

DRAFT: 29 July 2010

[Greater] Cleveland Action Plan for Vacant Land Reclamation

INTRODUCTION

In 2008-2009, the *Re-imagining a More Sustainable Cleveland* identified a series of principles to promote the strategic reuse of vacant urban land. These principles included three broad categories of vacant land reuse: (1) stabilization and holding strategies for areas of the city where new development is anticipated; (2) green space expansion and green infrastructure to improve ecological systems, increase access to parks and amenities, and improve public health; and (3) productive strategies (including urban agriculture and the generation of alternative energy) as a means to extract an economic benefit from vacant land.

To test these principles, the City of Cleveland and Neighborhood Progress, Inc. funded 56 vacant land pilot projects across the city, chosen through a competitive, neighborhood-based process. The implementation of these projects is currently underway with neighborhood stakeholders and two community partners (ParkWorks and the Ohio State Extension). These projects include community gardens and small-scale farming operations, native landscapes and pocket parks, soil remediation experiments, and stormwater management projects. The pilot projects provide an important outlet for community engagement; they demonstrate the inherent value of land at the neighborhood scale. The pilot projects also provide a means to evaluate various alternatives for vacant land reuse. The most successful and effective alternatives can then be scaled up in an effort to address the city's growing inventory of vacant property.

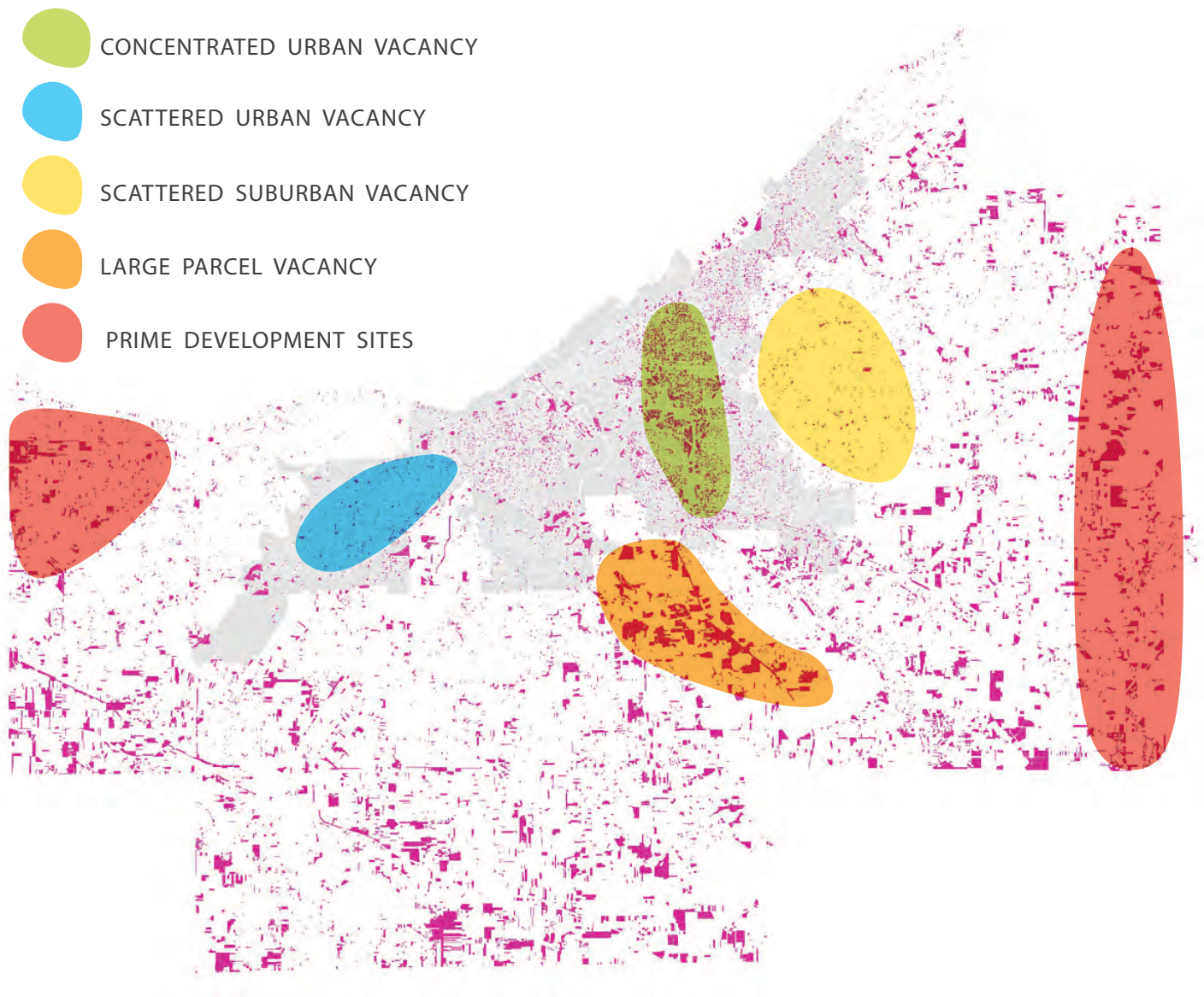
In 2010, the *Re-imagining* effort was expanded beyond city limits to include all of Cuyahoga County. The new initiative, *Re-imagining a [Greater] Cleveland* includes a series of county-wide land use overlays that delineate optimal areas for specific vacant land reuse strategies, including parts of the city and county that are most suitable for agriculture, stormwater management, and energy generation. At the city-wide scale, overlays have also been developed to identify areas most suitable for redevelopment and priority areas for land stabilization efforts.

The characteristics of vacant land vary throughout the county, but vacant sites can be categorized in general terms as follows:

- (1) *Concentrated urban vacancy*: areas within the city of Cleveland (most notably on the east side of the city) with high concentrations of vacant buildings/land and depressed property values.
- (2) *Scattered urban vacancy*: areas within the city of Cleveland where vacant residential lots are interspersed with occupied housing with stable or gradually declining property values.

- (3) Scattered suburban vacancy: dispersed pattern of vacancy, increasingly occurring in inner-ring suburbs. Characterized by growing numbers of vacant buildings, but fewer demolitions/vacant sites than comparable neighborhoods in the city of Cleveland.
- (4) Large-parcel vacancy: concentrations of vacant commercial and/or industrial sites, typically found along industrial rail corridors in the city and in commercial and industrial areas of some of the inner-ring suburbs, particularly the suburbs immediately south of Cleveland.
- (5) Prime development sites: never developed land and infill residential sites at the periphery of the county.

FIG 1: Range of vacancy conditions in Cuyahoga County



Scattered vacancy can be addressed through small scale interventions like pocket parks and community gardens, along with lot consolidations that incrementally reduce neighborhood density. The initial *Re-imagining a More Sustainable Cleveland* pilot projects address the scattered vacancy condition.

Areas of concentrated, large-scale vacancy can be found in areas with moderate to high development potential—these are the landbank hold areas where the city is assembling land for future development. Here, the focus is on stabilization efforts to make these areas look clean, safe, and ready for development. There are also areas of concentrated vacancy with low development potential. In these areas, vast tracts of land can be assembled, now or over the next few years, for which there is no apparent development demand and no immediate use.

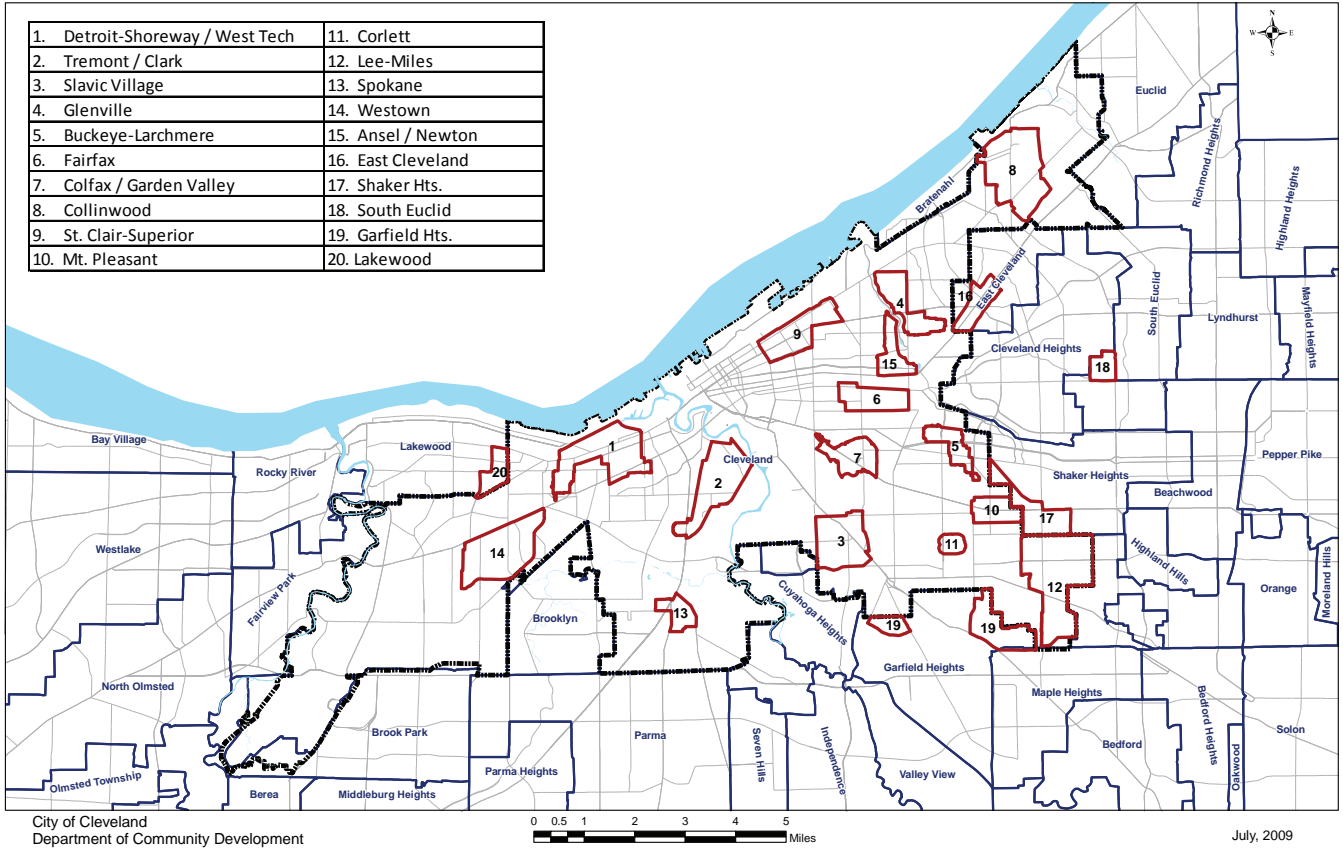
Re-imagining a [Greater] Cleveland will outline a range of large scale vacant land signature projects that address underlying economic, ecological, and social systems and set the stage for land reclamation efforts across the city and county. The unifying goals of *Re-imagining a [Greater] Cleveland* are to unleash the value inherent in vacant land, to restore the region's watersheds, and to establish more sustainable patterns for future development.

CRITERIA

Signature projects will:

- (1) Leverage partnerships and expertise of the Re-imagining initiative; BUT FOR this process, the idea would not be fully realized
- (2) Advance a VACANT LAND REUSE agenda
- (3) Weave together multiple objectives - NO SILOS
- (4) Achieve UNIQUE outcomes that are REPLICABLE
- (5) Have MEASURABLE, SUSTAINABLE impacts
- (6) Address the SCALE of the vacancy challenge
- (7) Involve MULTIPLE JURISDICTIONS, city and county
- (8) INVOLVE neighborhood stakeholders
- (9) Provide access to ECONOMIC OPPORTUNITY
- (10) Align with FUNDING OPPORTUNITIES, including NSP2 target areas
- (11) Address HEALTH IMPACTS
- (12) Change the image of Cleveland and be ICONIC
- (13) REINFORCE current and planned investments

HUD NSP 2 - Target Areas



VACANT LAND RECLAMATION STRATEGY

A vacant land reclamation strategy for [Greater] Cleveland includes three primary components:

- (1) Local food assessment and business plan
- (2) Large-scale vacant land stabilization
- (3) Vacant land initiatives organized within catchment (or local stormwater drainage) areas

Local Food Assessment and Business Plan

Michael Shuman, Leslie Schaller, and Brad Masi are currently preparing a local food assessment and business plan to determine the economic impacts of increasing local food consumption and supporting urban agriculture. The intent is to help greater Cleveland be more competitive nationally in food production and related enterprises, while also becoming more locally self-reliant.

There are many aspects of the local food agenda, but from the perspective of vacant land, there are three issues of major significance:

- (1) **ECONOMIC DEVELOPMENT:** can urban agriculture be an economic development driver for Cleveland and Cuyahoga County, one that uses vacant land as resource for launching new businesses and creating jobs? If so, what kinds of crops and livestock can be best produced here, and what are the land requirements for this production? The local food assessment is addressing these questions. To build on this, we can establish some goals and benchmarks for local food. For example, could a stronger local food economy:
 - Reduce unemployment in the city by 5%?
 - Create 1,000 new jobs in five years?
 - Create 200 new businesses in five years?
 - Attract 1,000 agri-tourists each year from outside the greater Cleveland region?

This analysis could be translated into land use recommendations that would align vacant land resources with desired outcomes.

- (2) **THE HUNGER-PROOF CITY:** Community gardens provide sustenance to people throughout Greater Cleveland and have been an especially useful tool for getting fresh, healthy food to low-income residents in the city's food deserts. But the local foods movement, particularly as represented by the region's many successful farmer's markets, typically serves a more affluent clientele. The *Re-imagining* initiative will examine whether vacant land can be used to completely eradicate hunger in the City of Cleveland. To determine whether this is possible, we will need to know:
 - How many people/families/children in the city experience chronic hunger (Cleveland Foodbank)
 - What is the combined annual caloric need of this population?
 - What combination of crops and livestock would produce enough calories to completely eradicate hunger in Cleveland?
 - How much land (and in what configuration) would be needed to produce these calories?
 - What would it cost to produce the necessary food locally? How does this cost compare to the cost of importing food from outside of our foodshed?
 - What is the value of the indirect benefits of local food, such as land stabilization, job creation, local self-reliance, and reductions in crime.

- (3) URBAN FARMSCAPES: Urban agriculture is on the rise in Cleveland, due to an energized local farming community and the progressive policies and legislation in the City of Cleveland. Many cities across the country have also embraced the urban agriculture movement. Greater Cleveland could distinguish itself from these other cities with innovative approaches to design and agri-tourism through the development of beautiful, multi-tasking farmscapes. The patterns of agricultural production can be arranged to create compelling places that people will want to live near and visit.

Large-scale vacant land stabilization

Background The main objectives of vacant land stabilization are to improve the aesthetics of vacant sites and to stabilize and enhance adjacent property values. But vacant land stabilization practices can also provide other valuable benefits, such as a reduction in maintenance costs, an improvement in ecological functions, and reduced public exposure to soil-based lead and other contaminants.

Currently, Cleveland's post-demolition strategy consists of sowing grass seed on vacant sites after a building demolition occurs. The property owner (or more often, the Cleveland Parks Department) assumes the responsibility for mowing these lots. The City of Cleveland spends approximately \$3.3 million per year to mow and maintain vacant lots in the city's landbank (more than 5,700 properties), along with privately owned lots that are not being taken care of by the property owner. The city charges a fee for this service; any unpaid fees are added as a lien on the property title. Frequently, the city does not recover its costs. Instead, the lien can be used to force a tax foreclosure after which the property becomes part of the city's landbank. The city gets the land and retains the responsibility for its maintenance unless the property is later transferred to a private owner. As a result, the city's responsibilities for vacant land maintenance continue to grow, while its financial resources to fulfill these responsibilities continue to decline.

Beyond city limits, some inner-ring suburbs have also seen an increase in vacant land maintenance responsibilities, particularly as houses are demolished in the aftermath of the foreclosure crisis. While vacant land issues have not reached the same level in the suburbs as in the city, suburban municipalities may face increased challenges and costs as the amount of unmanaged vacant land begins to increase in these communities.

In addition to the need for on-going maintenance, vacant sites also have ecological and environmental remediation issues. The common approach of planting turf grass offers relatively little benefit in terms of increasing ecosystem performance. Preliminary soil tests by the US EPA on vacant sites in Cleveland indicate that stormwater infiltration on a typical site is roughly equivalent to that of a paved parking lot. During a heavy rain, a significant amount of stormwater on these sites does not soak into the ground; it runs off into the storm sewer system. Most likely, this is because urban soils tend to be compacted and this compaction is further increased by the heavy equipment used for demolition. Also, turf grass has a shallow root system and does very little to reduce soil compaction and allow for the infiltration of stormwater.

Vacant sites would offer more opportunities for stormwater collection and infiltration if a wider range of vegetation is planted on vacant land. At the scale of the city and the county, increased stormwater infiltration will help to improve water quality and reduce the number of combined sewer overflow incidents that occur when storm sewers overflow into sanitary sewers and release sewage into Lake Erie.

Turf grass also offers little benefit in terms of wildlife habitat and biodiversity. A wider range of plant materials on vacant sites could enhance urban ecosystems by creating habitat for birds, butterflies, pollinators, and other wildlife. A more diverse landscape would also begin to restore fertility to degraded urban soils so that the city's tree canopy could be gradually reestablished. Increased soil fertility also ensures more complete ground cover on vacant sites, which would in turn reduce human exposure to soil-based contaminants such as lead and other heavy metals which are prevalent in many older neighborhoods.

An optimal mix of plant materials need to be identified that will provide habitat, increase biodiversity, reduce soil compaction, increase stormwater infiltration, reduce the city's maintenance costs, and provide full soil coverage on vacant sites. These plants (or seed mixtures) must also be low in cost, easy to establish, and have a high survival rate in challenging urban conditions. Furthermore, the plants must form a landscape that is aesthetically and culturally acceptable in city and suburban neighborhoods.

Large-scale vacant land stabilization can be achieved through several inter-related alternatives. The city (and possibly the county, or some portion thereof) could commit to a proactive new strategy for the planting and maintenance of vacant sites and implement this strategy over a large percentage of the sites currently in the city's land bank, the county's land bank, and privately owned sites that are being maintained by the city and county. The goal of this effort would be to significantly reduce the city's annual maintenance costs, perhaps by as much as \$1 million, and to adopt similar efforts to reduce the cost of holding and maintaining land in the county land bank.

Stabilization signature projects need to fundamentally change the existing system of vacant land management, so city maintenance crews are working smarter and getting a better outcome. Innovative, cost-effective stabilization practices be incorporated into the city's demolition specifications; new stabilization strategies can be phased in across the city, starting with the 1,000+ vacant sites that are added to the city's inventory of vacant land each year as a result of demolition efforts.

Stabilization Alternatives

Alternative 1: MULTI-TASKING LANDSCAPE

Nick Basta at Ohio State University and Sandra Albro at the Cleveland Botanical Garden have developed a proposal for large-scale vacant land stabilization that aims to:

- enhance soil fertility on vacant sites so that attractive, low-maintenance ground covers can become well-established;
- reduce the city's mowing and maintenance costs through the use of plant materials that require less mowing and maintenance than turf grass;
- reduce exposure to soil-based lead contamination;
- enhance property values by achieving a consistent appearance of maintenance and stability and stewardship for vacant sites throughout the city/county.

Cleveland's vacant sites typically lack the range of soil nutrients and organic matter needed to support healthy vegetation, resulting in a loss of ecosystem services such as air and water filtration, runoff reduction, noise reduction, temperature regulation, and plant and animal habitat. Soil contamination, particularly lead contamination from paint and gasoline, is widespread in Cleveland and poses a risk to human health. Phosphorus is a low-cost treatment for both soil degradation and lead contamination. It is an important nutrient for plants and is a main ingredient in most plant fertilizers. In recent years, high-phosphorus soil amendments have been shown to irreversibly bind to soil lead, reducing its toxicity by up to 85%.

Poultry litter, a combination of manure, straw, and feathers from poultry farms, is a plentiful source of phosphorus, organic matter, and other nutrients that support plant growth. In addition to binding soil lead, poultry litter has been shown to enrich soils and reduce runoff.

Dredged material from the Cuyahoga River shipping canal is another potential source of phosphorous. Disposal of dredged material is a major challenge for the Port of Cleveland. More than 250,000 cubic yards of sediment is excavated each year in order to keep the Cuyahoga River and Lake Erie shipping channels navigable. The current disposal facility (near Burke Lakefront Airport) is nearly full. Constructing a new disposal facility will be a costly proposition and a location for a new facility has not been determined. If contaminants can be cost-effectively removed, dredged materials could be used to create a fertile top soil blend that could provide a planting base for vacant sites.

Although experimental in nature, a phosphorous soil treatment applied to vacant sites could improve soil fertility and reduce exposure to lead contamination, while supporting an attractive, low-maintenance landscape that reduces the city's maintenance costs and enhances neighborhood property values.

Alternative 2: INDICATOR LANDSCAPE

Numerous commercial and industrial sites around the city and county have been tested for contamination and there are extensive and complicated records and reports that document locations of known brownfields sites around the region. Less is known about contamination levels in residential neighborhoods. Adjacency to industry, freeways, and major arterial roadways and the average age of the housing stock provide some indication of the likelihood of contamination, but there is no comprehensive inventory of soil contamination levels for the city or the county.

Landscape architect Alan Berger of the Project for Reclamation Excellence at MIT has suggested that vacant land stabilization practices could also provide some indication of relative levels of contamination and soil fertility on vacant sites through the use of indicator plants. An indicator plant is one that grows in some specific environment, allowing an assessment of soil conditions in a place by simple observation of vegetation. Indicator plants could be used to monitor the presence or absence of certain soil contaminants (such as lead, cadmium, arsenic, etc.) and also to identify areas where soils are particularly fertile or degraded. This is an experimental technique in which a seed mix of indicator species could be developed and applied to many vacant sites simultaneously through hydro-seeding or other low cost methods. For example, all the vacant sites in a neighborhood, or all of the city's demolition sites for one year, or a large percentage of vacant sites in the could be hydro-seeded with indicator plant species. Then, by observing what grows and doesn't grow on these sites, we would have a clearer sense of where the contaminated and clean areas are within the city, as well as a broad-brush picture of soil fertility levels. The indicator landscape could guide land use policies and allow for the targeting of more in-depth and site-specific soil testing. It could also form the basis for a clean site inventory in which vacant properties in the city and county that have the lowest likelihood of contamination are identified, classified, and mapped (based on methodology used for a similar inventory in Hennepin County, Minnesota).

Alternative 3: SUCCESSIONAL LANDSCAPE

Contrary to popular belief, "nature" and indigenous plant communities do not automatically become re-established when a neighborhood's population declines and formerly developed properties are abandoned. If we hope to restore some aspects of Cleveland's pre-settlement landscape and support the return of a mature tree canopy in the city, soil conditions will need to first be improved by re-establishing smaller scale vegetation on urban lots. Grasses, groundcovers, prairie plants, and perennials could gradually be established on city lots, although this process will require great care and good stewardship. These smaller-scale plant communities will add organic material to existing soils and their roots will help to reduce soil compaction. Over time, these sites may begin to support larger scale plants, shrubs, and trees, leading to the return of something that would begin to resemble Northeast Ohio's pre-settlement landscape of oak savannahs and wetlands. The Slavic Village Development Corporation and Metroparks ecologist John Mack have developed a small-scale, successional landscape for several sites along East 71st Street, a street with numerous vacant lots. The project was designed to grow as more vacant lots become available, creating a prairie/forest landscape that is integrated with the remaining houses.

On large, vacant industrial, commercial, and retail (brownfield/greyfield) sites, a series of successional plantings could be devised that will use these sites to re-create healthy soils. Landscape architect Charles Frederick has proposed a short-term (five-year) strategy could be developed in which increasingly substantial plant materials are introduced on a site to rebuild soil structure. At the end of five years, the resulting soil could be transported to sites elsewhere in the city or the county and then the process would begin again.

Alternative 4: SPONTANEOUS LANDSCAPE

Re-establishing native vegetation on vacant sites in city neighborhoods can be a challenge, since urban development often alters and undermines the ecosystems that are needed to support native plant communities. Broad expanses of pavement, reflected heat, polluted air, and contaminated soil make it difficult for native species to thrive. However, there are a number of plants that manage to grow spontaneously, even in the harshest urban conditions. There are positive and negative aspects of these invasive species. On the negative side, there is a tendency for these plants to crowd out native plant materials and alter wildlife habitats, and there is a risk that these plants will spread beyond vacant urban sites to parks and natural areas within and beyond city limits. But on the positive side, these plants provide ecological services, on their own and free of charge, that include temperature reduction, oxygen production, carbon storage, food and habitat for wildlife, pollution mitigation, and erosion control on slopes.

Alternative 5: GUERRILLA LANDSCAPE

While the city is responsible for official land stabilization actions on land bank properties and abandoned sites, citizen-driven activities can complement the city's efforts. A signature project could be devised to foster a do-it-yourself culture of vacant land management. A guerrilla gardening movement is spreading across the country in cities large and small, in which residents plant and landscape properties they do not own without any approval or permission from the property owner. Guerrilla gardeners are often motivated by a desire to beautify their neighborhoods or an interest in growing their own food. Eco-activism is another aspect of guerrilla gardening, since these efforts can turn neglected spaces into ecologically productive sites that reduce heat island effects, create wildlife habitat, sequester carbon, and manage stormwater. Guerrilla gardening sometimes also has a social component—late night planting parties, seed bomb initiatives, pop up events, and the lure of unauthorized behavior helps to build a community of like-minded individuals.

A guerrilla landscape signature project would be more of a programmatic intervention than a physical one. We could develop an arsenal of do-it-yourself greening weapons—seed bombs, postcards with seeds embedded in the paper, crack garden kits, improvised urban planters, etc. This would be combined with training for community development corporation staff, neighborhood activists, and others, along with an interactive website to enable “the troops” to interact and share their success stories.

Implementation support

Urban Long Term Research Area Exploratory grant (ULTRA Ex) The National Science Foundation has awarded Cleveland an ULTRA Ex grant to conduct research into the ecological reclamation of vacant land. The ULTRA Ex team includes scientific researchers from Cleveland State, the Cleveland Metroparks, Ohio State, and the staff of the Cleveland Urban Design Collaborative. ULTRA Ex has resources to develop vacant land experiments and to measure and analyze the ecological impacts of vacant land projects. The various vacant land strategies described above could provide the basis for this work.

West Creek Preservation Committee/Vacant Land Management: The West Creek Preservation Committee has expanded its jurisdiction so that it can now acquire, hold, and manage property outside of the West Creek watershed. The organization is developing the capacity to take on the implementation and maintenance of land stabilization practices throughout the county/

Greater Cleveland Stabilization and Neighborhood Improvement Fund: A funding endowment could be established for long-term vacant land stabilization. The City and community development corporations could create maintenance/training program similar to a program at Burton Bell Carr with rotating staff and set up an educational program in vacant land maintenance with JobCorps. As organizations and neighborhoods install green infrastructure features such as bioswales, these programs would teach this rotating staff how to maintain them. This could be a collaborative venture with the Cleveland Foundation to set up new co-op that pulls from these new trainees and offers stabilization and maintenance services to developers and other land holding entities.

City/First Suburbs vacant land inventory: The County needs a detailed, up-to-date, shared data resource for vacant land. Currently, County records are out of date for tracking vacant land (recent demolitions) and municipal land bank properties. The appraisal records (for taxation purposes) and even the sales transaction records (transfers to land banks) are often a year or more out of date. The County Planning Commission could go to the municipalities for their records on vacant land, demolitions, and land bank properties. There are 59 municipalities in the county, but the inventory would focus on a subset of these communities—the First Suburbs Consortium members (where the problem is worst). The County could work with Cleveland and the first suburbs communities to arrange for simple monthly updates, which would be mapped. This would provide cities and the County Land Bank with up-to-date inventories of vacancy on which to base their acquisition decisions.

VACANT LAND STRATEGIES ORGANIZED BY CATCHMENT (STORMWATER DRAINAGE) AREAS

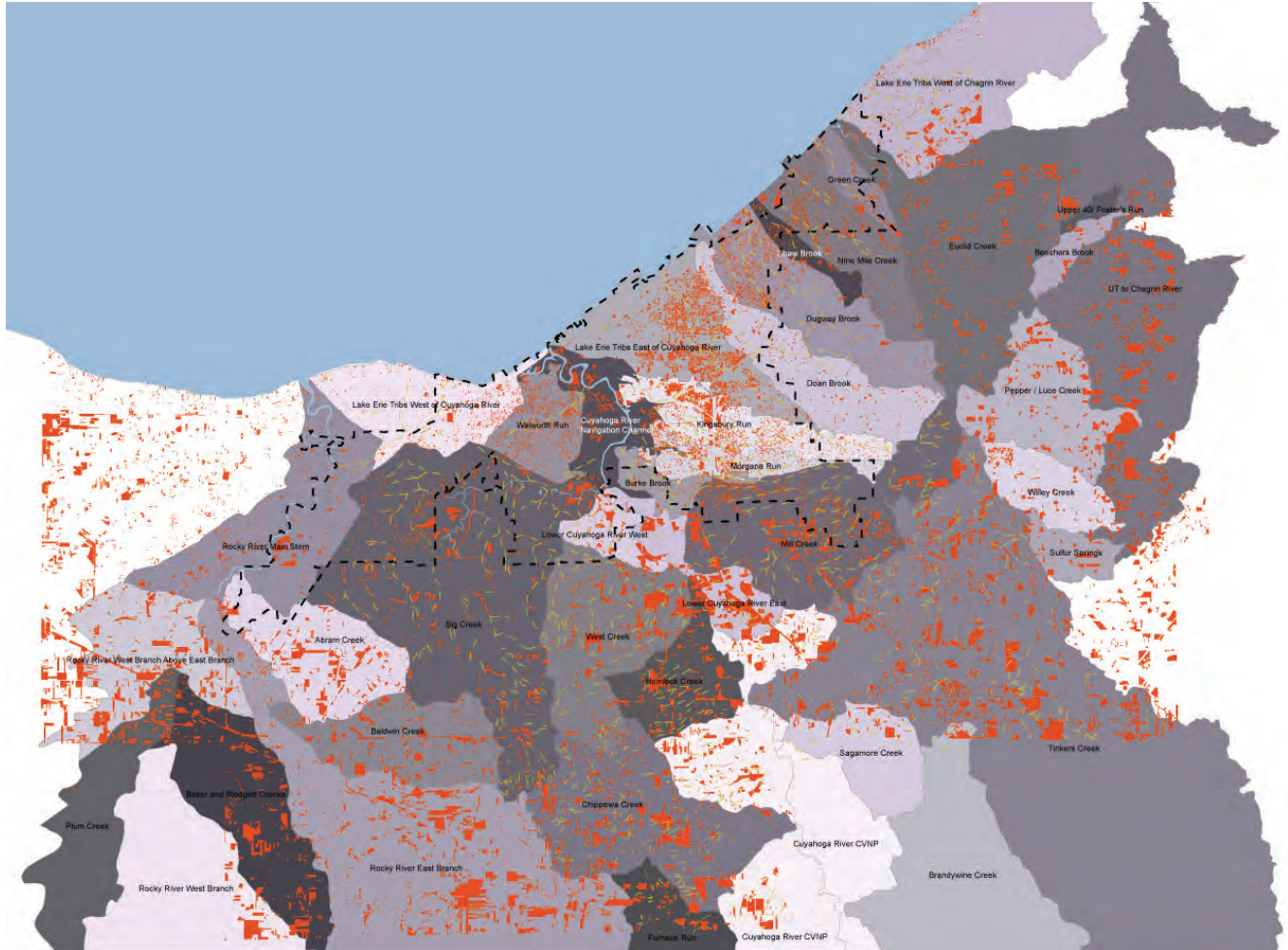
Water is [Greater] Cleveland's competitive advantage. The challenges of population loss and large-scale vacancy are common to many Great Lakes cities. Through the *Re-imagining* initiative, we have an unprecedented opportunity to use vacant land to restore the region's watersheds, safeguarding our most valuable natural asset.

The region's underlying hydrology provides a useful mechanism for organizing vacant land initiatives and integrating the efforts and activities of multiple organizations and entities that have vacant land projects underway or under consideration. The smallest unit of a watershed is a catchment area. The smallest geographical boundary within a watershed is a catchment area. A catchment area is the extent of land where water from rain and melting snow drains downhill into a body of water, such as a river, creek, lake, or wetland. A catchment area includes both the streams and rivers that convey the water as well as the land surfaces from which water drains into those channels, and is separated from adjacent basins by a drainage divide. The catchment area acts as a funnel by collecting all the water within a given area and channeling it into a waterway. Each catchment area (or drainage basin) is separated topographically from adjacent basins by a geographical barrier such as a ridge or hill, which is known as a water divide.

When catchments are clustered into a related group, they form a sub-watershed. And a group of sub-watersheds clustered into a group forms a watershed (for example the Cuyahoga watershed or the Lake Erie watershed). In this document, we have organized vacant land initiatives based on their location within their respective sub-watersheds. This enables us to begin to bring these projects together and evaluate their effectiveness in terms of ecosystem restoration. We can identify ecologically sensitive areas within the city and county where vacant land conservation and restoration efforts should be concentrated. We can also see areas of the region where vacant land is very limited and building-based best practices will be most effective approach to watershed restoration and protection.

It's important to note that many kinds of vacant land projects can strengthen and protect our watersheds. Stormwater management projects are just one example of a watershed-based vacant land initiative; agriculture, stabilization, energy, green space, and development projects can also be designed to enhance the region's watersheds and protect Lake Erie.

FIG 3: Cuyahoga County Vacancy by Sub-Watershed



Cuyahoga Sub-watersheds

1. Cuyahoga River Navigation Channel

Vacant land is fairly limited in this catchment area. Building-based green infrastructure strategies (i.e. green roofs, rainwater cisterns, pervious pavement, bioswale streetscapes) should be encouraged for all new development in dense downtown areas.

Medical Mart, Convention Center, re-design of Cleveland's Malls, Flats connector trail; Flats East Bank Development, Public Square redesign, Rivergate project in the Flats; green street demonstration project, city-wide design guidelines.

Large-scale, commercial urban farming operation, developed in Ohio City/Riverbed Road/St. Emerick's Church in conjunction with a business plan and a health impact assessment so that the economic and social impacts of the project are integrated.

2. Kingsbury Run

Farmscape Linked network of food producing sites in the city, inner-ring suburbs, and townships based on the recommendations of the Northeast Ohio Food Assessment. Possible location: Central/Kinsman (with possible linked farming sites in suburban/rural parts of the region).

Green infrastructure and redevelopment project for Hyacinth Park/Myers Dairy site

Green infrastructure project for East 79 Street site in the Forgotten Triangle that could potentially replace a planned storm sewer pipe with a wetland/public green space near the proposed Opportunity Corridor.

Opportunity Corridor: Green street/green infrastructure potential in what will become a prime development area based on a major infrastructure investment, the planned Opportunity Corridor which will link the airport to University Circle and create development opportunities in city neighborhoods.

3. Morgana Run

Micro-Prairie project: John Mack of the Cleveland Metroparks has been working with the Slavic Village Development Corporation on a scattered-site prairie restoration project on vacant sites along East 71st Street (near the Morgana Run Trail). The project includes native landscapes on scattered/clustered vacant sites in a residential neighborhood. This model can be expanded within the neighborhood as more vacant sites become available, and also transferred to other neighborhoods experiencing similar conditions.

4. Mill Creek

Lee-Miles/Kerruish Park Build on stormwater management project activity at Kerruish Park; Intensive tree planting in the neighborhood around the park on vacant land and by residents; Expand Kerruish park through string of vacant lots to the east of East 178th Street; Plant new street trees in whole neighborhood doing one street per year beginning with Tarkington.

5. Doan Brook

Mini-Emerald Necklace Create off-road bike and pedestrian greenway through reclaimed vacant land that creates a loop from Rockefeller Park, touches Cleveland Clinic campus, loops around and connects to Gordon Park at the Lake; Create small pocket park "fingers" that extend from Rockefeller and touch the main loop; incorporate native plantings; reforest neighborhood through resident-based street and park planting program. Incorporate best management practices for stormwater throughout. Market project both ecologically and as an incentive for additional development; easy and safe access to employment center (Cleveland Clinic). Set up funding mechanism for maintenance; begin maintaining lots along trail corridor prior to full completion; add trees, signage, stormwater infrastructure.

St Luke's Point A major private- and public sector development initiative, just west of Shaker Square. The project includes new housing, a new school and library, improvements to a Rapid Transit Station, and the planned rehabilitation of one of the former St. Luke's Hospital buildings. Green infrastructure investments in this area could complement the other recent investments and help to re-ignite market interest in the project.

Superior 5 Multiple site vacant land stabilization in an area that has the potential for future development. This area would be an opportunity to implement multi-level stabilization strategies, from simple landscaping approaches to more ambitious greening and public art projects.

6. Dugway Brook

Inner-ring to Lake Erie connection: Aligning vacant lots to link Forest Hills Park (Cleveland Heights/ East Cleveland) to Patterson Park (East Cleveland) to Bratenahl Park (Bratenahl) and Lake Erie. The Cuyahoga County Planning Commission, the Cuyahoga County Health Department, and the Center for Healthy neighborhoods at Case Western Reserve University (among other partners) are working on a strategy for East Cleveland to promote youth development and improved public health outcomes in East Cleveland. 150 residential demolitions are planned in East Cleveland. The alignment of Dugway Brook provides an opportunity to create a green connection between Cleveland, East Cleveland, Cleveland Heights, and Bratenahl that takes advantage of existing and soon to be vacant sites, and improves water quality by re-establishing a more natural flow of stormwater from the eastern suburbs to the lake.

7. West Creek

The West Creek Greenway: For the past ten years, the West Creek Preservation Committee has been coordinating efforts to develop a fifteen-mile recreational trail system, extending through Brooklyn Heights, Independence, Parma and Seven Hills. This trail will connect to the Ohio & Erie Canal Towpath Trail and it is also envisioned to connect neighborhoods, business districts, historical landmarks and other public parks and recreational amenities such as the West Creek Reservation, the Cuyahoga Valley National Park, Canalway Reservation, Brooklyn Heights Park and Henninger House. In 2006, Cleveland Metroparks was awarded a Transportation for Livable Communities Initiative (TLCI) grant from the Northeast Ohio Areawide Coordinating Agency (NOACA) to study and propose the most feasible and effective trail route for those areas of the Greenway Trail that remain in a conceptual state.

Water Resource Restoration Sponsor Program: In 2004, the Sewer District was awarded funds from Ohio EPA's Water Resource Restoration Sponsor Program (WRRSP) to implement projects in partnership with West Creek Preservation Committee that address non-point pollution sources along West Creek. \$3.5 million was awarded to support restoration activities ranging from preservation and protection to intensive repair of affected stream and aquatic habitats. Work is focused on the more urbanized reaches of West Creek towards the mouth of the Cuyahoga River in Independence, Brooklyn Heights, and possibly Parma.

8. Big Creek

Commercial composting operation, possibly in proximity to the Cleveland Metroparks Zoo.

Lower Big Creek: greening and redevelopment strategy for a 1/2 mile stretch of the lower Big Creek to reconnect the neighborhood to the Cuyahoga Valley.

Spring Road alternative energy project: Potential location for a solar array on a landfill site.

9. Walworth Run

Train Avenue green infrastructure alternative: URS developed a scattered site raingarden strategy for Walworth Run that would capture the first 0.75” of rainwater through raingardens on vacant lots, in parks, in school yards and on industrial sites.

10. Burke Brook

11. Lower Cuyahoga River

12. Tinkers Creek

13. Multiple Catchment Areas

Green Cap strategy to create functional and beautiful landscapes on top of/in conjunction with NEORS D stormwater control projects; distinctive, usable green spaces that reinforce adjacent property values, build community support, make underlying hydrological systems legible, and allow for needed access and control to gray infrastructure systems by NEORS D.

Emerald Fibers network based on assembling and re-vegetating vacant land over the actual or approximate location of buried and culverted waterways. The resulting riparian pathways can be used to manage stormwater runoff that will, in turn, improve water quality in the river and the lake. These pathways also provide an opportunity to restore the city’s depleted tree canopy and reduce urban heat island effects, reducing the energy costs for adjacent development. Over time, a network of formerly vacant sites will emerge as the green arteries of the city, connecting residents with the river and the lake, and creating attractive frontage for new development. (see Inner-ring to Lake Erie Connection for Dugway Brook)

Metroparks expansion areas assembling vacant parcels adjacent to Metroparks properties in an effort to expand parklands and link them to neighborhood parks and other amenities per the principles of the County GreenPrint. *Urban Oasis project:* strategic reforestation initiative to mitigate urban heat island effects and reduce energy costs by shading the hottest spots in the city and county.

14. Locations to be Determined

Urban Ecology field station: ULTRA Ex outdoor laboratory, teaching garden, and (semi) public green space.

Energy Project: identify neighborhood clusters (with low vacancy potential – but a few vacant parcels) for creation of community (shared) geothermal development.

BioCellar: Jean Loria of CT Waterworks proposed a concept for reusing the masonry foundation of demolished or deconstructed houses to support agriculture, stormwater, energy generation, and other projects. A re-purposed foundation would become a BioCellar; the existing foundation wall (surrounded by earth) is an insulated container that can store energy and serve a variety of productive functions such as green houses, solar collectors, aquaculture facilities, stormwater filtration, and other new uses. The CUDC is currently studying some of the structural and energy-performance issues associated with BioCellar concept.

Possible location: adjacent to the Hough Vineyard, one of the initial *Re-imagining Cleveland* pilot projects.

Watersquare: Dense urban neighborhoods tend to have an inadequate amount of infiltration space to absorb heavy rainfall. Parking lots, roadways, and other impervious surfaces further limit opportunities for stormwater infiltration. This causes flooding in some neighborhoods and contributes to problems with combined sewer overflows.

A watersquare is a concept developed by the landscape architecture firm De Urbanisten for the city of Rotterdam in the Netherlands. A water square is a stormwater containment facility and a public amenity, consisting of a paved sports area/water basin and a hilly playfield. The sports area is sunken into the ground by one meter and is surrounded by steps that also function as seating for spectators. The hilly playfield is also sunken into the ground and provides different spaces to sit, play and linger with many different levels in height. Both spaces are connected within a green frame of grass and trees that border the square. Most of the time (an estimated 90% of the year) the water square will be dry and in use as a recreational space. Only when heavy rainfalls occur, the water square changes in its appearance and use. During a storm, the watersquare is designed to flood gradually. Short cloudbursts will only fill parts of the hilly play areas in the water square, creating streams, brooklets and small ponds where kids can play in and around the water. The rainwater will stay in the water square for a few hours until the water system of the city is back to normal. When cloudbursts are prolonged, more of the water square will be filled with water until finally also the sports area is flooded and the water square becomes a pure water storage basin. A watersquare can be designed to hold a maximum of one thousand cubic meters to cover the heavy rainfall on an entire neighborhood. The water square model was developed by the landscape architecture firm *de Urbanisten* in Rotterdam, but has yet to be built. Cleveland could be the first place where a watersquare is implemented.

Possible locations: Detroit Shoreway, University Circle

PROJECTS

	Partners	Funding Sources	NSP 2 Target Areas
Stabilization			
1. Multi-tasking	OSU; CBG	City, County landbank	
2. Indicator	ULTRA Ex?	City, County landbank	
3. Successional		City, County landbank	
4. Spontaneous		City, County landbank	
5. Guerrilla	Clev Public Art; Ohio Prairie Nursery		

Projects by catchment area			
1. Cuya. navigation channel			
<i>Large-scale farm</i>	Ohio City Near West		
2. Kingsbury Run			
<i>Farmscape</i>	Burton, Bell, Carr		Central
<i>Meyers Dairy</i>	NEORS		Slavic Village
<i>E. 79 / Forgotten Triangle</i>	NEORS	NEORS, County landbank	
<i>Opportunity Corridor</i>			
3. Morgana Run			
<i>Micro-prairies</i>	Slavic Village Development		Slavic Village
4. Mill Creek			
<i>Lee Miles-Kerruish</i>			Lee-Harvard
5. Doan Brook			
<i>Mini Emerald Necklace</i>			
<i>St. Luke's Point</i>			
<i>Superior 5</i>			
6. Dugway Brook			
<i>Inner-ring to Lake Erie</i>	East Clev Land Use Committee		East Cleveland
7. West Creek			
<i>West Creek greenway</i>		TLCI	
<i>Water Resource Restoration</i>		Ohio EPA	

PROJECTS	Partners	Funding Sources	NSP 2 Target Areas
Projects by catchment area, continued			
8. Big Creek			
<i>Commercial composting</i>	Metroparks		
<i>Lower Big Creek Greening</i>			
<i>Spring Road Alt Energy</i>			
9. Walworth Run			
<i>Train Ave green infrastructure</i>			
10. Burke Brook			
11. Lower Cuyahoga River			
12. Tinker's Creek			
13. Multiple catchment areas			
<i>Green Cap</i>	NEORS	NEORS	
<i>Emerald Fibers</i>			
<i>Metroparks expansion</i>	Metroparks		
14. Locations to be determined			
<i>Urban ecology field station</i>	ULTRA Ex		
<i>Energy project</i>			
<i>BioCellar</i>			
<i>Watersquare</i>	NEORS	NEORS	