Right-sizing shrinking cities:
a landscape and design strategy
for abandoned properties

Jeremy Németh University of Colorado Denver, USA
Justin Hollander Tufts University, Medford, MA, USA

Abstract

Much popular and academic attention is paid to population deconcentration and economic decline in so-called shrinking cities. In this paper we react upon several theories of urban decline with a novel analysis of abandoned properties in the United States, using foreclosure-driven residential vacancies (FDRVs) as a proxy for abandoned properties. We empirically examine the amount and type of abandoned land in some of the cities hardest hit by the mortgage crisis, and present a relevant landscape and design strategy to show that landscape architects are well positioned to redesign this newly available land. To help develop a systematic set of stages and actions for right-sizing initiatives, we catalogue several examples of current initiatives to address abandonment, paying attention to roadblocks inherent to this landscape and design strategy. This strategy presents a useful model with which designers can tackle the difficult and controversial issue of right-sizing.

*shrinking cities / vacant land / public space /
urban decline / right-sizing*

The Great Recession of 2006 devastated countless neighbourhoods across the United States. Declining property values and widespread unemployment further contributed to housing abandonment, generating a spiral effect on neighbourhood conditions. Federal intervention has done little to arrest this process and, as a result, vacant and abandoned homes have proliferated at high levels. Abandoned properties—especially when concentrated densely in a neighbourhood—can impact surrounding property values and quality of life and can even become the *de facto* responsibility of neighbours to police and maintain. Until now, academic research has provided little assistance to local planners and designers to address these issues.

This paper shows why right-sizing can be a positive solution for local communities experiencing significant property abandonment and can serve as a valuable complement to traditional strategies for arresting decline. In this paper, we define right-sizing as the strategic production of public space networks replacing abandoned properties. We find that in many areas experiencing decline, there is sufficient land to create larger aggregations of public space. We also demonstrate that usual concerns about discontinuity of abandoned parcels can be addressed through thoughtful urban design and landscape architectural solutions. Much of the data on housing abandonment remains aggregated on the municipal- or region-wide level, even though responsibility for addressing blight lies predominantly with local planning staff. We address this oversight by working almost exclusively on the 'zip-code' scale, which in denser environments approximates the level of the neighbourhood. With this paper we intend to fill

two important gaps. First, in response to fervent calls for better research into how housing abandonment plays out on a local scale (*Hammel 2008*), we examine closely the increase in abandoned homes in shrinking cities on the zip code level from 2006 to 2009. Second, we provide a clear roadmap for designers struggling with *how* they might address the issue of property abandonment in their own communities.

We begin by presenting traditional strategies for addressing severely shrinking population and accompanying property abandonment and show why right-sizing is a viable complement to these. Next, we address possible barriers to right-sizing and then outline a straightforward three-step approach based on an analysis of data gathered from 2006 to 2009 that demonstrates that abandoned land is quite plentiful in many areas of the United States. Although the paper is primarily directed towards design professionals such as landscape architects, urban designers, and planners, many other groups are implicated in these projects such as ecologists, architects, neighbourhood organizers, and political officials. Throughout the paper, we confine our arguments to the American experience, but show that lessons are relevant to shrinking cities in Europe as well.

Dealing with decline
Much recent research exists on the confluence of factors that led to the recent foreclosure crisis and widespread housing vacancies, such as predatory, subprime, and race-driven lending practices (*Renaurt 2004; Wyly et al. 2008a, 2008b; Ashton 2008; Hammel 2008*). And scholars have attributed depopulation to natural disasters (*Vale and Campanella 2005*), deindustrialization (*Bluestone and Harrison 1982*), natural boom and bust cycles (*Rust 1975*), demographic change, suburbanization (*Jackson 1985; Clark 1989*), and globalization (*Sassen 1991; Hall 1997*).

In general, the shrinking city phenomenon is portrayed as deeply damaging. And the solutions to address this perceived problem tend to focus on economic growth, expansion of infrastructure such as roads and bridges, and community development activity (*Leigh and Blakely 2013: 213*). Public investments intended to counter the decline process often involve the construction of megaprojects such as new stadiums or arenas, although these typically have little impact on broader demographic and socio-economic trends (*Baade and Dye 1990; Baade 1996; Billings and Holladay 2012*). In fact, research has shown that economic development initiatives fail more often than not in reversing structural economic conditions that contribute to population and employment decline, particularly in declining industrial regions such as the Rust Belt (*Boyer 1983: 272; Logan and Molotch 1987: 13*).

In response to the mixed record of such strategies, planners, elected officials, and mayors in several US cities have begun to advocate the strategic reuse of abandoned properties, especially in cities such as Detroit, Philadelphia, and Youngstown, which are experiencing precipitous population loss and economic decline (*Oswalt 2005; Pallagst 2007; Hollander et al. 2009*). Rather than trying to make every declining city grow by chasing industry with hefty incentives and economic development instruments, these officials argue that some cities might be better off focusing on enhancing

abandoned landscapes in ways to improve the quality of life for those that are still living there.

The potential benefits of right-sizing a city, carefully matching its physical infrastructure such as housing, roads, and public facilities to its population, are numerous, but so are the critiques. Recent proposals to tear down abandoned homes to produce new public space networks in depopulating neighbourhoods have been met with both celebration and consternation. Proponents argue that abandoned properties can lead to dereliction, arson, illicit activity, and increased local crime rates. By demolishing blighted properties, neighbourhoods can become less congested, require less costly infrastructure, increase the quantity and quality of public space, and raise adjacent and nearby property values. On the other hand, opponents claim these policies are eerily reminiscent of 1960s style urban renewal clearance and constitute the de-densifying of cities when best practices show the ecological, social, and economic benefits of fine-grained, walkable, mixed-use neighbourhoods (*Greiner 2011; Hollander and Németh 2010*). On a more technical level, critics of demolishing abandoned buildings for public space also argue that the creation of meaningful open-space networks is difficult, and even impossible, because of the perceived lack of sufficient land due to the disconnected nature of individual abandoned parcels (*Haase 2008: 5; Schilling and Logan 2008: 462; Hollander et al. 2009: 229*).

One of the most common right-sizing techniques involves tearing down abandoned homes and the conversion of land into an integrated public space system (see *Schilling and Logan 2008*). In partnership with banks, communities, and non-profit organizations, public agencies can turn private lots into public space through a variety of institutional and physical mechanisms in order to create new benefits for residents that remain. Studies reveal that a property's value increases when it is located within walking distance of a quality park or public space, and park proximity is associated with higher levels of physical activity as well as with health and social benefits, especially among youth and lower-income populations that often make up a majority of these neighbourhoods (*Bolitzer and Netusil 2000; Crompton 2005; McConnell and Walls 2005; Miller 2001; Trust for Public Land 1999; Robert Wood Johnson Foundation 2010*). New public spaces can connect neighbours by providing playgrounds, tool-lending services, swimming pools, block parties, film screenings, dog parks, or sculpture parks such as that in Germany's Dessau-Rosslau (*Müller 2010*). Right-sizing programmes such as Denver's Confluence Park, Detroit's Campus Martius Park, and Houston's Brays Bayou initiative are also based on the notion that surplus land should be redeveloped as green space in order to create an economic multiplier that helps jumpstart local development since land without buildings remains a valuable asset (*ASLA 2011*). Bringing natural habitats into the city can even restore ecological habitat and create valuable stormwater sinks. Finally, vacant lots can be converted into small-scale urban farms, local community gardens, or even larger-scale agricultural initiatives such as the Hantz Farms project in Detroit (*2014*). The push towards food delivery systems that increase access to healthy, locally-grown foods provides an impetus for such solutions.

STAGES

	PREPARATION	PLAN/DESIGN	IMPLEMENTATION
ACTIONS / CHALLENGES	- Inventory abandonment - Forecast market trends	- Create redevelopment authority - Prioritize investment categories	- Identify areas appropriate for redevelopment
	- Funding difficult to identify in initial stages - Interoperability of technological platforms - Heavy staff demand (reliance on volunteers) - Private funding can shift priorities	- Need central vision for implementation - Consensus difficult to forge	- Controversial; threat of eminent domain abuse - Reminiscent of urban renewal policies
	- Community meetings - Produce guiding vision - Propose investment strategy	- Study infrastructural precedents - Simulate proposed scenarios - Propose design solutions - Produce short-term lease agreements	- Produce guiding plan - Establish policy for future abandoned properties
	- Lack of available residents - Priority of residents is keeping home	- Innovation rare; tested solutions preferred - Short-term uses forced out when market rebounds	- Implementation often top-down - Selecting neighbourhoods for redevelopment priority
	- Distribute funding - Provide relocation assistance - Identify institutional partners	- Purchase abandoned properties - Prepare/remediate land - Create land banks - Pursue/distribute funding	- Roll out new policies - Monitor new right-sizing policies and programmes
	- Funding priorities difficult to determine - Relocation assistance costly	- Land banks need sustainable financing - Land banks require state legislation - Land banks only acquire tax foreclosures - Poorer localities lack funds to purchase properties	- Management authority for new public spaces unclear - Maintenance costly with burden on local population

Table 1 Actions, challenges, and stages in the right-sizing process

Right-sizing strategies

Just how does one right-size a shrinking city? Schilling and Logan (2008) outline three stages that are useful for determining a landscape design strategy: preparation, plan and design, and action. The 'preparation' stage involves a survey and assessment of existing conditions, including identification of market trends, revenue options, business models, and potential legal barriers. During the 'plan and design' stage, as well as throughout the process, planners and designers ideally engage stakeholders in strategic investment areas through broadly collaborative planning processes. The 'action' stage includes implementation activities such as the development of funding mechanisms, the establishment of land banks or other intermediary bodies, and the eventual strategic acquisition of properties. These stages are not necessarily sequential, and many activities can occur simultaneously.

Within each stage, planning and design professionals also take action in three categories: strategy, investment, and regulation. With regard to strategy, planning agencies conduct collaborative outreach activities to develop a vision for an urban future. Policymakers then make public investments in both physical infrastructure and institutional and financial mechanisms. Designers are then called upon to provide regulation for urban development processes, creating zoning, land use and fiscal policy that support the creation and management of public space systems. Table 1 modifies and arrays these stages and categories, presenting representative activities in each cell and discussing the feasibility and challenges associated with each stage.

Action 1: Preparation: Strategy

Design professionals, ecologists, architects, neighbourhood organizers, political officials, or others involved in designing public space systems must first understand the extent of vacant and abandoned homes in their locality. This can be done using innovative programmes like Data Driven Detroit that involve field research, fact-checking, and the utilization of several databases to understand the extent and 'hot spots' of decline, producing many jobs in the process (*Saulny 2010*). Municipal agencies can allocate funds and staff to undertake or oversee such a process. Once data become available, planning staff can overlay existing underutilized properties with environmental and economic analyses to understand which neighbourhoods are most affected by vacancy and which properties might be most appropriate for demolition or conversion to public open space. Using the type of analysis we introduce later in this paper allows city staff to develop a similarly efficient inventory of the amount of land available for new uses and activities.

Understanding the extent of available land is not enough to guarantee a well-designed solution. Open-space systems should be advised by technically-skilled landscape architects, planners, and urban designers knowledgeable about an area's natural context, demographics, and history. These professionals should organize strategic efforts of various stakeholders such as neighbourhood organizations, government-appointed task forces, and community-based organizations involved in decisions concerning shrinking cities. Redevelopment agencies can guide these processes to help ensure that citizen-led efforts are produced through robust, bottom-up processes/strategies that recognize the inherent validity

of resident opinions and desires. Although this process is vital, many municipalities give it short shrift. Crain (*2010: n.p.*) laments Detroit's lack of strategy:

> Right now, the vision for Detroit's future is myopic, not necessarily in intent, but in scope. Converting abandoned neighbourhoods into farmland could actually be an economic and social boon, but without being presented as part of a larger vision for the city, it's easy for such a plan to sound like a massive step backward, or even a waving of the white flag of surrender.

Kromer (*2009*) argues that decisions about which vacant properties are most appropriate for alterations that improve the surrounding environment should be based on a well-conceived, empirically-derived neighbourhood investment strategy designed in close coordination with business and community constituencies. Cities with these kinds of coordinated plans can now avail of federal funding for planning and physical services, such as demolition and rehabilitation. Besides providing strategic visions for urban redevelopment, agents can work with non-profit organizations to purchase land and hold it indefinitely or temporarily. The Trust for Public Land (TPL) partners with cities to identify and purchase land likely to become abandoned. Although TPL seeks a small fee from public agencies to defray transaction costs, it can be a strong partner in acquiring key parcels and assembling them to support new, non-residential uses.

Such tasks do require strategic financial investment by city agencies to pay for significant staff time and delivery costs, although such investments are especially difficult in shrinking cities due to a lack of property tax revenues and real-estate transfer fees resulting from increased vacancy rates. Social equity questions are also paramount, and any right-sizing strategy must balance needs of existing residents and future viability, a particularly difficult issue since neighbourhoods with high concentrations of vacant and abandoned properties are often composed of low-income, minority populations (*Schilling and Logan 2008*).

Action 2: Investment

Municipal agencies can purchase underutilized or vacant land; usually this occurs through a public redevelopment authority that involves the taking of private land for public benefit through eminent domain. Banks can place property tax liens on abandoned property and force owners or banks to maintain the property. When this fails, the government can take the property. Some cities such as Dallas, Omaha, and Providence have created land banks to take control of such properties, 'clearing land, remediating environmental contamination, and figuring out what to do next with the parcel, whether that's making it into a small park, deeding it to a neighbour to create a well-tended yard, or assembling large tracts of land for redevelopment or permanent green space' (*Katz and Bradley 2009: n.p.*). Land banks are not a silver bullet: creating one requires both state-

authorized legislation and a sustainable financing stream to cover staff time, demolition, land acquisition, and land holding (*Schilling and Logan 2008*). In addition, land banks can only acquire tax *foreclosures*, which often occur some time after mortgage delinquency, making it difficult for land banks to obtain properties before they decline significantly and depress surrounding property values. Nevertheless, land banks are a powerful solution for acquiring property in a broad and organized fashion for eventual public space conversion.

Properties being held by banks due to mortgage foreclosure represent a particularly challenging type. In contrast to the properties that eventually are tax-foreclosed and eligible for land banking, the bank-owned properties for which banks are actively paying taxes are not an easy target for right-sizing. In those cases, the banks are hoping to retain some value and eventually sell or rent out the property, which can be time-consuming. In those examples when banks decide to cut their losses, they may stop paying taxes. The property will eventually go into tax foreclosure and be eligible for inclusion in a land bank and subsequent right-sizing process.

Also, when developers hold significant portions of land waiting for markets to rebound, planning agencies or their subsidiaries can create institutional mechanisms whereby the public sector essentially 'rents' the property from the owner for a specified period of time.

Targeting one neighbourhood for redevelopment over another, and certain properties over others, should be set out in a guiding plan produced by designers and community-based organizations in direct consultation with local residents who have personal knowledge of their locality. Such actions can be undertaken sensitively, even without the use of eminent domain. According to Glaeser (*2009: n.p.*): 'If removing a largely vacant neighbourhood really generates significant gains, then some sizable fraction of those gains can be given to the citizens who will have to give up their homes.' Even in the face of widespread abandonment, some residents are frightened by the potential for neighbourhood gentrification, a real concern that planners and designers must account for in the right-sizing process.

In order to keep open the possibility for future redevelopment of land, redevelopment agencies can pay for the cost of purchasing, holding, and even remediating land previously used for industrial purposes. These processes can be costly, so agencies often levy an exaction on developers—that is, charge them a sort of transaction/processing fee for doing business in their municipality—that they can then invest in the redevelopment process. Additionally, municipalities and non-governmental organizations can make use of federal, state, local, and non-profit funding in the form of block grants, tax credits, or other programmes that provide funds for demolition, rehabilitation, and related activities. The federal government, at least in the United States, is supportive of such activities: the Department of Housing and Urban Development's (HUD) new Urban Revitalization and Livable Communities Act of 2009 authorizes spending over $445 million over ten years to states, local governments, and non-profit organizations to rehabilitate parks and construct new ones. Incidentally,

programmes such as Wayne County, Michigan's Economic Development Growth Engine (EDGE) worked to dismantle thousands of properties, coupling the cost of deconstruction with job creation, workforce training, and the salvaging of brick, timber, and other unique architectural features. This deconstruction programme has created jobs for local residents and training on home building activities.

Despite these options for converting private land to public land, the process is intensive and expensive and requires expert knowledge of the planning and real-estate development process. Although any strategic investment might not be earmarked for infrastructure such as utilities, highways, or transit systems, public space right-sizing strategies require both short- and long-term funding, as the cost of maintaining a park or open space often exceeds the price of design and implementation after eight to ten years (*Wenk 2010*). Thus it is important to account for long-term maintenance costs in order not to pass these expenses indirectly to residents.

Action 3: Regulation

Regulatory mechanisms can induce a desired private market reaction to successfully alter the design and use of the physical environment, such as right-sizing. One of the more important steps planners and neighbourhood organizations can take is to develop a long-term plan that guides development on previously vacant land. This can be done by characterizing neighbourhoods on a typology constitutive of ownership and rental mix, physical quality, and foreclosure percentage (*Schilling and Logan 2008*). Once this typology is developed and neighbourhoods are assigned to categories, each neighbourhood becomes responsible for producing its own localized plan for right-sizing. These plans should be developed with significant citizen participation and should identify the viability and character of redevelopment in each neighbourhood.

In more desperate situations, in which population decline and physical conditions are threatened by lack of investment, planning officials can advocate for more innovative regulations. One example of regulatory innovation is the provision of temporary zoning for lots that lay undeveloped during slow economic cycles. If left to market devices, these vacant or underutilized lots draw down surrounding property values and become eyesores for the entire neighbourhood. In response, some municipalities have experimented with temporary zoning ordinances that—in agreement with property owners—allow public agencies or neighbourhood groups to 'colonize' a vacant lot with a community garden or event space for a specified and finite period. For example, San Francisco's short-term gardening initiative in the Hayes Valley neighbourhood (*2010*) involves a strategy by which vacant lots are taken over by local non-profit organizations that teach teens to grow food and provide it to pantries and soup kitchens serving poor and homeless residents. Since 2000, downtown Denver's myriad parking lots have been home to several community gardens, with each 'site' donated by the landholder of record to the city. One particularly interesting example is located across from the city's very visible and

central Convention Centre building; this garden provides fresh produce to the surrounding high-end restaurants. Another example is Cleveland's Pop-Up City project (*2007*), which promotes and organizes cultural events in abandoned or underutilized spaces in the city's downtown.

Although a number of potential solutions exist for these temporary installations, landowners, local residents, and city agencies or neighbourhood associations charged with maintaining these spaces should vet all proposals. A clear concern with temporary use permits is that developers might not be interested in 'leasing' this land to a public or non-profit agency that will then convert the space into a temporary public space. Since all local parties involved would want the park or public space to be successful, it should have to be difficult for the developer to 'take back' his or her land when markets rebound (*Németh and Langhorst 2014*).

It is important to note that several intervening variables shape the right-sizing process. The three most notable contextual features for right-sizing are morphology and geography, history, and politics. With regard to morphology and geography, sites might be clustered or dispersed, or might be located in residential or commercial districts or neighbourhoods. In the case of a residential neighbourhood, planners may find the duration of vacancy shorter than in a commercial district. In terms of history, a community might have a long history of abandonment and vacancy (declining cities in the Rust Belt, for instance) or this decline might be more recent (Sun Belt cities like Phoenix). Therefore, the public space solution might find less traction in Sun Belt cities than in Rust Belt cities, as residents of the latter have likely witnessed more pronounced negative impacts of longer-term decline. On the other hand: 'The environmental and social scars of urban renewal stand as an unsavoury reminder of past planning efforts used to address decline' (*Fullilove 2004*). In this regard, planners must be cognizant of the social histories of the neighbourhoods in which they work. Along these same lines, abandoned homes in Sun Belt cities have a greater chance to be reoccupied within several months, especially as prices drop significantly as the economic recession continues. Notably, these contextual features are often interrelated: abandoned homes and lots in Sun Belt cities are likely to be found in residential areas, on larger lots, and with a shorter period since abandonment than those in Rust Belt cities. Finally, political leadership also plays an important role in right-sizing strategies: the emergence of active and engaged leadership in Youngstown, Ohio, and Braddock, Pennsylvania, clearly coincided with a reorientation of resident opinion towards progressive and smart decline solutions.

At this point we return to two of the main critiques of right-sizing: the lack of available land with which to create sufficient open-space networks, and the inability to create aggregated public space systems given the disconnected nature of individual abandoned parcels.

How much local land is abandoned?

We examine data gathered from 2006 to 2009 from some of the hardest-hit US cities to determine the extent and scale of newly abandoned properties that lie vacant for ninety days or longer. We selected this time period

because it represents the height of the mortgage crisis, so we can witness decline and abandonment at their most pronounced. We acknowledge that since 2009 the global economy has picked up and development activities have increased, but we contend that some cities, including those we examine below, still see an overabundance of housing for the population living there, especially those that have experienced population decline for several decades. Recent studies have shown that from 2006 to 2009, foreclosure-driven residential vacancies (FDRVs) were not confined to the Rust Belt cities of Detroit, Buffalo, and St. Louis; some of the hardest-hit regions in the United States were in the fast-growing Sun Belt. From Atlanta to Fort Myers to Phoenix, massive new housing developments still sit largely unoccupied while older housing has continued to empty until very recently (see *Hollander 2011: 117*).

To analyze property vacancy and abandonment at a level more detailed than the city or metropolitan area, we turned to the United States Postal Service (USPS), which maintains detailed delivery statistics for all 42,000 zip codes in the country. The USPS removes an address from its active inventory when a property sits vacant for ninety days, which is the term that most communities use to determine that a property has been 'abandoned', although some use 180 days as the threshold. These USPS data thus allow up-to-date analyses of vacancy on a relatively fine grain (*Hollander 2011: 49*). Nonetheless, there are a few potential drawbacks (and workarounds) associated with using these data, which we will discuss.

First, in the whole of the United States, around 100 to 200 zip code boundaries change each year. One solution with which to deal with this is to maintain a list of those zip codes that changed boundaries during the study period and examine the data both with and without them, noting any variation in results. The second drawback is that land use change is not interchangeable with housing density change, so measuring one is problematic when designing for the other. For depopulating neighbourhoods, a decrease in occupied housing unit density may indicate something other than vacant lots and abandoned buildings; it could mean a change in land use from multi-family homes into single-family homes, conversion of homes into offices, or perhaps a consolidation of apartments within an apartment building. The occupied housing unit density variable can be better understood when interpreted alongside certain data indicators found in the US Census, such as the number of residents per housing unit. Third, household size and composition changes are often more indicative of population shifts than number of occupied housing units. Nonetheless, household composition has less bearing on the physical conditions of a declining neighbourhood than do occupied housing units counts. In other words, this single USPS-based measure at least partially and sufficiently reflects the social, physical, environmental, and economic forces generating occupied housing unit density over a proscribed period. Because this measure only reflects residential housing conditions and excludes other major land uses (commercial, industrial, or institutional), our results cannot be generalized to mixed-use or primarily commercial neighbourhoods.

We use these data to run descriptive analyses on the extent and scale of abandoned homes in zip codes containing the largest decline in total occupied housing units from February 2006 (the height of the real-estate boom) to February 2009 (the nadir of the recession) for all of the United States. To generate our sample, we identified cities experiencing the highest residential foreclosure rates in 2007, with the aim of accounting for the natural time lag between initial foreclosure and likely abandonment. Using a 2007 report from RealtyTrac, an organization that tallies foreclosed homes throughout the United States, we assembled a list of the twenty metropolitan areas with the highest foreclosure rates, which we argue is a strong predictor of subsequent housing vacancy and abandonment. To further drill down our sample, we selected only cities with complete (and low-cost) parcel data from a mix of Sun Belt and Rust Belt cities, reducing our list to Akron (OH), Atlanta (GA), Bakersfield (CA), Cleveland (OH), Dayton (OH), Denver (CO), Fresno (CA), Las Vegas (NV), Memphis (TN), and Stockton (CA). In each city, we examined USPS data to determine which zip codes experienced a loss in occupied housing units during the three-year period, a proxy for those neighbourhoods experiencing increased housing vacancy. For each city, we identified up to three zip codes that experienced the greatest decline in occupied housing units, resulting in a sample of forty-one zip codes divided more or less equally across the ten cities. With our sample now determined, calculating abandoned property was a multi-stage process:

First we determined the number of occupied housing units in a zip code using USPS data. [Ex: 1000 units]

Second, we calculated the mean parcel size for all land zoned residential within each zip code, using parcel data from each municipality. [Ex: 0.25 acre per housing unit]

Third, we calculated the number of housing units lost from each zip code from 2006 to 2009 using USPS data. [Ex: 200 units]

Fourth, we calculated the total acreage of parcels with abandoned housing units by multiplying the mean parcel size (the outcome of step 2) by number of lost (or abandoned) housing units (the outcome of step 3). [Ex: 0.25 acre x 200 units = 50 acres]

The outcome of this process was that the total decrease in land no longer in active residential use from this period across all zip codes was 1,817 acres [ca. 735 ha], for an average of 62.7 acres [ca. 25.4 ha] per zip code, with a standard deviation of 60.8 acres (see Table 2). This number accounts for all land within an abandoned parcel, including driveways, gardens, and setbacks. We recognize that this calculation is quite coarse, especially since zip code size varies, but it does show the extent of abandonment over this period.

	City	Country	Zip	Total land area (acres)	Total number residential parcels	Total acreage residential parcels	Total residential parcels per acre	Mean acreage residential parcels (SD)	LISC foreclosure risk score	USPS total occupied housing units (2006)	USPS total occupied housing units (2009)	Total housing unit change (2006-2009)	Change in total occupied residential acreage	Mean housing units per parcel	Adjusted change in total occupied residential acreage
RUST BELT	Akron	Summit	44304	1,171	1,853	343.17	5.40	0.185198 (1.81)	0.70	2,009	1,697	-312	-57.78	0.95	-60.66
	Akron	Summit	44307	1,247	4,155	344.74	12.05	0.082969 (0.66)	18.80	3,857	3,646	-211	-17.51	1.01	-17.38
	Akron	Summit	44311	1,124	2,726	145.93	18.68	0.053534 (0.50)	13.20	3,233	3,047	-186	-9.96	1.13	-8.78
	Cleveland	Cuyahoga	44108	2,728	10,699	1,290.70	8.29	0.120637 (0.40)	52.50	12,515	11,389	-1,126	-135.84	1.40	-97.16
	Cleveland	Cuyahoga	44112	2,403	1,547	273.15	5.66	0.176568 (0.44)	51.50	12,673	11,338	-1,335	-235.72	9.71	-24.28
	Cleveland	Cuyahoga	44127	1,134	15,007	1,950.57	7.69	0.129977 (0.42)	24.70	2,728	2,458	-270	-35.09	0.22	-157.30
	Dayton	Montgomery	45404	4,597	1,197	168.56	7.10	0.140822 (0.60)	6.00	5,137	4,680	-457	-64.36	0.75	-86.18
	Dayton	Montgomery	45405	2,436	4,754	558.66	8.51	0.117514 (0.16)	27.30	10,012	9,232	-780	-91.66	1.22	-75.13
	Dayton	Montgomery	45417	1,850	3,868	470.40	8.22	0.121613 (0.24)	8.90	4,057	3,858	-199	-24.20	0.70	-34.44
SUN BELT	Atlanta	Fulton	30314	2,948	5,334	1,530.21	3.49	0.286879 (1.27)	28.40	8,163	7,343	-820	-235.24	1.44	-163.45
	Atlanta	Fulton	30354	7,066	7,798	4,022.83	1.94	0.515879 (3.04)	7.00	5,599	5,483	-116	-59.84	0.40	-150.24
	Bakersfield	Kern	93301	2,730	2,118	410.47	5.16	0.193801 (0.47)	1.60	5,453	5,379	-74	-14.34	1.24	-11.57
	Bakersfield	Kern	93305	4,006	7,569	1,653.64	4.58	0.218476 (1.68)	11.70	11,110	10,808	-302	-65.98	1.21	-54.33
	Bakersfield	Kern	93309	7,025	14,475	3,306.68	4.38	0.22844 (0.59)	15.60	23,445	23,271	-174	-39.75	1.40	-28.34
	Denver	Denver	80235	2,358	1,413	1,413.00	1.00	5.978116 (6.57)	1.00	3,528	3,479	-49	-292.93	2.30	-127.59
	Fresno	Fresno	93650	260	682	117.33	5.81	0.17204 (0.30)	1.30	1,483	1,454	-29	-4.99	1.09	-4.57
	Fresno	Fresno	93701	947	682	117.33	5.81	0.17204 (0.30)	4.70	3,729	3,632	-97	-16.69	1.57	-10.62
	Fresno	Fresno	93703	2,975	4,669	1,150.15	4.06	0.246338 (0.97)	10.00	10,194	9,918	-276	-67.99	1.32	-51.38
	Las Vegas	Clark	89104	3,900	13,170	2,948.72	4.47	0.223897 (1.68)	24.40	15,752	14,851	-901	-201.73	0.84	-241.51
	Las Vegas	Clark	89128	3,900	8,285	1,882.91	4.40	0.227267 (2.08)	27.20	15,738	14,884	-854	-194.09	1.71	-113.74
	Memphis	Shelby	38105	1,068	934	239.40	3.90	0.256317 (0.86)	1.60	3,663	3,325	-338	-86.64	2.34	-37.00
	Memphis	Shelby	38106	17,309	12,400	2,356.35	5.26	0.190028 (0.42)	21.80	11,277	10,914	-363	-68.98	0.93	-74.15
	Memphis	Shelby	38114	4,797	10,257	2,003.58	5.12	0.195338 (0.29)	27.80	11,406	10,965	-441	-86.14	1.19	-72.28
	Stockton	San Joaquin	95202	688	208	35.37	5.88	0.170037 (0.14)	0.50	3,369	3,184	-185	-31.46	2.71	-11.59
	Stockton	San Joaquin	95203	1,290	3,604	552.11	6.53	0.153192 (0.19)	5.00	5,378	5,263	-115	-17.62	1.54	-11.44
	Stockton	San Joaquin	95207	4,841	14,351	3,541.33	4.05	0.246765 (1.76)	16.00	18,625	18,243	-382	-94.26	1.02	-92.33

Table 2 Descriptive statistics for all twenty-six zip codes studied

What would a right-sizing plan look like?

The final stage of our research involved a deeper exploration of one of these shrinking neighbourhoods. We began by selecting one neighbourhood in Akron, Ohio. It was fairly prototypical of a shrinking zip code and zoning data were fully available. For that neighbourhood, we used a random number generator to calculate where vacancy might occur under a no-design intervention case. Within that neighbourhood the occupied housing units lost from 2006 to 2009, X, were assigned into actual residential parcels to simulate the kind of expected outcome of vacancy without any design intervention. [1]

The random assignment of residential lots to 'vacant' status was processed using Random.org for the first 100 parcels. [2] Subsequent vacant units were assigned using a contagion factor, consistent with the literature that suggests that vacancy is spatially clustered (*Harding, Rosenblatt and Yao 2009*). The contagion factor also included a random number generator to assign an additional vacant lot within the same city block. We repeated this process again by randomly assigning a second or third vacant parcel within a city block, until all of the vacant units were linked to a parcel on the map.

Finally, we developed a sketch of a landscape plan for the neighbourhood—offering a view of how the X parcels that were randomly selected could be spatially organized. The primary focus of the plan was applying straightforward urban design and landscape architecture techniques to a shrinking place. Being a hypothetical case, a cursory review of newspaper accounts provided us with nominal information about the neighbourhood, simulating the engagement of the design team in a robust process with community stakeholders, environmental experts, political leaders, and all others affected by the project.

Figure 1 Semi-random assignment of vacant housing units in the Middlebury neighbourhood of Akron, Ohio. White parcels are residential and occupied. Black parcels are assigned vacant, formerly residential.
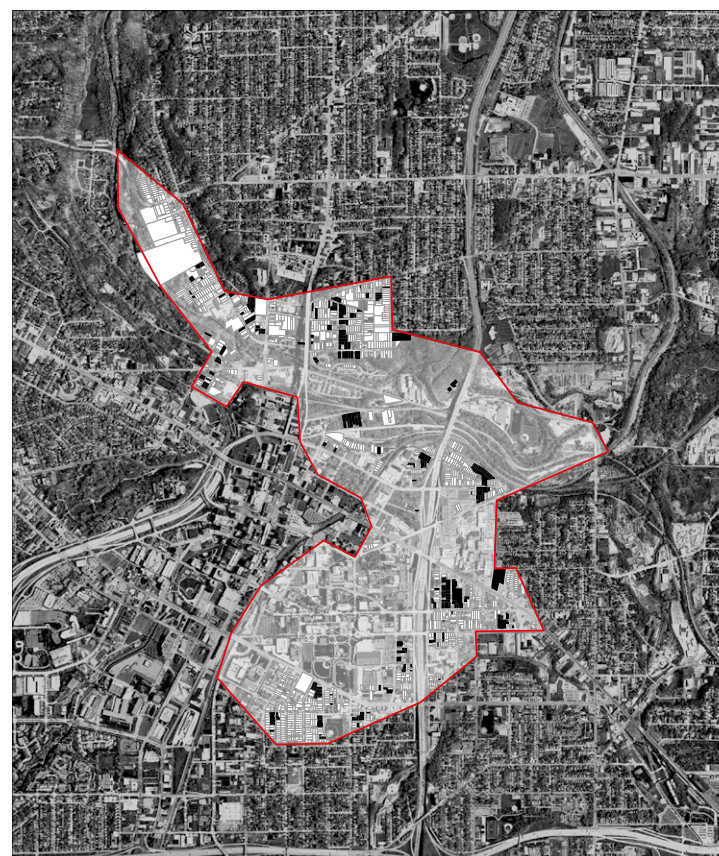
0   1000 ft

Figure 2 Spatial distribution of vacant land as a result of hypothetical right-sized landscape design in the Middlebury neighbourhood in Akron, Ohio. White parcels are residential and occupied. Black parcels are assigned purposefully reused for non-residential uses on formerly residential land.

0   1000 ft

To illustrate how our right-sizing design strategy would play out in a single neighbourhood, we highlight here the example of the Middlebury neighbourhood in Akron, Ohio (zip code 44304), selected both because it is a representative case in our sample and because of our existing knowledge of and work in the neighbourhood. As indicated in Table 2, the dimension of the neighbourhood is 1,171 acres [473 ha], of which 343 acres [138 ha] are devoted to residential uses. It had 2,009 occupied housing units in 2006. With 1,853 residential parcels in the Akron municipal database, we calculated that the typical residential parcel sits on 0.19 acres [ca. 0.077 ha] of land. [3]

Over the three-year study period from 2006 to 2009, the Middlebury neighbourhood lost 312 occupied housing units. Simple multiplication leads us to estimate that those 312 units yield 58 acres [23.5 ha] of newly vacant or abandoned land in the city. A final adjustment was made to account for multi-family housing, resulting in a total of 61 acres [24.5 ha] for the Middlebury neighbourhood. [4]

Figure 1 is the result of the assignment of those 312 formerly occupied units to residential parcels within the neighbourhood. As described above, using a combination of a random number generator and a contagion effect, we assigned those 312 units in a spatial distribution that might be expected without any design intervention. The 58 acres [23.5 ha] of newly vacant or abandoned land represent a typical scenario in many

shrinking cities; however, due to its relative disconnected and haphazard quality, the land is not well suited to serve as an attractive or well-used amenity for the City of Akron.

However, if the distribution of vacancy is purposefully designed from the outset, we might expect a different outcome. The analysis above shows that the changes in Middlebury from 2006 to 2009 resulted in 312 fewer occupied housing units. We argue that a strategic landscape design for the neighbourhood could potentially allocate that vacant land in a more organized and strategic configuration than illustrated in Figure 1. Although population and housing forecasts are always incomplete and subject to contestation, we argue here that the projection that Middlebury might expect 312 fewer occupied housing units, or 58 [23.5] vacant acres [ha], could be transformative in planning for a shrinking future. Figure 3 represents an effort on our part to sketch out a 'right-sized' design for the Middlebury neighbourhood with the knowledge that a decrease in the number of occupied housing units was expected.

The design illustrates the advantage of clustering through the adoption of side-lots, 'Olmstedian' green necklaces, bike and pedestrian circulation, community gardens, and land set aside for future development. Though conducted as an academic exercise, the design did tie into a larger landscape plan for the area to enhance pedestrian access to the Little Cuyahoga River.
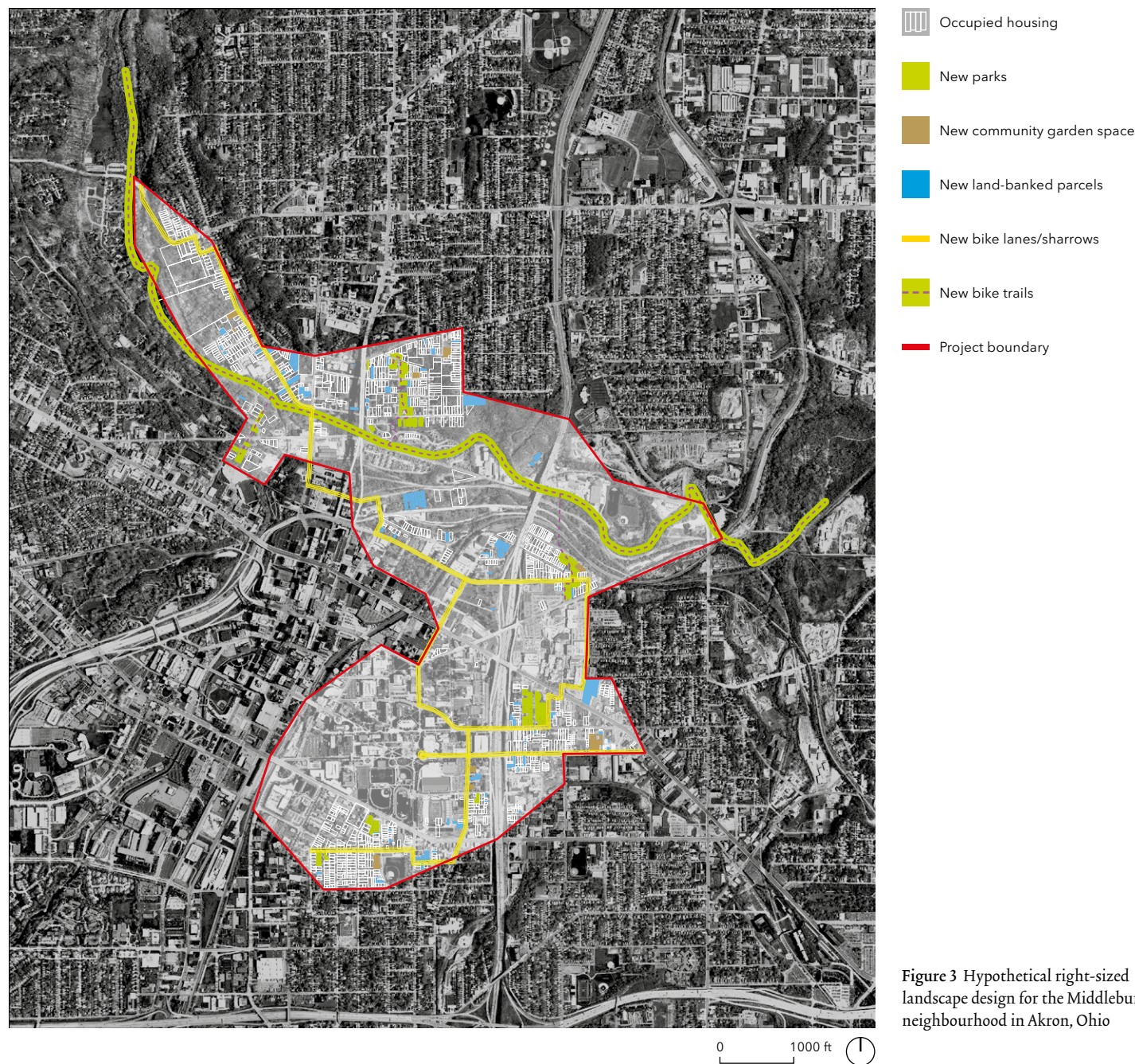
Occupied housing	
New parks	
New community garden space	
New land-banked parcels	
New bike lanes/sharrows	
New bike trails	
Project boundary	

Figure 3 Hypothetical right-sized landscape design for the Middlebury neighbourhood in Akron, Ohio

0   1000 ft

To understand the impact of a strategic landscape design such as that presented in Figure 3, Figure 2 shows the expected land use outcomes of the plan using the same graphic language of Figure 1. Here, we see how the right-sized design intentionally focuses and clusters the 58 acres [23.5 ha] of vacant land in a way that supports productive uses, in stark contrast to the randomized outcomes of shrinkage that Figure 1 typifies.

Summary and conclusion

We began this paper by discussing multiple causes for the depopulation of neighbourhoods and examined the extent of abandonment in some of the United States' hardest-hit cities. On average, more than 60 acres [24 ha] of previously occupied residential land sat vacant for at least three months in the zip codes examined. With these findings, we sought to reconceptualize the problem of vacant and abandoned property. Instead of viewing abandoned homes as a problem, we argued that right-sizing landscape design

strategies can anticipate economic decline in ways that can enhance the public realm in residential neighbourhoods. We provided a new—or at least repackaged—set of tools and strategies for addressing urban abandonment and outlined experiences with a number of right-sizing initiatives to help develop a table of actions that planning and design professionals—specifically landscape architects, urban designers, and urban planners—can pursue immediately.

Our empirical analysis has helped us to determine the extent of abandoned property, giving us an idea of how much land could potentially be available for repurposing. This type of analysis can be appropriated in similar studies, but it is not without its limitations. As with any data set, the accuracy of the USPS report is limited by potential inconsistencies in collection and reporting. Another limitation of this research is our blanket characterization of land as being universally suitable for public uses. Characteristics such as slope, drainage, frontage, land use patterns, lot

sizes, ownership, soil quality, and clustering/dispersion will bear directly on how suitable each parcel is for various public uses including agriculture, forest, park, or recreational spaces. Nonetheless, these aspects may limit the development of land into more productive uses, but still allow for the repurposing of land for more 'natural' purposes.

The assignment of vacant land to real residential parcels in the neighbourhood of Middlebury in Akron, Ohio, illustrates how a non-designed option offers few community benefits, whereas the development of a right-sized design for the neighbourhood could potentially assign that vacant land in a strategic and clustered fashion that would result in numerous community benefits. Future research ought to follow our methods with ground-truthing, to explore on the ground which parcels are really vacated and then to develop realistic designs for such places. It should also look more closely at geographical characteristics to better aid designers in calibrating their efforts to help fit new public uses for appropriate parcels.

We have argued that existing legal and real-estate development frameworks limit the strategic use of unoccupied land until it is too late, have outlined several strategies for proactively addressing environmental, economic, and social decline, and discussed tools for pre-empting further degradation. The strategy we presented here must be seen as the beginning of what should be an ongoing debate within the development, design, and planning communities about what vacant land and buildings ought to be used for and how their reuse ought to be decided. Once a property owner walks away from his or her responsibilities, it is the obligation of the broader community (as operationalized in local government) to respond.

Although there might be drawbacks and roadblocks at each stage of such a right-sizing process, this smart decline strategy has significant potential given the tools and training of planning and design professionals. In this paper, we have offered some ways in which local governments and planning agencies might respond to economic decline, but more research is needed to study the effectiveness of these responses in practice.

NOTES

1 It is important to note that we did not examine the legal status of these properties. For some of those vacant lots, a bank may continue to hold an interest in the property and would not so readily give up that interest without compensation. Long-term vacancy (of ninety days or more) of mortgage foreclosure properties demonstrates that banks are not quickly reoccupying properties with tenants or a new owner, providing some evidence of their ultimate commitment to their financial and legal interest in the properties.

2 We conducted this hypothetical, randomized exercise for the purposes of this paper; planners and designers working in the field would of course have more knowledge of and experience with their locality's neighbourhoods and would choose blocks and parcels accordingly.

3 For each zip code, a cursory review of Google maps confirmed approximate density and lot sizes.

4 Here we divided the 58 acres [23.5 ha] by the mean number of housing units per parcel (0.95).

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BIOGRAPHICAL NOTES

Jeremy Németh is Associate Professor of Planning and Design at the University of Colorado Denver and a Fulbright Scholar in Rome (2016). His research centers on environmental justice and the politics of public space.

Justin Hollander is Associate Professor of Urban and Environmental Policy and Planning at Tufts University. He is the author of *Sunburnt Cities: The Great Recession, Depopulation and Urban Planning in the American Sunbelt* (2011) and two other books examining the challenges of planning for postindustrial, shrinking cities. Dr Hollander has led several award-winning urban design projects through the Open Neighborhood Project.

CONTACT

Jeremy Németh
Department of Planning and Design
University of Colorado Denver
1250 14th Street
Denver, CO 80202, USA
Phone: +1-303-315-1000
Jeremy.Nemeth@ucdenver.edu

Justin Hollander
Department of Urban and
Environmental Policy and Planning
Tufts University
97 Talbot Ave
Medford, MA 02155, USA
Phone: +1-617-627-3394
justin.hollander@tufts.edu