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Using suitability analysis to select and prioritize naturalization efforts in legacy cities: An example from Flint, Michigan

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ABSTRACT

Given the lack of market demand and the abundance of vacant lots in legacy cities, not all vacant lands can be redeveloped or even maintained in a highly manicured state. While many vacant lots are being creatively reused as community gardens and side lots, in areas where residents are few and vacancy is high, the best use for vacant lands may be in a naturalized state such as meadows or forests. The author argues that in legacy cities, the critical question is not whether to naturalize (i.e. to stop mowing lots and allow for succession), but rather how to determine which properties to naturalize, in what order, and how. Using the example of Flint, Michigan, the author proposes suitability analysis as a method for selecting and prioritizing naturalization. Every property in the city of Flint was assigned a naturalization score derived by calculating subscores on nine variables, weighing the subscores by their importance, and summing. The nine variables included were contiguous vacant land, prospective vacancy, public ownership, land use designation, parks adjacency, proximity to industry, waterway buffers, property values, and population change. The naturalization scores can be combined with the results of a prior study to create a vacant land use decision tree pre- and post-demolition. Ultimately, the purpose of the paper is to facilitate property selection for naturalization while encouraging public discourse around what should happen with vacant lots in legacy cities.

1. Introduction

Legacy cities, also known as shrinking cities, are cities that have lost significant proportions of their populations and which continue to experience severe population decline due to factors like deindustrialization and suburban sprawl (Deng and Ma, 2015; Gillotti and Kildee 2009; Dandaneau, 1996). The loss of major employers, along with the flight of middle-class populations to the surrounding suburbs, contributes to social problems that are common in legacy cities, such as concentrated poverty, racial disparities, poor educational outcomes, and crime (Galster, 2012; Kneebone and Nadeau Berube, 2011). Population change also results in dramatic changes to the built and physical environments, as structures that are no longer needed are abandoned at a rate that outpaces demolition resources (Morckel, 2016). Consequently, many legacy cities are a veritable patchwork of occupied properties, abandoned structures, and vacant land (Deng, 2015; Ryan, 2012a). This patchwork presents numerous land-use planning challenges, the most difficult of which involve questions of how to allocate scarce resources. Because legacy cities tend to struggle financially due to declining tax revenues and increasing demands for services, tough questions emerge about which areas of the city to rebuild, stabilize, disinvest from, and/or naturalize (Nassauer and Raskin, 2014; The American Assembly of Columbia University (2011).

Using the example of Flint, Michigan, this paper proposes a method for selecting properties to naturalize in legacy cities. Here, the term "naturalization" and its derivations refers to the process of restoring previously developed sites to a more natural state through the use of trees, grasses, and other native plants (Ingram and Breen, 2001). This term was selected over "urban wilderness" because wilderness suggests a lack of safety, and it was selected over "urban wasteland" because wasteland connotes a lack of value (Rink, 2009). The author envisions that naturalized vacant lots could have ten feet of vegetation mowed from the road, a basic fence installed at the ten-foot line (one with high visibility, such as a low picket, post and chain, or split rail), while the remainder of the site beyond the fence would be left to naturalize with minimal human intervention besides the initial seeding, removal of invasive species, and/or the planting of trees to expedite succession.

Figs. 1–4 illustrate the concept. Fig. 1 shows aerial imagery of a few blocks in a highly vacant area of Flint. Unlike stable neighborhoods in the city which have a structure on nearly every 30- to 45-foot lot, this four-block area is missing around fifty structures due to population loss and subsequent demolitions. Fig. 2 is a rendering of the aerial imagery shown in Fig. 1. Fig. 3 shows the proposed naturalization concept for this area, while Fig. 4 is a detailed view of the concept. As one can see,

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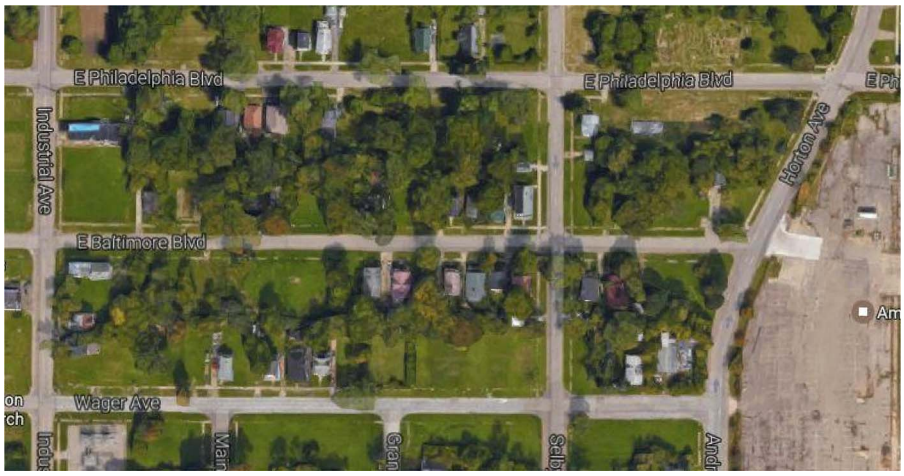

Fig. 1. Aerial imagery of a highly vacant area of Flint, Michigan.

not every vacant lot has been naturalized. The lots next to some homes have been left as traditional turf (perhaps for the homeowners to use as a garden or larger yard) although the exact configuration of which lots to naturalize would be determined by the model presented in the next section.

Mowing the frontage maintains sightlines while fencing discourages dumping and provides a clear demarcation between the mowed and naturalized spaces. Combined, these treatments should emphasize that naturalization is intentional and the sites are cared for, both of which are important for naturalization efforts to be accepted by residents (Herrmann et al., 2016; Mathey and Rink, 2010; Nassauer, 1995). Notably, similar fencing treatments have been successfully paired with urban greening initiatives in Philadelphia, Pennsylvania (South et al., 2015; Garvin et al., 2013) and Youngstown, Ohio (Kondo et al., 2015). These efforts have reduced blight and dumping while increasing residents' sense of safety. However, to the author's knowledge, these fencing treatments were only implemented on sites that continue to be fully mowed; therefore, the full effects of the proposed treatment are unknown.

Flint serves as a good test-case for rethinking vacant land due to the scale of its vacancy problem. At its peak in the 1960s, the city's population was nearly 200,000. Since that time, several large automobile production facilities have closed and the population has dropped by half, resulting in vacancy and blight (United States Census Bureau, 2014; Highsmith, 2015; Gillotti and Kildee, 2009). Flint is home to an estimated 7500 vacant structures and 14,500 vacant lots, making 43% of the land in the city vacant in some form (Pruett, 2015). Although the Genesee County Land Bank is eliminating blight by demolishing derelict structures in Flint, a serious question remains about what to do with the resulting vacant land post-demolition. Mowing all of the land is not a viable option because basic maintenance costs are well beyond the capacity of the city, land bank, and other governmental entities. A report written by a local planning consultant (Pruett, 2015) indicated that it would take $6 million to mow all of the vacant, unimproved properties in the city 6 times per year. To reduce costs and provide better maintenance, the land bank actively encourages residents and local organizations to take responsibility for caring for nearby vacant lots through its "Clean and Green" program. While this program is successful in getting hundreds of lots regularly mowed (Heins and Abdelazim, 2014), it is limited in the most vacant parts of the city where land is abundant but residents are few (Herrmann, 2016). In such cases, it may be more appropriate for the land bank and other property owners to refrain from maintaining properties in a traditional sense, as mowed turf, and instead shift to naturalization. It is not possible to naturalize all lots at the same time because the proposed design requires some investment (fencing and perimeter maintenance at a minimum; trees and other vegetation ideally), making it necessary to create a model that not only selects properties, but also suggests some order.

Naturalizing formerly developed properties is desirable for reasons beyond reducing the costs of mowing. There are a number of potential ecological benefits, including reducing pests, flood risk, and the urban heat island effect; improving air and water quality; and increasing wildlife and species diversification (Kim, 2016; Burkholder, 2012; Zipperer, 2002; Ingram and Breen, 2001; Pickett et al., 2011). When paired with good design, urban greening efforts can also result in social

Fig. 2. Rendering of the aerial imagery shown in.