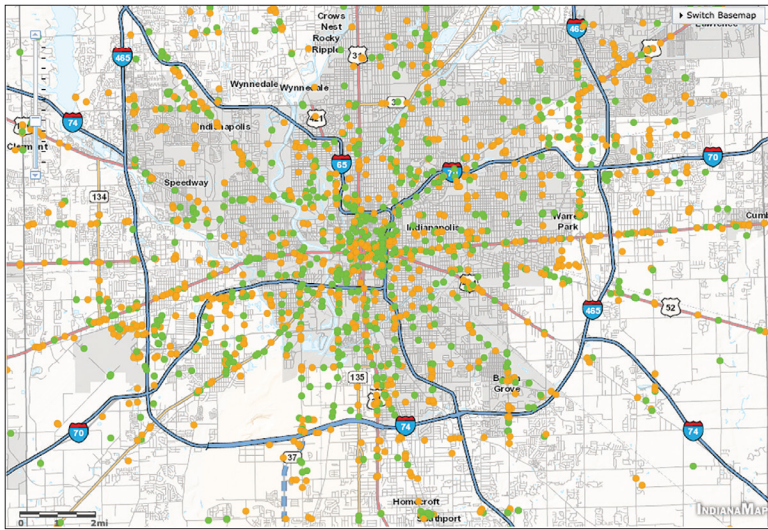


Figure 3.2 The Indiana Department of Environmental Management reports almost 16,000 underground petroleum storage tanks around the state, with 8,089 leaking (orange dots) and 8,302 not leaking (green dots). This close-up of central Indianapolis reveals the widespread distribution of the tanks. (Credit: UST_IDEM_IN: Underground Storage Tanks in Indiana [Indiana Department of Environmental Management, Point Shapefile], digital compilation by Indiana Geological and Water Survey, 20181019. Figure © Indiana Geological and Water Survey, Indiana University, Bloomington, Indiana.)

site in a low-income neighborhood is a place in hiatus, connections stymied by regulation, legacies of racism, asphalt, pollution, and chain-link fence; all process slowed to a crawl. Such sites are invisible to us partly as a function of their ubiquity and unremarkable nature and partly because so much of what orphans them lies underground, out of human sight.

Still, things can happen here, only slowly—exactly where sculptor and School of the Art Institute of Chicago professor Frances Whitehead found a toehold.

Slow Cleanup, Frances's project on gas station remediation pursued in collaboration with the City of Chicago's Department of Innovation and Technology and Department of Environment, began in 2009 under Mayor Daley. As Frances explained to me, *Slow Clean-*

up was about how doing things slowly can be doing things at the right speed. She worked with Dave Graham, a brownfield specialist with the city, and Paul Schwab, a professor and specialist in soil environmental chemistry. The project centered on a research project into “rhizodegradation,” the potential of soil microbes fostered in a plant’s root zone to dismantle contaminating petroleum hydrocarbons. Along with building new relationships to plants and microbes, Frances also centered social inequity and the uneven impacts of such lots on marginalized communities. She reoriented the production of scientific knowledge to center those who are typically left out of conversations about uses of urban space.

Frances was keen to leverage her skills and position at the School of the Art Institute of Chicago to work with the city; she argued that artists have important contributions to make across institutional contexts. She aimed to link art and the practical by providing examples of the power of artistic training to city governmental agencies and arguing for the larger role of culture in solving environmental problems. As she explained to me later, after working for years at the community level she wanted to expand beyond limits to that engagement. One way to exert more influence was to go where the rules are made. “I realized I needed to infiltrate further up the food chain,” she told me.

Artists’ training, she argues, enables artists to see patterns of all sorts, in part because they traverse multiple disciplines and different modes of production. She created the Embedded Artist Project aimed at involving artists in city government programs to contribute to problem-solving and sustainable urban design. Besides offering expertise in understanding cultural value, Frances emphasizes that artists are synthesizers as well as creative, working across a diversity of areas of expertise to solve problems to achieve artistic vision. She also explained to me that artists are accustomed to tight feedback loops; they compose *and* perform, design *and* execute. In addition, she said at one point, they aren’t afraid to ask “dumb” questions. Learning about how she tackled her project, I came to understand better what this meant.

Abandoned gas stations present a kind of typology, Frances explained when I visited her in her house near downtown Chicago.

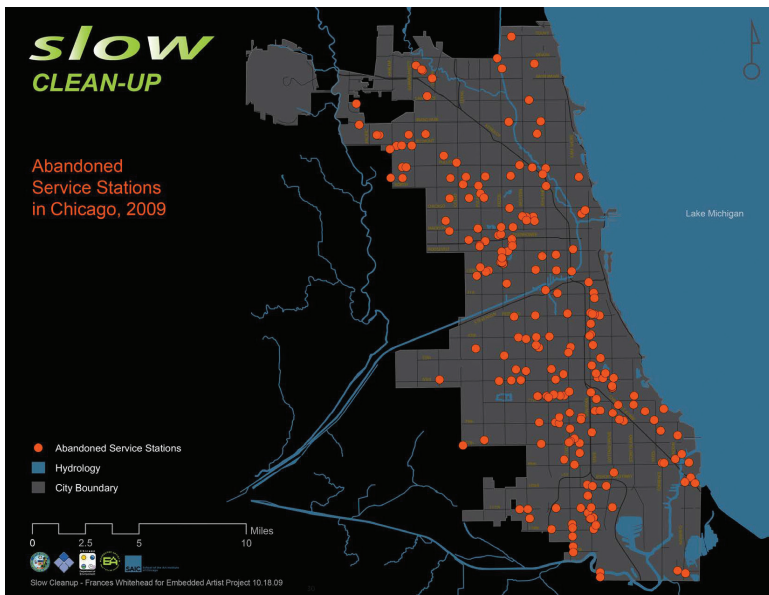


Figure 3.3 From the City of Chicago’s abandoned service station inventory of hundreds of sites, Frances Whitehead selected a pilot site based on hydrology, contamination levels, and potential support from neighbors. *Slow Cleanup—Civic Experiments with Phytoremediation* (2008–2012), Frances Whitehead. (Reprinted by permission of Frances Whitehead.)

“When you look across gas station sites you see similar pollutants, and similar layers of asphalt, gravel, leaking tanks, etc.,” she said. It was a beautiful, cloudless July day in 2011, and she gave me a tour. She and her husband had designed and built the “carbon friendly” house with solar panels, wind turbines, and geothermal technologies. It’s tucked in among a row of more traditional, upper-scale Chicago homes.

I had called Frances the night before to be sure we were still on for a visit to her remediation project site on Chicago’s South Side. She had told me that Paul Schwab would be there in the morning as well. Frances had found Paul by researching the published literature on phytoremediation, the use of plants to clean polluted soil, air, and water. After reading about his work on root-microbial interaction in

the soil, she reached out, explaining that she was working on hydro-carbon remediation by plants with the City of Chicago and needed to consult with an expert. She described her role as an “embedded artist” with the city. He replied by asking her if her project needed an “embedded scientist.” I think that was the beginning of a productive relationship.

When Frances began her project, there were over 400 abandoned gas stations languishing on the City of Chicago inventory.⁹ Especially in places like the South Side, the lots have been a persistent drag, a negative for real estate values and community perceptions of health, safety, and vibrancy of neighborhoods. And, of course, this is where there is real need. As city lawyer Jessica Higgins documented in Chicago: “Brownfields tend to be concentrated in older, predominantly minority and low-income neighborhoods from which manufacturers and businesses have fled and in which market forces will not prompt redevelopment. Such neighborhoods are faced with numerous social and economic issues, and empty and unproductive brownfields carry with them a host of problems that contribute to an overall condition typically described as blight.”¹⁰ Although Chicago’s brownfields program is impressive, cleaning up well over 13,000 acres of industrially polluted land, she notes that its programs have done less well at reaching and serving the communities who live in lower-income areas. This can be observed in terms of how community members are included in decisions about new land uses, in the types of job-creation programs implemented, and in the ways the redevelopments have ultimately contributed to gentrification.

A “sustainable” solution to abandoned polluted gas station sites had to be multidimensional. For one, there was no digging and dumping polluted soil elsewhere, which would just move the problem to a new location; it had to happen in situ. Any new engagement at the plots needed to respond to its conditions—the people and environments around the site. “I wanted to change the story and perceive of brownfields as cultural heritage,” Frances told me, adding that she starts from “the premise that everything is cultural.”

When I arrived to visit Frances, she and Paul Schwab were carrying flats of four-inch potted plants from her courtyard garden out to his car. He was taking them to his lab at Purdue for a greenhouse

experiment on their ability to remediate hydrocarbons, a sister test to plots being planted at a gas station research site. I recognized many of the plants, prairie beauties like blazing star, bee balm, coneflower, and Joe Pye weed. When Frances understood that many of the larger hydrocarbons typically found in the soil of abandoned gas stations are remediated in the rhizosphere by microbes and are not taken up into the plant itself, she saw an opportunity.

Phytoremediation encompasses a broad range of engagements, with a variety of mechanisms and targets. Plants with long tap roots and high evapotranspiration rates can help minimize water infiltration, thus keeping contaminants from moving with the flow of water. Certain trees, like poplars, can pump and treat groundwater. Physically, plants can provide buffers for water flow underground, or air flow up above to prevent blowing dust. Some plants are great at withstanding both flooding and drought and can thrive in catchment areas, helping remove and trap sediment and other contaminants from stormwater. Others can be planted in a wetland, helping to hold water in place, and slowing the eroding rush of stormwater and filtering out soil and other elements. Floating mats of plants can also filter contaminants from water. Long-rooted trees and shrubs can degrade contaminants deep in the soil profile. Some fast-growing shrubs are tolerant of organic contaminants and help degrade the hydrocarbons.

But research into these capabilities of plants has been a start-and-stop affair, stymied by the long time horizons the plants require to get the job done, the research needs served by neither the typical federal grant-funding timelines of two to four years or the fast turnaround demands of the private sector.¹¹ Artist Mel Chin aimed to bring attention to the potential of phytoremediation in his 1991 project *Revival Field* at the Pig's Eye landfill in St. Paul, Minnesota, also a Superfund site. He collaborated with a scientist to research the efficacy of “hyperaccumulators”—plants that actually take up into their leaves nasty heavy metals such as arsenic, selenium, nickel, cadmium, and zinc. He enclosed a small area of the landfill with chain-link fence subdivided by paths and separating different varieties of plants from each other for study. He sought funding from the National Endowment for the Arts, which initially accepted and then rescinded support, citing questions of aesthetic quality: Was this art?

The funding was eventually reinstated, with Chin arguing that the project was a kind of sculpture using the tools of biochemistry and agriculture. Although the work is unseen, he explained, “an intended invisible aesthetic will exist that can be measured scientifically by the quality of a revitalized earth. Eventually that aesthetic will be revealed in the return of growth to the soil.”¹²

The challenge Frances saw for plots scattered around her city, especially those that lingered for decades in lower-development pressure areas, was the meager palette of known plants confirmed to help degrade petroleum contamination. What about plants that people wanted to live with? What kinds of activities and new connections might occur in these spaces that would make them an asset to the neighborhood? She conceived of a “swatchbook of phytoscapes,” with functions like small tree bosque, winter color, fragrance, biofuels, birdscares and bugscapes, fruitscapes, and prairie. Her vision revolved around creating small landscapes that would be inviting to people and also include plants engaging with the contaminants underground. And that required a reorientation of research.

The research on phytoremediation has typically been done at agricultural research stations and has focused on tall grasses and agricultural plants, which are not well suited for small plots and the diversity of applications Frances envisioned as benefitting urban neighborhoods. Nonagronomic plants, including ornamental, habitat, fruit bearing, and prairie forbs, remained, and remain, largely untested. After exhaustive literature reviews, phone calls with specialists, and a lot of “dumb” questions, Frances created a database of almost 500 plants with promising root structures that looked like they might generate microbial activity capable of dismantling petroleum hydrocarbons. From that list she determined dozens of potential new remediators in ornamental and horticultural varieties of flowers, shrubs, and fruiting trees. These included trees like serviceberry, redbud, and persimmon; shrubs like indigo bush and dogwood; and flowering plants such as asters, purple coneflowers, prairie smoke, and evening primrose.

“I believe there is a solution and all I have to do is find it,” she explained to me later. “I’m not afraid to not know, to bug people to death, and I just call people up and if they can’t help, I call the next person.”

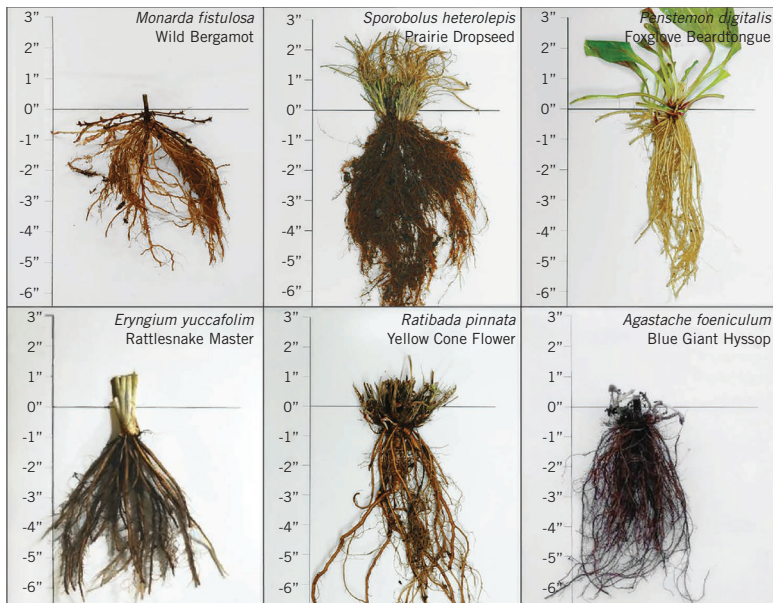


Figure 3.4 Part of Frances Whitehead’s research involved creating a database of 475 native and horticultural “remediator candidates”—plants with promising root morphologies for soil remediation that also might be popular in yards and gardens. *Slow Cleanup—Civic Experiments with Phytoremediation* (2008–2012), Frances Whitehead. (Reprinted by permission of Frances Whitehead.)

She described the “days of searching” the Internet for photos of plant roots and the phone calls she made to connect the “plant roots guy” with the “soil guy.” In making the final decisions about which plants to test, Frances said, “I did this really intuitively and it drove Paul crazy, he would have wanted a more statistical way, but I had to factor in my own interests—whether it was good visually and a fit in the landscape. I had to just go for it the only way I know how. I eventually got the list down to one hundred and thirty-seven.”

Rhizodegradation, as noted, is the breakdown of organic contaminants in the soil by microbes. These soil microbes, which help plants by making nutrients in the soil available to them, are nurtured by plant root exudates such as sugars and alcohols—because what better way to make a party? The exudates offer a source of carbs for the

soil microflora, enhancing their growth and activity, along with other chemicals that get them moving. The plant roots also loosen the soil and transport water to the rhizosphere, or root zone, thus additionally making life good for the microbes. It's a burgeoning set of relationships about which we have a lot more to learn.

This process of building up the microbial community and breaking down the pollutants takes decades, hence Frances's use of the word "slow." While plant-microbial symbiosis can be at work cleaning up underground, she imagined the site above as an engaging, colorful, fragrant space, productive of food for birds, insects, even people. And that's why the relationship between the site and the surrounding community was so important. For her initial installation, Frances chose a site near Chicago State University enabling her to offer an opportunity to a class of environmental science students, many of whom lived nearby, to be involved in the research. Their work taking soil cores augmented the city database of the locations of lenses of petroleum and other contaminants at different locations and depths. Frances also wanted to connect with the neighbors, which was a challenge as she couldn't physically open up the plot to them because of safety issues and to protect the research project. She reached out to the local alderperson, who, after hearing the plan, endorsed her efforts and suggested the site be named the Cottage Grove Heights Laboratory Garden.

"We refer to this as the knowledge site," Frances summed up. "We are growing knowledge here."

We traveled together in her truck from her house, driving south on highways for some 20 minutes. When we arrived, I observed a site that looked nothing like a classic research plot. The Cottage Grove Heights Laboratory Garden was laid out along a series of lines radiating out from the entrance and dissected by arcing smaller paths. The triangles curved gently as they expanded, marked by black metal edging. Frances explained how she'd laid out the site to be a kind of performance for the passersby—"like Versailles." The radiating lines, which divided the plots within which some 80 different plants species were being tested, moved out from vantage points coinciding with places in the fence where people could stop, view the gardens, and read signs that informed them of the experiment their neighborhood



Figure 3.5 Before, during, and after the field trials were established on the abandoned gas station site. *Slow Cleanup—Civic Experiments with Phytoremediation* (2008–2012), Frances Whitehead. (Reprinted by permission of Frances Whitehead.)

was hosting. One goal of her design, as Frances described it, was a “reversal of the power dynamics” associated with similar grand geometric space plans. It was built as a performance for the neighborhood, the design integrating research, aesthetics, engagement, and, slowly, economic benefit as the plants did their work. Nearby residents would see and smell flowers, hear bees and birds, and, she hoped, understand how their neighborhood was hosting an experiment generating information of potential use to people just like them.

Through Greencorps Chicago, an environmental job-opportunity program, the city agreed to provide maintenance of the site for three years, including planting and then watering once a week in the growing season. But this arrangement created friction. Frances described how having her School of the Art Institute of Chicago sculpture-class students lay the edging instead of the Greencorps workers was a point of contention with program leaders; she was adamant that achieving just the right curve of each bed, and especially working

with metal, was a job that required special training. The city program administrators wanted participation in the project and opportunities for their workers. In addition, the racial dynamics were hard to overlook, with the largely Black workers providing the hard labor for the site. It was to balance tensions like these that Frances worked to build a local sense of ownership of the project, engaging Chicago State University students and the neighborhood alder in research planning.

When I saw it, the garden was largely planted, with young trees and bushes at the back of the space (I recognized a native honeysuckle and a persimmon) and lower-growing plants, some of which were in bloom, closer to the entrance point. The deepest-rooting plants were placed where the underground gas tank had been. There is a “hot spot” of TCE (or trichloroethylene) at the bottom of that area—about 10 or 12 feet down. Poplars have been tested frequently for this type of situation, but Frances was investigating the potential of cup plant, or *Silphium*, to do the job since they have very deep roots and are also “gorgeous kick-ass plants.” After spending time at the site, she discovered a low, much-wetter spot toward the front right corner, requiring an adjustment to the plant choices. I saw a few empty spaces among the plots, and some of the plants were struggling or had died, although many of them looked fairly well established.

As she designed the planting plan, choosing longer-rooted plants over the deeper lenses of contamination, she also created a seasonal flowering “clock,” clustering flowering plants together according to bloom time, moving from left to right from April to October, and, with the trees in the background, blooming a “frothy” pink in the spring. The performance would last all growing season, reminding everyone nearby of horticultural rhythms. Among her ambitions for the project, Frances aimed to make visible the sequences of “plant time,” using flowers to pull people’s attention to the shifts of botanical life and from there to demonstrate the power of the associations at work: the conversations among root, microbe, and hydrocarbon. “I wanted to revalue slowness, deep work, and help the public understand why this is so important, on a neighborhood basis.”¹³

I was especially captivated by Frances’s tale of the Wortken, an enormous roadbed-building machine she repurposed to prepare the site. A big challenge was the feet-thick gravel bed lying underneath

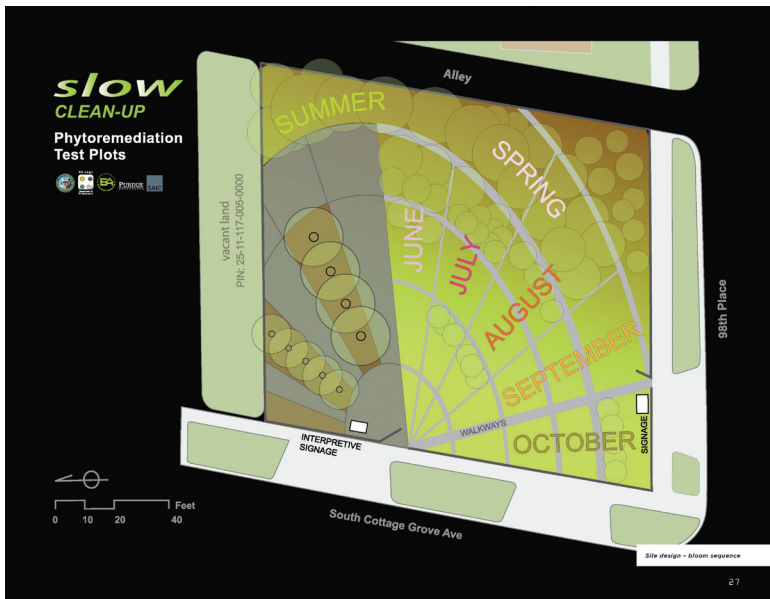


Figure 3.6 The design of *Slow Cleanup* was informed by seasonal plant rhythms (top) as well as color and plant architecture (bottom). *Slow Cleanup—Civic Experiments with Phytoremediation* (2008–2012), Frances Whitehead. (Reprinted by permission of Frances Whitehead.)

the asphalt and cement, again an element typical of most gas stations. The question was how to integrate enough organic matter to support the plants without disturbing the lenses of pollutants lying just underneath. The rotating blades of a Wortken proved to be the answer, although this solution was discovered only after weeks of making phone calls to construction companies and road-building specialists.

There were other hurdles. She explained to me that she'd had the asphalt and concrete from the gas station pulled off for recycling but that because of the three inches of topsoil that had developed on top in the 20 years since the station closed, the recycler wouldn't take the material. It had to be trucked to the landfill. It was the only part that went there, she said, and that was a mistake since the topsoil was "good stuff." There are other possibilities, Frances suggested later, especially in small plots, to leave such hardscape in place but kick-start the rhizoremediation by doing gridded or decorative saw cuts into it and planting a series of engaging designs.

In 2011, the project suffered what many such public endeavors experience, and funding was pulled by the incoming city administration of Rahm Emanuel. Unwilling to continue upkeep, the city yanked the plants and removed the edging. Frances moved to other sites to continue her work with plants and people.¹⁴ But Paul's research team was able to continue the work begun at the greenhouses in Purdue and eventually determined 12 new species of flowering plants found to aid the dissipation of contaminants in the soil—all but one never before tested. The list includes:

- Purple coneflower, *Echinacea purpurea*
- Blue giant hyssop, *Agastache foeniculum*
- Horse mint, *Monarda punctata*
- Rattlesnake master, *Eryngium yuccifolium*
- Alum root, *Heuchera richardsonii*
- Yellow coneflower, *Ratibida pinnata*
- Wild bergamot, *Monarda fistulosa*
- Prairie dropseed, *Sporobolus heterolepis*
- Yarrow, *Achillea* sp.
- Catnip, *Nepeta cataria*

- Foxglove beardtongue, *Penstemon digitalis*
- Evening primrose, *Oenothera biennis*

Other promising plants include several species of flowering tree: black cherry, red-osier dogwood, downy serviceberry, and fragrant sumac.

How does one engage with and transform, but not necessarily disappear, history? Landscapes have been fertile ground for planners, geographers, art theorists, and others thinking about how humans activate the environments and spaces around them, particularly as we create patterns that communicate some messages and hide others.¹⁵ Denis Cosgrove, in an iconic 1984 essay about landscape and European Renaissance art, laid out how the composition of landscape paintings of the time provided viewers with a sense of mastery in which much of the material conditions of rural life, especially those related to labor, were hidden or romanticized. Grant Kester made similar observations about the compositions of eighteenth-century English landscape gardens and the herculean labor required to make “nature appear natural.” Ecological restoration efforts in damaged landscapes risk “distracting from historical trouble,” as Elizabeth Spelman has observed, while often done with good intentions, such restorations can erase history and the shameful actions tied to it in dangerous ways. Stephen Daniels, referring to work by John Berger, describes the “duplicity” of landscape, a quality that cannot be resolved but serves as a signal to inquire into the politics and histories of how landscapes are made and maintained. He writes, “We should beware of attempts to define landscape, to resolve its contradictions; rather we should abide in its duplicity.”¹⁶

It’s interesting to reflect on this notion of the duplicity of landscape. Indeed, some of the labor for planting this municipal art production was provided by Greencorps via a carceral system constructed out of racial injustice, labor that was not evident in the final product. Yet, contrary to obscuring a history of contamination, Frances’s work was generated by hidden pollutants, surfacing and seeking to transform them via a people-plant-microbial alchemy into flowers, fragrance, texture, color, fruit, and more. She offered a new take on gardening for the twenty-first century—a way to understand garden

plants not only as beautiful and often ephemeral companions, but also as partners in the work of attending to legacies of injustice and pollution.

It's also helpful, thinking through *Slow Cleanup*, to return to the three conditions for loving orphaned space. Following the first one to "reject the void," the project helps us comprehend the vast landscape, not only above but also below ground, orphaned by car culture. The project gestures to the costly and racially uneven legacy of spilled oil and gas that sickens people and continues to orphan space, especially near those already disadvantaged by discrimination. This legacy can be hard to comprehend, lying invisible underground. Part of the power of *Slow Cleanup* is, to quote Ukeles, how it "flushes up into our consciousness" the persistent contaminants in these numerous shadow places. By manipulating the science and technology of phytoremediation, Frances, working with Paul Schwab, pulls this legacy into view, transformed. Contrary to a simplistic ambition to beautify a landscape, the extravagance and complexity of her design can be seen as a radical centering of the perspective of nearby residents rather than, for example, importing an external ecological vision of "natural" landscape on the site.

The manipulation of science, technology, and aesthetics in *Slow Cleanup* ties into what I say more about in the next chapter regarding the "diplomacy" of art (condition #2). Not much about this project fit with standard operating procedures for the City of Chicago, whether the application of phytotechnology, the aesthetically driven design of the research plots, the selective engagement with programs like Greencorps, or the time required to search out a Wortken. Challenging business as usual will always pull people out of their comfort zones. While this is risky, and people situated within organizations are often not in positions to take those risks, the benefits in terms of realizing new solutions and engaging with new partners can be enormous. Frances's persistence and willingness to go against the grain were critical ingredients to loving that orphaned space.

Slow Cleanup benefitted from a close art-science collaboration, an example of condition #3 to use "collective imagination." Paul Schwab and Frances worked together to reorient phytoremediation technologies to include a new suite of research objects—specifically,

a new set of people-friendly plants that can help combat soil contamination and provide pleasurable company where there was previously only a depressed conversation. The choice of plants to work with was confirmed via the science of plant root-microbial interaction but also an artist's intuition. As Frances put it to me: "As a sculptor you *have* to understand the material you work with. You have to know all about different processes, and the science, the chemistry, etc. Technology and art have never, until the last 100 years, been thought of as separate. I have to make a place where people can see they are not separate."

This kind of "ontological transformation" of the objects and relations of research is a critical contribution of art-science collaborations, a fleshing out of the possibilities of inter- and transdisciplinary research.¹⁷ Attentive to the surroundings and the historical conditions perpetuating the languishing of the site, Frances employed the "grand gesture"—but inverted its orientation toward those typically not gestured to. Her work generated a new suite of characters and relationships in the narrative of such orphaned landscapes.

Artists have a history with toxic landfills and the alchemy of plants, microbes, and soil. As mentioned before, Mel Chin's *Survival Field* aimed to exhibit phytoremediation as an underground "sculpting" of the land. Other creative efforts exploring gas stations and phytoremediation have designed miniature gardens that gesture to car culture while including plants that remediate soil and water. Is this "beautification"? We are suspicious of design as it obscures originating ideas—baiting audiences with a lovely but deceitful form. This apparent independence of design is often referred to pejoratively as propaganda, notes Zachary Kron writing on the challenges of engaging with repugnant and toxic objects. But he also notes, "We must also consider the value of propaganda not as an enticement to embrace that which is sinister, but to endure that which is difficult."¹⁸ Abandoned gas stations, like many orphaned spaces, are bereft of much that is attractive to humans and other life. The role of *Slow Cleanup* in making enduring the challenge of proximity to a toxic space, where purification happens only on "plant time," is convincing.

While the list of promising new horticultural remediating plants stands as a durable result of Frances's aesthetically charged research,

the precarity of the specific context of the project is hard to miss, a commonplace occurrence for any project funded by political administrations. The project reveals, even while seeking to go “higher up the food chain,” the limits of local control over such spaces. The short duration of the project allowed little time for Frances to generate the type of local interest and support that might have somehow overcome city bureaucracy. By excavating the history of gas station site contamination and abandonment, we can begin to untangle the global reach of the factors at work generating the “typology” of this orphaned site and the ongoing conditions for the precarity of local control and involvement, even while burdened by the risks and ongoing negative impacts.

And this is not a problem of the past. The contaminating layers in the soil remain, both in old gas station sites and in new ones made every day. Writing about the “slowly dying” fossil fuel industry, Bill McKibben describes 93,000 inactive oil and gas wells in Alberta, Canada, as “orphaned”—the companies that owned them bankrupt, leaving wounds in Earth, leaking greenhouse gases into the atmosphere and contaminants into the soil and water table, and saddling taxpayers with the cleanup bill.¹⁹

As we move forward to contend with the myriad “wounds,” Frances’s project suggests how we might wrangle with the forces enabling the creation—as well as the abandonment and orphaning—of such contaminated sites. Her work populates our imaginations with new ways of connecting and enduring by providing new technologies for both inhabiting and healing.