

**RESIDENTS' PERCEPTIONS AND PREFERENCES OF VACANT LOT
VEGETATION, WILDLIFE AND USE IN ST. LOUIS, MISSOURI**

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**RESIDENTS' PERCEPTIONS AND PREFERENCES OF VACANT LOT
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Table of Contents

ACKNOWLEDGEMENTS	II
ABSTRACT	V
INTRODUCTION	1
VACANT LOTS	1
ENVIRONMENTAL PERCEPTION AND VACANT LOTS	2
<i>Vegetation Perceptions and Preference in Vacant Lots</i>	4
<i>Wildlife Perceptions and Preferences in Vacant Lots</i>	5
<i>Vacant Lot Use Preferences</i>	6
RESEARCH NEED	7
<i>Vacancy and Race in St. Louis, Missouri</i>	8
<i>The Rise of the Green City Coalition</i>	9
<i>Research Questions</i>	11
METHODS	12
STUDY AREA	12
<i>Baden and Wells-Goodfellow</i>	12
DATA COLLECTION AND PARTICIPANTS	13
DATA ANALYSIS	16
RESULTS	18
INTERVIEW THEMES	18
<i>Community Change</i>	18
Vegetation Perceptions: Mimic residential yards	19
Wildlife Perceptions: Signs of Decline	19
Vacant Lot Use Preferences: Repopulation and Revival, Neighborhood Aesthetic Fit, and Community Areas	20
<i>Neighborhood Care</i>	22
Vegetation Perceptions: Overgrowth, City Maintenance Dissatisfaction	23
Wildlife Perceptions: Trash Brought Unwanted Wildlife	25
Vacant Lot Use Preferences: Redevelopment, Beautification, Water Detentions Basins are Positive, Native Prairie Grasses Require Clear Maintenance Signs	26
<i>Maintenance Effort</i>	28
Vegetation Perceptions: Simple Vegetation is Maintainable, Vegetation Spillover to Adjacent Properties, Tall and Dense Conceals Dumping Activities	32
Wildlife Perceptions: Wildlife Nuisance and Damage Issues	33
Vacant Lot Use Preferences: Mown Lawn, Low Maintenance Structures, Proximity to Residents, Prairie Grass Potential	34
<i>Safety</i>	36
Vegetation Perceptions: Tall and Thick Vegetation Obscures Threats and Illicit Activities	40
Wildlife Perceptions: Wildlife Fear	41
Vacant Lot Use Preferences: High Visibility Fields, Fencing, Proximity to Vacant Homes	42
PHOTOGRAPH EVALUATIONS	43
<i>Most Liked Photographs</i>	43
<i>Least Liked Photographs</i>	45
DISCUSSION	48
PERCEPTIONS OF VEGETATION AND WILDLIFE	48
<i>Community Change</i>	48

<i>Neighborhood Care</i>	49
<i>Maintenance Effort</i>	50
<i>Safety</i>	51
PREFERENCES FOR VACANT LOT USE.....	53
MANAGEMENT IMPLICATIONS	56
<i>Green City Coalition Recommendations</i>	57
LIMITATIONS	59
CONCLUSION	61
LITERATURE CITED	62
TABLES	69
TABLE 1.	69
TABLE 2.	70
TABLE 3.	71
TABLE 4.	72
TABLE 5.	75
TABLE 6.	76
FIGURES	77
FIGURE 1.	77
.....	77
FIGURE 2.	78
FIGURE 3.	78
<i>FIGURE 4.</i>	80
FIGURE 5A.	81
FIGURE 5B.	82
FIGURE 5C.	83
FIGURE 5D.	84
FIGURE 5E.	85
FIGURE 5F.	86
APPENDIX	87
APPENDIX 1.	87
APPENDIX 2.	88
APPENDIX 3A.	89
APPENDIX 3B.....	91

Abstract

UNDERSTANDING RESIDENTS' PERCEPTIONS AND PREFERENCES OF VACANT LOT VEGETATION, WILDLIFE AND USE IN ST. LOUIS, MISSOURI

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Vacant lots are a prevalent issue in many urban neighborhoods nationwide. These lots are often targeted by city officials for greening interventions, though nearby, marginalized residents may not adequately be involved in the planning process. This exclusion disempowers residents and provides greenspace that while ecologically useful, can be socially unjust. St. Louis, Missouri is one of many Midwest cities dealing with a high level of vacancy, with lots concentrated in the predominantly low-income, African-American areas. The Green City Coalition (GCC), a collaboration between the city of St. Louis and its partners, has selected several lots in two neighborhoods within these areas to implement management strategies for storm water control and biodiversity conservation. To understand residents' management preferences for the lots, I sought to answer the following questions: 1) How do residents' perceive wildlife and vegetation in the vacant lots? 2) What are residents' preferences for lot use? I administered semi-structured interviews combined with vacant lot photo-evaluation surveys to 27 residents affiliated with at least one of the neighborhoods. For both questions, I found that residents' framed their thoughts within a

larger picture of the vacant lots, the vacant homes, and the surrounding community. Through analysis of the interview transcripts and photo-evaluation survey comments, I created the themes of community change, neighborhood care, maintenance effort, and safety to explain residents' perceptions of wildlife and the vegetation within the lots, as well as their preferences for vacant lot use. Comments of the top ranked vacant lot photograph scenes in the survey focused on clear lines of sight and signs of care such as mowing, fencing and litter absence. While wildlife was sometimes tolerated or appreciated, most wildlife was associated with negative area changes or seen as sources of nuisance or danger, with minor impact on how residents perceived the vacant lots. In contrast, vegetation was pivotal in how residents felt an area was cared for and whether a vacant lot was seen as being safe and usable, with low, uniform vegetation preferred. In the absence of home and business development, I found that residents preferred vacant lots be used as park-like areas for community gatherings and recreation, incorporating mown lawn and low-maintenance structures such as benches, walking paths, or fencing to signal community care and prevent litter accumulation. I found mixed feelings about the GCC's current and planned vacant lot management interventions. Familiar residential landscapes incorporating mown lawn, such as water detention basins, are far more accepted than areas like prairie grass or woodlands. I recommend the GCC undertake an earlier collaborative vacant lot planning process to incorporate residents' vacant lot desires. This helps ensure vacant lot management improves the well-being of surrounding communities, with sociological benefits as well as ecological ones.

Introduction

Vacant Lots

Vacant lots are a type of informal urban greenspace (Rupprecht and Byrne 2014) especially common within shrinking cities (Newman et al. 2016). They are generally described as a parcel of property that no longer houses a structure on it, with many once having homes that later became abandoned and torn down (US EPA n.d.). Vacant lots are intertwined with often competing economic, ecological, and social issues (Németh and Langhorst 2014). City officials typically view vacant lots as sources of lost property tax and a lack of economic development while ecologists may focus on the important role these urban greenspaces serve for global biodiversity (Bonthoux et al. 2014, Ives et al. 2016, Aronson et al. 2017) Meanwhile, community residents may view these area as symbols of neglect and magnets for crime within their neighborhoods (Accordino and Johnson 2002, Mikelbank 2008, Németh and Langhorst 2014). These parcels of land often contain remnants of human use in the form of structures and litter, altered hydrology and soil profiles, and introduced invasive species that impact the value and aesthetics of a neighborhood (Accordino and Johnson 2002, Nassauer and Raskin 2014), lowering nearby property values (Crompton 2001) and creating a vicious cascade of further vacancies.

City officials in many older, industrial US cities have sought to convert their unmaintained vacant lots into temporary or permanent types of formal urban greenspace, in a process dubbed greening; these areas include pocket parks, community gardens, storm water detention basins and other areas that are meant to reverse the downward

spiral of vacancies and community blight (Schilling and Logan 2008, Németh and Langhorst 2014). While providing various ecosystem services (Kim 2016), health (South et al. 2018) and economic benefits (Crompton 2001, Wachter and Gillen 2006), these greening interventions may not reflect the needs and desires of the residents living nearby. This may potentially result in various ecosystem disservices that harm the community (Lyytimäki et al. 2008) and culminate in a failure to maintain the greening interventions long-term (Pediaditi et al. 2010). To help prevent this, research suggests involving residents in a collaborative decision-making process from the beginning planning stages to implementation, ensuring the greened lots' long-term maintenance and benefit to residents (Pediaditi et al. 2010). This requires residents' landscape and management preferences for vacant lots to be understood on a local scale.

Environmental Perception and Vacant Lots

There are numerous theories and frameworks that attempt to explain the relationship between landscape perception and preference. The purview of this section is not to be exhaustive, but to touch upon some of the most dominant frameworks and factors influencing landscape perception. One of the most prominent and well-studied environmental perception theories is Kaplan and Kaplan's (1989) Informational Processing Theory, based upon empirical landscape photograph perception studies, which posits that individuals' preferences for landscape will depend upon the landscapes' four factors of coherence, complexity, legibility, and mystery. These four factors constitute what the Kaplans describe as an individuals' ability to understand and explore the landscape, with coherence and complexity falling into the understanding domain, or the ability to understand the layout and appreciate the diversity of patterns and structures

within the scene, and legibility and mystery falling under the exploration domain, or the ability to navigate in and out of the landscape and the potential promise of something to discover. However, this theory does not account for other more local factors and personal experiences that could influence landscape perception, such as the role of nature in one's cultural or individual identity (Chan et al. 2016), sense of place or the value and meaning a location has for a local population, (Russ and Krasny 2017), perceived threats safety in the area (Fisher and Nasar 1992), and social norms (Nassauer et al. 2009) which could dictate levels of desired, intentional management on the landscape (Nassauer 1995). These other factors may be of particular importance for vacant lots, urban land that possesses a number of cultural, social, and historical meanings for local populations that reside around them (Németh and Langhorst 2014). The Informational Processing Theory and other more location and population-specific landscape perception factors point towards the need of local, qualitative research that can take into account the social context for individuals when seeking to understand vacant lot landscape preference and use.

Vegetation and wildlife, as part of the structure and experience of vacant lots, are natural foci of study to understand individuals' vacant lot perceptions and preferences. Both vegetation and wildlife have been shown to be important factors in how urban residents perceive urban green space areas and their management (Gobster and Westphal 2004, Rupprecht et al. 2015, Rink and Arndt 2016, Gunnarsson et al. 2017). Furthermore, while vegetation predominantly makes up the visual composition and thus, ability for individuals to understand, process, and experience landscapes, according to Kaplan (1989), wildlife can also be important for individuals' experiences, cultural values, and

local landscape norms (Chardonnet et al. 2002, Qiu et al. 2013). Thus, understanding how both vegetation and wildlife are perceived by local residents is a crucial step to understanding how to manage vacant lots for both residents' needs and aesthetic preferences, as well as biodiversity objectives.

Vegetation Perceptions and Preference in Vacant Lots

Vegetation plays a dominant role in how vacant lots are perceived, the potential mental health benefits they afford residents (Kaplan and Kaplan 1989) and their influence on neighborhood pride (Foo et al. 2013). The presence of vegetation within vacant lots can increase residents' willingness to use these areas (Kuo et al. 1998), leading to an increased level of neighborhood community (Kuo and Sullivan 2001). Previous studies found some over-arching vegetation preferences for urban greenspaces, like vacant lots. These include preferences for low and well-spaced vegetation that allows for line of sight (Botzat et al. 2016), tall trees that provide shade (Rink and Arndt 2016); and broad expanses of lawn with trees that allow for recreation (Ignatieva et al. 2015), which has been characterized as a preference for a "picturesque", globalized landscape (Ignatieva et al. 2010), sometimes known as the "urban savanna" (Gobster 1994).

Many of these perception and preferences may be explained by two dominant themes in landscape perception research, safety and care (Nassauer 2011, Sreetheran and van den Bosch 2014). Threats to sense of safety are particularly strong in urban settings where illicit activities are known to take place around and inside urban greenspaces (Groenewegen et al. 2006). A study of mostly lower-income residents living in areas of high vacancy in Leipzig, Germany found perceived threats (e.g. violence, drugs/alcohol, harassment) increased in photographs of vacant lots that exhibited denser vegetation and

less visibility (Rink and Arndt 2016). Residents also express a general need for what has been termed “cues to care”; these consist of landscape characteristics that are clearly intentional, orderly and human managed, such as signs, uniformity, designated borders, and clean lines that signal a landscape is actively managed and cared for (Nassauer 1995). These cues to care can prevent the presence of wildlife habitats, which are often perceived as unmanaged and messy (Nassauer et al. 2009, Goddard et al. 2013), especially in urban areas, where vacant lots are already associated with economic decay and neglect (Accordino and Johnson 2002). The above-mentioned perceptions may often lead to residential design expectations that may result in landscapes supporting a poor level of urban biodiversity (Ignatieva et al. 2010, Goddard et al. 2013).

Wildlife Perceptions and Preferences in Vacant Lots

Research on wildlife perceptions in urban greenspaces has also focused predominantly on formal urban greenspaces. In formal urban greenspaces, the plants and animals are integral to how people perceive these areas (Gobster and Westphal 2004). Wildlife can positively contribute to how people experience urban greenspaces. In England, residents reported mental benefits from greenspaces increased along with plant and animal diversity (Fuller et al. 2007), though whether this was a conscious connection was unclear. Supporting the lack of a conscious connection, Belaire et al. (2015) found that Chicago, Illinois neighborhood residents desired and appreciated high bird species diversity, but their perceptions were not linked to the biodiversity present, as people chronically underestimated the number of species present. On the other hand, residents may negatively perceive wildlife in urban greenspaces as producers of ecosystem disservices – e.g., nuisance animals, disease vectors, and safety threats (Lyytimäki et al.

2008, Terada et al. 2016). For example, urban residents interviewed about biodiversity in Calgary, Canada frequently mentioned wildlife as potentially dangerous to pets and children as well as damaging to the home and yard (Campbell-Arvai 2018). This may also be reflected in informal urban greenspaces, like vacant lots. Reflecting these conflicting viewpoints in vacant lots, a cross-cultural study of Australian and Japanese residents found that vacant lots and other forms of informal urban greenspace were valued for their provision of wildlife habitat; at the same time, residents also expressed concerns about the greenspaces becoming breeding grounds for pest animals (Rupprecht et al. 2015). This suggests that wildlife perceptions in vacant lots, could vary broadly, depending upon the local social context.

Vacant Lot Use Preferences

While residents may be able to recognize some vacant lot landscapes as more beneficial for ecological purposes, perceived benefits may be overruled by preferences for use (Hofmann et al. 2012, Goddard et al. 2013, Rega-Brodsky et al. 2018). Vacant lot uses vary widely and include both areas for community gatherings, private individuals, and recreation , among others (Kremer et al. 2013, Rupprecht et al. 2015). In New York City, Kremer et al. (2013) found that while approximately 33% of vacant lots appeared to be unused, others served as parking areas, commercial areas (i.e. for storage of equipment), sport fields, playground, and community gardens, showcasing a wide variety of uses.

Safety and perceived threats may also be large factors in determining the kinds and degree of use for vacant lots (Rink and Arndt 2016). Inner-city Los Angeles residents expressed concerns about the use of some vacant spaces due to perceived threats, such as

gang activity and drive-by shootings (Pincetl and Gearin 2005). Contrasting this, elementary and middle school students in Milwaukee, Wisconsin noted that spaces like vacant lots, sidewalks, and alleys were *preferred* for recreation due to their perceived accessibility and safety when compared to the low-quality parks in their neighborhoods (Platt 2012). This may be a reflection of how children's perceptions of vacant lot use reflect the safe, spatial boundaries allowed by parents who increasingly value parent-supervised recreation for their children (Valentine and McKendrick 1997, Platt 2012). This could signal an opportunity for vacant lots to serve as nearby areas of recreation, where access is improved and parents can easily supervise, although locally perceived safety threats in the area may determine actual use. Each desired vacant lot use requires a landscape that facilitates desired activities, largely determining characteristics such as vegetation structural complexity, plant species, and subsequent wildlife habitat present (Zipperer 2002, Aronson et al. 2017, Rega-Brodsky et al. 2018).

Research Need

Vacant lots have received little attention in the perception literature in comparison to formal urban greenspaces (Rupprecht and Byrne 2014, Botzat et al. 2016). The need for vacant lot perception studies continues to grow as shrinking cities across the United States and the globe produce more vacant land (Haase 2008, Newman et al. 2016, Terada et al. 2016). There are still numerous questions about what particular ecological features of vacant lots contribute to residents' perceptions and how residents perceive the ecological and social trade-offs of vacant lot management (Anderson and Minor 2016, Rega-Brodsky et al. 2018). Due to the complex and local context of the factors associated with vacant lots, their perception and their desired management, qualitative explorations

of local residents' perceptions is warranted for initial investigations. While a few studies to date have qualitatively explored residents' perceptions of vacant lot vegetation to understand preferences for use and management (Foo et al. 2013, Rink and Arndt 2016, Brun et al. 2017), no studies known to the authors examined both vacant lot perceptions and use in relation to their vegetation *and* wildlife perceptions, while taking into account the social context of the area, all of which have been shown to be important for desired vacant lot management.

Vacancy and Race in St. Louis, Missouri

Since the late 1800's, St. Louis, Missouri has often experienced social and economic divisions, beginning in 1876 with the legal succession of St. Louis from the county over tax collections and expenditures (Huber 2010). St. Louis continued to experience institutionalized housing and segregation issues into the 1900's. Redlining, blockbusting, and exclusive zoning were common institutional and social practices, resulting in housing segregation and discrimination against minorities (Cooperman 2014). In the 1950's, St. Louis had achieved its peak population and was experiencing a general lack of quality housing, especially for low-income residents (Coates 2014). To combat this, the city embarked upon the construction of multi-story public housing complexes. Perhaps the best-known example of this practice was the establishment of Pruitt-Igoe, an area in north St. Louis consisting of thirty-three 11-story buildings, segregated by race. Within 20 years, what once housed middle-class white and black families became a strictly-black housing area infamous for its poverty, crime, and crumbling infrastructure, serving as a national symbol of public housing failure, social injustice and racial discrimination (Wendel et al. 2012, Coates 2014).

After the Supreme Court struck down racial covenants in 1948, a series of citizen exoduses into St. Louis' suburbs and the surrounding county by whites occurred from the 1950's to the 1970's, soon followed by blacks, some of which were forcibly moved from the city's center. (Gordon n.d., Cooperman 2014). Combined with post-war deindustrialization and general suburbanization, these population movements resulted in the city of St. Louis losing 63% of its population from its peak in the 1950's, while inheriting a substantial amount of abandoned homes and vacant lots (Ihnen 2011, Cooperman 2014). In 2018, the City of St. Louis found 19% of all properties in the city to be vacant, totaling about 25,000 properties, with 71% of those properties being vacant lots (A Plan to Reduce Vacant Lots and Buildings 2018). A recent study found that these estimates may be highly conservative (Prener et al. 2018). The current mayor's administration has earmarked more funding for vacant building demolition, thus ensuring a growing supply of vacant lots in the future (A Plan to Reduce Vacant Lots and Buildings 2018).

The Rise of the Green City Coalition

In 2012, the Environmental Protection Agency and the Missouri Coalition for the Environment successfully sued the Metropolitan St. Louis Sewer District (MSD) over wastewater discharge into the Mississippi River (Trickey 2017). The lawsuit resulted in MSD being ordered to invest billions of dollars into the development of enormous, underground water control structures in south St. Louis, while in north St. Louis, MSD was allowed to focus their efforts upon the demolition of vacant homes and building green infrastructure using some of the vacant lots (Trickey 2017). A total of \$13.5 million has been allocated to specifically tear down vacant homes to allow the new

vacant lots to absorb rainwater, with another \$100 million devoted to the creation of green infrastructure projects on the landscape (Trickey 2017).

Seeing an opportunity to transform the vacant lots left behind into various forms of urban greenspace that provided ecological services for local residents, the City of St. Louis' Office of Sustainability, the Missouri Department of Conservation (MDC) and Missouri Botanical Garden (MBG) formed the Urban Vitality and Ecology Initiative (UVE) in 2013 (Urban Vitality & Ecology n.d.). The goal of this coalition was to improve residents' contact with nature and access to ecosystem services through the implementation of various green infrastructure projects, such as rain gardens, community gardens and greenways, that also provided urban wildlife habitat (Urban Vitality & Ecology n.d.). Now the partner-expanded Green City Coalition (GCC), program leaders identified various vacant lot greening project sites in several north St. Louis neighborhoods, based upon the concentration and connectivity of vacant lots in the area, as well as where the city of St. Louis was removing vacant homes (Green City Coalition 2019). Similar to UVE, the goal of the GCC is to demolish and remove any vacant homes that are condemned or deteriorating and stage a greening intervention for a network of vacant lots in the hopes of providing ecosystem services and economic benefits to residents and the city (Green City Coalition 2019). The planned greening interventions completed and under progress include water detention basins, restored prairie areas, and community gardens.

Our objective was to speak with residents in two of these north St. Louis neighborhoods experiencing various forms of vacant lot greening to find out how they would like the vacant lots around them to be used as well as managed in terms of the

vegetation aesthetics as well as the wildlife that would inhabit these areas. We ultimately sought to understand how the vacant lots could be managed to benefit residents while accomplishing green infrastructure and biodiversity goals. In order to understand residents' desired management, we sought to answer the following questions:

Research Questions

- 1) How do residents' perceive wildlife and vegetation in the vacant lots?
- 2) What are residents' preferences for lot use?

Methods

Study Area

The neighborhoods selected for this study are Baden and Wells-Goodfellow, located on the north side of St. Louis, Missouri.

Baden and Wells-Goodfellow

Both Baden and Well-Goodfellow are located in north St. Louis along the city of St. Louis and St. Louis County boundary line (Figures 1-2). Baden is approximately 263.7ha (1.02mi²) (Figure 1) and is home to about 7,200 residents (City of St. Louis 2019a), Wells-Goodfellow is approximately 318.6ha (1.23mi²) (Figure 2) and houses about 5,900 residents (City of St. Louis 2019b). Both neighborhoods are composed primarily of black, low-income residents with median household incomes of \$29.5K for Baden and \$23.5K for Wells-Goodfellow (Table 1). Baden possesses a higher quantity of public greenspace that is less concentrated than in Wells-Goodfellow; Baden has three parks spaced throughout the neighborhood (Figure 1) totaling 27.67 acres, while Wells-Goodfellow has only one park totaling 13.16 acres near the neighborhood edge (Figure 2) (City of St. Louis 2019a, b). Both neighborhoods have experienced large population losses, with Wells-Goodfellow experiencing the greater out-migration of residents, losing almost 30% of its population compared to Baden's 13.9% loss, according to the most recent census data, from 2000 to 2010 (City of St. Louis 2019c). The greater population loss in Wells-Goodfellow is reflected in a larger total area of vacant properties (includes vacant buildings and vacant lots) owned by the city of St. Louis through the Land Reutilization Authority (LRA) in each neighborhood, with 96 ha in Wells-Goodfellow

and 32 ha in Baden (Moreno 2018). This does not include the large amounts of privately owned vacant properties. The vegetation cover types were previously categorized for all LRA vacant lots in each neighborhood, showing that vegetation structure and density greatly varied within the lots, with examples of closed forest and woodland to more open meadows, lawns, and artificial surfaces (Figures 3-4) (Moreno 2018). Researchers found the most common cover type to be mowed lawn, followed by woodlands, artificial cover, closed forest, and meadow (Moreno 2018).

Data Collection and Participants

I conducted in-depth, semi-structured interviews (Creswell and Poth 2012) with 27 north city, St. Louis residents from the fall of 2017 until the spring of 2018 (Institutional Review Board Project #20087790). Using purposive sampling (Marshall 1996), we gathered contact information from Wells-Goodfellow residents attending a stakeholder meeting surrounding the vacant lot interventions by the city of St. Louis and its partners within the neighborhood. We later contacted each resident via phone to explain the research and set up in-person interviews, typically at the resident's home, but sometimes in public areas (e.g. local library). We used a snowball sampling method (Goodman 1961) to solicit additional interviews; we asked participants to recommend and contact other residents who were potentially interested in giving their input on how the vacant lots in their area should be managed. For Baden, we gathered key informants initially from a fellow researcher's contact in the neighborhood. Additional participants were identified using the aforementioned snowball sampling as well as key informants through the local neighborhood organization, Revitalization of Baden Association (ROBA). Interviews were conducted using an interview guide (Denzin and Lincoln

2017), with five main questions focusing upon residents' perception of their community and its development, the vacant lots, the wildlife and vegetation in those lots, as well as present and future vacant lot use (Appendix 1). Notes were taken during the interviews and memos were created immediately after. This allowed for further exploration of initial interview themes within subsequent interviews, creating a more complex picture as interviews continued (Denzin and Lincoln 2017). Interviews lasted 30-90 minutes with participants being interviewed predominantly alone, although occasionally with a spouse. Participants were compensated with a \$10 gift card to a local grocery store to encourage participation and as compensation for their time (Seidman 2013, Mumaw and Bekessy 2017). All potential participants were walked through the purpose of the research, verbally consented, and given a brief description of the interviewing author, whom interviewed all participants. The interviewing author presented himself to participants as an out-of-state student, ignorant of most details concerning St. Louis and the two study areas, beyond knowing about the existence of vacant lot management by the city. This prevented the assumption of shared knowledge during the interviews and encouraged richer answers from participants (Seidman 2013). The University of Missouri provided Institutional Review Board approval. All participants either currently resided in the study areas or had resided there in the past and had experiences with the vacant lots. Fourteen of the interview participants were from Wells-Goodfellow and the other thirteen from Baden, totaling 27 participants (Table 3). Specifically, participants ranged in age from 40 to 89, with most older than 50. Interview participants were predominantly black (21 black, 6 white), reflecting the neighborhood's racial makeup, and skewed slightly female

(16 female, 11 male). All participants were homeowners, with most having resided in one of the neighborhoods for over a decade.

The photo-evaluation method has been used effectively to determine landscape preference and perceived benefits in numerous studies (Gobster and Westphal 2004, Matsuoka and Kaplan 2008, Botzat et al. 2016). During the last third of each interview, participants were administered a vacant lot photograph survey. The first part of the survey consisted of demographic questions that included, race, age, education, marital status, age of children (if any), and home ownership, to understand their potential influence on vacant lot perceptions. For the second part, participants were shown a packet of 24 vacant lot photographs lettered A to X to allow for easy reference by participants and investigators (Figure 5). The photographs were taken in both Baden and Wells-Goodfellow and exhibited different vegetation structures (high, medium, low) and varied, maintenance cues (e.g. presence of trash, mowing, fencing, overgrown sidewalk, dead wood, garden plots, signage, etc.) as well as different levels of lot visibility (high, medium, low). The photographs and their characteristics are displayed in Table 4. Each photograph was shown in color to allow for better differentiation between lot characteristics, such as dirt, sparse vegetation, and gravel. Participants were told these photographs were taken in both Wells-Goodfellow and Baden and were asked to score each photograph on a Likert-style scale of 1-5 based upon having the vacant lot in their area, with 1 representing “strongly dislike”, 2 representing “dislike”, 3 representing “neutral”, 4 representing “like”, and 5 representing “strongly like”. As they scored each photograph, participants were encouraged to think aloud about what they liked and didn’t like in each photograph. We followed this up with open ended questions asking

participants to choose their three top liked and disliked photographs and then to describe what photograph characteristics motivated their decision.

Data Analysis

Interviews were transcribed and then the transcripts reduced into outline form. These outlines were analyzed using a thematic analysis approach (Boyatzis 1998) to inductively develop codes and themes through a constant comparative method, involving an iterative process of review and comparison amongst previously coded outlines (Strauss and Corbin 1997). A secondary round of coding with the full transcripts was then implemented within NVivo 11 (QSR International) to further develop the themes created from the outlines and gather illustrative quotes. During this process, a second coder was brought in to independently code the transcripts (Thomas 2006). Three transcripts from each neighborhood were separately coded and then discussed for any theme discrepancies between coders. Following this, four additional transcripts from the neighborhood were coded and the themes developed from the first transcripts were further discussed along with any new themes that may have appeared from the first round of coding. After seven transcripts, the coders found that the themes captured the material consistently and that no new themes emerged. Following this, all themes were divided into their respective sub-theme parts, pertaining to wildlife, vegetation, and vacant lot use.

For the photograph survey, we used a ranked sum for each photograph to determine overall preference scores for each greenspace. Participants' comments about their most liked and disliked photographs were transcribed and then analyzed using

content analysis within NVivo 11 (Weber 1990). Comments were coded based upon whether they pertained to positive or negative attributes of each picture.

Results

Interview Themes

The following sections describe emergent themes about how residents think about the vacant lots and their management, compiled from the interviews and comments from the vacant lot photograph evaluation survey. The four themes of *community change*, *neighborhood care*, *maintenance effort* and *safety* arose that explained how residents' wanted the vacant lots to be managed in the future. Although my research questions centered on the perceptions of wildlife and vegetation and preferences for vacant lot use, there were overarching themes surrounding vacant lot perception that transcended these topics. The affiliated perceptions about vegetation and wildlife and preferences for vacant lot use are included within each theme as sub-themes and will be discussed. The themes and sub-themes can also be found in Table 5.

Community Change

All participants discussed the negative impacts to their communities that preceded and coincided with the appearance of vacant lots. Many participants spoke of the bustling communities that once resided in each neighborhood, complete with shopping and business districts, mom and pop stores, and influential neighbors that had since disappeared. As time passed, participants noted significant demographic changes within their neighborhood, with new residents arriving as renters instead of homeowners. A Baden participant spoke of her neighbors changing from majority white to majority black neighbors and the loss of local businesses,

“When my husband bought this house we had . . . about 6 to 10 white neighbors, and then some blacks. But it was more white than blacks at that time. And then we had a lot of different businesses and places that we could go out to dinner and that type of thing in the neighborhood.” [B6]

Another participant notes the increase in renters and its negative impact upon the community,

Well, they had a transition with the residents that have been down here for years. Of course, they moved, and mostly what they had come in are renters, and that's not the best area when you got all renters . . . Because homeowners have to stabilize the community. [B1]

Vegetation Perceptions: Mimic residential yards

When speaking about vegetation, many participants preferred management in the vacant lots that *mimicked that of the surrounding residential yards*, just as if someone still lived on that space. One participant mentioned a nearby vacant lot and its past management, when describing how she felt the lots should be managed,

“When the people used to live there, they had a nice lawn, just like anybody else in their backyard, but the grass has grown so high, that you can't even see through it, you know.” [WG 8].

Wildlife Perceptions: Signs of Decline

Participants often expressed surprise to frequently see various kinds of wildlife in a city they felt were not present or common before the number of vacant lots increased.

Wildlife such as opossums, raccoons, deer, and hawks were mentioned often in this context. Some participants associated these wildlife with *signs of decline*, in terms of the area population and the rise of unmaintained, shrubby or forested vacant lots. One participant describes this association after seeing deer in his area:

It let me know that I was living in an area beginning to be like a wooded area or something, almost like the city has transformed itself from the city into a forest land . . . that these animals [were] coming [where] their food was plentiful. That's what an animal gonna do. . . It's gonna go where it can survive at. [Interviewer: How do you feel about it turning into a forest land?]. Well that's horrible, because I've seen this entire area thrive off of business . . .it was a very thriving place." [WG 3]

However, several participants expressed interest in seeing some wildlife, such as the local baseball team mascot, the northern cardinal and other song birds such as blue jays and robins. One participant even expressed interest in creating a space specifically for bird habitat and environmental education,

"We got a bunch of lots. Can we build something? Okay, in the meantime can we come up with something? A bird sanctuary! . . . Come over and talk about birds. [WG 1].

Vacant Lot Use Preferences: Repopulation and Revival, Neighborhood Aesthetic Fit, and Community Areas

In terms of desired vacant lot use, participants often spoke of *repopulating* their neighborhood with new residents and businesses in the vacant lots instead of greenspace

whenever possible. In Baden, where greenspace was more abundant and accessible, one participant plainly expressed this sentiment,

“Well we’ve got the greenspace. We’re losing people. We’re losing families.” [B2]

Even when residents saw the value in greenspace as a vacant lot use, they still ultimately desired the vacant lots to be used to *revive* the neighborhood community. One participant noted that a greened vacant lot was limited for its benefit to the neighborhood and that social issues of the area were more important than ecological ones,

“The lot is fine, but you just going to replace it with just seeds, it’s just going to be a lot . . . Bring the neighborhood back alive. . . We got some issues in this world that precedes lots of birds” [WG 1]

Some participants expressed confusion and doubt about changing the identity of a vacant lot from a neighborhood residence to a greenspace. Participants wanted the vacant lots to *fit into the neighborhood aesthetic* of the other residential properties. One participant questioned transforming some of the vacant lots into wildlife habitat as “strange” for a neighborhood, feeling the spaces would fit better on the outskirts of a block instead of within it,

“My question is, is that fitting for a neighborhood? Most of our lots are like in the middle of the block and would you do that for a neighborhood? I could see something like that on a corner . . . but I don’t know in the middle of a block . . . it just seems kind of strange to me.” [WG 7]

Other participants suggested family-friendly and *community areas* to attract new households to the area and re-ignite neighborhood ties that had waned. Community

gardens were frequently suggested due to participants past gardening experiences and a desire to restart the farmer's markets that used to exist in the neighborhoods. One Wells-Goodfellow participant heavily involved in his neighborhood's youth community suggested the vacant lots serve as parks for both adults and kids to meet in the summer,

“Well, what I'd like to see is some type of family atmosphere, like a little park for the kids. Something nice and a sitting area, like a barbeque pit or a little . . . outdoor amphitheater or something where . . . in summertime you could probably talk to people about what's going on in the community versus sitting up in a closed up room” [WG 9].

Neighborhood Care

The second theme that arose was that of neighborhood care. This was comprised of residents speaking about the vacant lots and vacant homes as signs of neglect and abandonment for their communities. Some participants, particularly in Well-Goodfellow, perceived the city of St. Louis to be apathetic to the increasing vacancy and deterioration of properties in their neighborhood. This came predominantly from their perceptions of how the city managed the vacant properties and how they handled dumping and litter in the vacant lots.

Participants felt that the image of their neighborhood was intricately tied up with the vacant properties as a whole. Participants spoke of others' negative views of the neighborhood, with the dumping and littering of the vacant lots signifying the low esteem others held for their area. Participants often cited people outside the neighborhood dumping trash onto the vacant lots as evidence that the perception of a lack of care where

they lived was prevalent. This was the most commonly cited grievance with how the vacant lots looked, with residents not able to keep up with the large amounts of trash thrown by individuals during the day and dumped by trucks at night. One participant described his long-time frustration with attempting to keep the vacant lots clean with his neighbors, and then having people from outside the area deposit trash on the lots again, because they didn't respect his neighborhood,

“Me and some of the neighbors took the initiative to try and clean some of the lots in the neighborhood . . . So when we cleaned [them] up, they come and throw trash and dump waste. I think . . . it might be people familiar with [the] area and . . . moved out that come back and dump. So it's a lack of respect, 'cause what they don't do in their neighborhood, they'll do in ours . . . and it's been going on in the city of St. Louis for quite a while, possibly forty or fifty years.” [WG 3]

Vegetation Perceptions: Overgrowth, City Maintenance Dissatisfaction

Residents perceived the vegetation in the vacant lots as representations of either a clean and maintained space or one of abandonment and disrepair. Participants often used the word “*overgrowth*” to describe vegetation that was not being maintained enough or had surpassed the level of acceptability for seeming cared for. This overgrowth encompassed vegetation that had encroached upon structures (e.g. sidewalks, buildings, fences) and property lines, as well as thick vegetation that obscured vision, and any vegetation that was not uniform or perceived as clearly and intentionally cut on a regular basis. One participant described his frustration with a vacant property owned by the city next to his house that he saw deteriorate with overgrowth under city management. He

described only wanting a vacant lot that he could control access to and maintain to his level of satisfaction,

“I’d rather not have a lot right next to me that may not be taken care of well and maybe utilized for many different things, perhaps even unscrupulous, right next to me, unless I have control over it and I’ll use it. I just wanna be able to have control because it’s been a frustrating thing for years, since I couldn’t get the [vacant] house [next door] and how the city basically let it go; overgrowth [in] the front yard and the backyard and you had grass four feet tall and it could have been kept up a lot better. But now it will be, because it’ll be mine. [WG 2]

Conversely, an absence of overgrowth was seen as a sign of “intentionality” or “care” in a vacant lot that looks as if someone cares about the property. Other indicators of care with a vacant lot usually involved “green grass”, filled, uniform and “smooth” lawn, as well as clearly trimmed bushes and trees that lacked low-hanging branches that obscured a person’s view.

Many residents spoke of their *dissatisfaction with how LRA and the city of St. Louis maintained the vacant lots*. One participant described residents’ frustrations with how a vacant lot may look after the St. Louis Forestry Department has mown the lot with a tractor, which mows around obstacles and away from woody vegetation on the edge of the lot, leaving unmown sections for residents to clean up afterwards with their personal equipment,

“Well, I would like to see a better attitude in [the City of St. Louis Forestry Department] maintenance ability. . . Some of them do not cut that grass

adequately. They have a guy that comes on the motor [tractor] and cut it but they don't have nobody to come and trim it up to a uniform look. . . This is not just me talking. . . I'm talking for my neighbors and they very disappointed when they see them come. Because [the neighbors] come out . . . and they'll finish it off. And they out there for hours. . . I'd rather have one area looking in an orderly fashion than just go over five areas and not put them in the uniform fashion. . . And they don't even have guys coming with trimmers. Because we know the big tractor ain't gonna be able to trim so he come and that's it. He just knocked the grass down to make it look . . . like an eighty something year old man where you cut [the middle] and then didn't trim around the head. And that's been an ongoing thing.” [WG 3]

Wildlife Perceptions: Trash Brought Unwanted Wildlife

In the context of neighborhood care, some wildlife were associated with a lack of maintenance with the vacant lots and vacant homes, especially with the presence of trash. *An increase in unwanted wildlife interactions with rats, mice, raccoons, and opossums were often associated with an increase in the level of trash buildup and dumping that had occurred both inside the vacant lots and within the trash alleys behind residents' homes.* A participant described the connection between the increased amount of trash and wildlife in the area,

“The dumping in this area has brought wildlife and different things, the level the amount of dumping, the trash and debris in this area . . . I think . . . sometimes animals like to be in the trash and sometimes some of them don't.” [WG 2].

Vacant Lot Use Preferences: Redevelopment, Beautification, Water Detentions Basins are Positive, Native Prairie Grasses Require Clear Maintenance Signs

In terms of use, participants often expressed the desire for the vacant lots to be *re-developed* with businesses and homes and filled with people. To the residents, empty lots and streets with few people were signs of a loss of community, abandonment and lack of care.

If the lots were to continue to sit empty without structural reinvestment, participants desired management of the vacant lots that *beautified* the area and signaled a level of intentionality and care to others who passed through the neighborhood. Participants often spoke of mown lawns combined with structures such as benches, pavilions, water features and walking paths that served as clear signs of maintenance. The use of color in the form of flowers, blooming trees, and art was also desired to beautify the area and increase neighborhood pride.

Water detention basins were generally seen as positive landscapes due to their fencing to prevent dumping and their uniform and regularly mowed grounds, though residents expressed a desire to use these restricted spaces for community events. However, one resident who lived near a detention basin described voicing her opposition to the use of the area when the city called due to her lack of trust in potential users,

“Oh no, I don't want to see anybody down here [at the detention basin]. The MSD called me one day and say some people wanted to know if they could hold a family reunion or something over there, and I'm like, "I better not see anybody down here

talking about holding nothing." That is not a picnic area. It looks like a picnic, but under there is a sewer system. No. And plus, we don't want the company . . . They will start congregating down here at the end of this block and we have all kind of trouble. . . Probably people coming to steal. Probably people fighting. Probably gunshots." [B 6]

When prairie grasses entered the discussion as a potential vacant lot use, participants normally saw *prairie grasses as only acceptable if they possessed clear signs of maintenance*. One participant described how she preferred color and green grass instead of the native grass that turned brown but would accept the planting of native grasses in a large vacant lot area if it incorporated landscaping and borders, as she generally perceived native grasses as untamed and wild:

"I want color. I like color and green. . . it [native grass] looked dead . . . I don't want to just freely plant it. It has to be landscaped and planned, none of those native grasses just . . . I like native grass but it's got to be landscaped, bordered. The native grasses are just like wild-looking flowers, plants. I don't like that. I want them organized and planted and structured." [WG 12]

Throughout all interviews, particularly in Wells-Goodfellow, participants expressed a long-running frustration with how vacant lots were currently being managed, even going as far as to suggest simply paving over them,

"I just wanna see them clean, even if they could just be paved or just something like that . . . just clean. Even, even if they have to fence them in, that would be fine, or it could just be grass, as long as they keep it cut." [WG 6]

Maintenance Effort

Participants often cited the time and finances for vacant lot maintenance when describing how the lots should look and be managed. The perception of the maintenance effort involved was generally shaped by concerns about social capital, city capabilities, and financial capital.

When speaking of social capital, participants mentioned how there were few left in the community who would be willing or able to help maintain any community lots. Many of the residents who would assist with maintenance were purported to have moved on or passed away, with homeowners being replaced by renters and their often absentee landlords. Both renters and non-resident landlords were described by participants as lacking a sense of ownership and pride in the community and thus not likely to invest their time. One participant described why she felt renters in her neighborhood were not invested in property maintenance,

“When you’re a resident and you own the property, you tend to keep it up, have it looking nice, invest in it. Whereas you know, you got renters. They don’t own it so they don’t really have a stake in keeping their neighborhood beautified.” [WG 12]

As homeownership declined, once prominent neighborhood organizations and block units who helped maintain vacant properties either dissolved or became a fleeting shadow of their past due to aging and lack of interest. As one long-time resident put it when discussing their block unit,

“You don’t have too many young people that want to participate in something like this. Our vice president, he died. Our treasurer, he died. We had a bunch of them pass on. Ain’t nobody else want to participate.” [WG 11]

Connecting this to the maintenance of the vacant lots, another participant discussed the limited ability of the elderly homeowners who remained over time to maintain the properties around them:

“When you take into consideration the population, most of it, especially in vacant areas, is going to be the elderly. They’re not capable of getting out there cutting and weeding.” [WG 4]

Organizing vacant lot or property clean-ups for the rampant dumping issues that developed throughout both neighborhoods became more difficult, with participants reporting more success in clean-ups organized by local entities and assisted by outside aid. A participant in Baden describes a local church as the focal point for vacant lot clean-ups in the area, with the neighborhood business organization, the Missouri Botanical Garden and a local university sometimes assisting with manpower,

“We cleaned off this lot and stuff over here. My board president, he brought a chainsaw and he brought some other stuff. City brought those big dumpsters and we threw everything in there. . . We had a lot of the residents, but like I said, we get a lot of college students that participate. . . [from] Washington University, and then some from Saint Louis University. . . We had a young man from botanical garden that worked with that. But like I said, it all comes through the church up here.”
[B1]

City capabilities to maintain the vacant lots were generally discussed in terms of residents' past experiences with city entities, such as LRA, St. Louis Forestry Department, MSD, and their local alderman. Many participants, particularly in Wells-Goodfellow, expressed distrust and disappointment with the city's efforts and capabilities to maintain the LRA owned vacant lots. One participant described her dissatisfaction upon seeing sections left unmown by the city and the presence of trash cut up and spread around a nearby vacant lot,

“They don't do a good job. . . they'll cut a lot . . . and don't cut the curb. So they'll cut the grass and then the curb is 4, 5 feet high . . . Or it'll be trash on the lot and they don't clean the trash. They'll just cut over the trash and then you have all the paper flying all over the place. They don't do a good job at all. I think that's one of the main complaints of the residents.” [WG14]

Participants expressed financial capital concerns around the cost associated with maintaining the vacant lots, either by residents or the city. Some participants expressed concern about the city's financial state impacting its ability to maintain the lots. One resident spoke of simply wanting mown grass in vacant lots due to the city's financial inability to do more,

“No I don't really want something immediately. I just want to cut the grass, that's it. The reason being is, the cost of doing something immediately is not cost efficient and the city is strapped for cash. . . and they keep building things that are high maintenance.” [WG 5].

Other participants spoke of the personal cost of vegetation removal, like one participant who received an unaffordable quote to remove a tree on her property,

“And then tree-cutting service . . . there was a tree that was half cut down and so for me to have somebody to come . . . they wanted to charge me \$1,600 and that wasn’t even stump removal.” [WG 4]

Some participants brought up the cost of living in the area, inability to acquire loans, and insurance redlining as factors that led to a financial inability to maintain their properties to the level desired. One participant described his frustrations with acquiring loans when discussing his desire to acquire a vacant home next door and fund required electrical and plumbing updates,

“You can’t get money here. If I went to a bank and said I needed \$25,000 or even \$15,000, \$10,000, it would not be that easy to get.” [WG 2]

Another participant discussed the red-lining she felt was present in the area that manifested in difficulty acquiring building insurance, even with costly safety code updates,

“The red-lining here is still fairly bad whatever the banks tell you, it is still really a problem. . . you can’t buy a house if you can’t get insurance . . . I can’t tell you what a nightmare it was shopping for insurance on this building. We tore it down to the brick and redid all the systems and everything in this thing . . . it’s all brand new wiring, there’s a fire system in there, and we still didn’t get insurance.” [B 3]

Vegetation Perceptions: Simple Vegetation is Maintainable, Vegetation Spillover to Adjacent Properties, Tall and Dense Conceals Dumping Activities

Participants typically saw vegetation as the factor that would ultimately decide how much effort would be needed to maintain the vacant lots. While participants often talked about using the vacant lots to beautify the area, participants saw *simple vegetation, such as grass, as something they themselves or the city could maintain*. When asked if she would like to see a variety of vegetation like flowers, trees, and bushes, one participant responded that she felt those features required maintenance that would not occur,

“I’d just be less apt to say that because I know that’s more maintenance. And past experience, I’m not quite sure who would keep the maintenance up. . . Plain, all grass is maintenance but low maintenance.” [B 5]

Flowers were desired for their beauty, but some participants mentioned that annual flowers require a lot of upkeep, even referring to a vacant lot that was filled with sunflowers in the central part of the city that eventually just became a grass lawn over time due to maintenance. Trees were desired by participants for their shade, fresh air and flowers but some residents expressed concerns about the upkeep involved in leaf pick-up or vandalization by children or others. One participant spoke of her decision to change the flowers on her property into mulch and rocks after a neighbor’s children pulled them up, choosing a passive approach instead of engaging with the children or parents,

“I got some bad kids that live next door to me. They were coming over and pulling up my flowers and messing with them and instead of me yelling at them or talking

to their parents I just went a different route. I pulled them all up and I went with rocks. And I went with mulch.” [B 5].

Additionally, several participants voiced concerns about *vegetation spillover* from nearby vacant lots onto their own properties, costing them more effort or even money in the form of city code violations or decreased property value. One participant describes his grievances with a vacant lot next door to his home that’s owned by the city,

“[The] property’s overgrown, it’s actually encroaching on my land. So it really hurts the value of my land and allows me to also be in that code violation realm, to where at any time they (The City) could knock out 15-20 violations on me. And half of them are coming from their lot.” [WG 5]

Clustered trees or other forms of tall, dense vegetation around the perimeter in vacant lots were often disliked by residents due to their ability to *conceal dumping activities*, which made keeping the lots trash-free more difficult. Trash and dumping issues were voiced as pressing issues for all participants across both neighborhoods.

Wildlife Perceptions: Wildlife Nuisance and Damage Issues

In terms of wildlife, maintenance effort manifested in participants describing various forms of *nuisance and damage caused by wildlife* that were sometimes directly associated with originating from the vacant lots. Participants described wildlife taking trash out of receptacles and strewing it about as well as wildlife damages to various parts of their homes, including gutters, trash cans, and attics. Damages to the lawn, landscaping, and gardens were also mentioned. One participant described actions he felt forced to take to stop opossums from entering his home from a vacant lot next door,

“I had to trap a whole family of ‘possums out of my house that was living next door. I finally got them all . . . And I didn’t have a problem anymore. Now I got rats. But it’s all coming from their [vacant] property.” [WG 5].

Another participant went into detail about the garden damage from squirrels and rabbits that affected how he and his spouse felt about those wildlife,

“Then the squirrels, ah, these squirrels . . . it’s like there’s thousands of them over here, they be trying to get into everything. My wife, she doesn’t like squirrels too much because they . . . get into her flowers. Then sometimes the rabbits get into them too.” [WG 3]

Vacant Lot Use Preferences: Mown Lawn, Low Maintenance

Structures, Proximity to Residents, Prairie Grass Potential

As mentioned previously, many participants voiced concerns about the ability to maintain the vacant lots, either by themselves, with their community, or via paid services. If this concern was expressed, participants spoke of a management preference for simple vegetation, typically in the form of a *mown lawn* or some perennial flowers. Above all, participants expressed the desire for whatever vegetation on the vacant lots to be continually trimmed back. Pavilions, benches, and statues which were seen as *low maintenance structures* by participants but adding significant value to the use of the lots. Some participants reinforced the choice of a mown field by suggesting recreational uses for these areas, such as one participant who saw a football field as cheap and easy for a vacant lot,

“Just put some grass seed right there . . . Boom, that way you got a football field . . . But that's about it. . . depending on who got the money to really spruce it up. [B 12].

Several participants mentioned using the lots for income generation such as with an orchard or a community garden, but some expressed doubt over the ability to maintain them properly in the neighborhoods. Specifically, participants were concerned about the number of residents left to maintain these areas and a general lack of time for the neighborhoods' mostly low-income residents, many of whom work multiple jobs. One long-time resident spoke of her experience organizing residents for activities in the neighborhood organization that had since dissolved after residents moved away and how a garden might fail due to the lack of social capital,

“Gardening has been made a good thing. . . But like I said, so much vacancy. No resident. It's hard to keep.” [WG10]

When talking about maintaining a vacant lot of their own, participants expressed a desire to fence off the lot in order to control who could use it and prevent trash build-up, as one participant mentioned,

“Well, when you get a fence around it, it's great. If you take the fence down you get trash being dumped there.” [B 13].

Several participants mentioned *proximity* as an important factor for maintaining a vacant lot in their community. Nearby lots, especially next door, were seen as more easily maintained due to accessibility and proximity versus one that was further away, less accessible, out of sight, and forgotten about.

Some residents saw *the potential value in prairie areas* and butterfly gardens for vacant lots due to their low maintenance, though this often came with the stressor that they still needed to look maintained. One participant balanced her aversion to taller, “wild” grass with the smaller mowing effort that prairie grass requires, envisioning a way to maintain the prairie grass to satisfy both aesthetic preferences and the city’s mowing budget,

Oh, I'm just saying you know how the prairie grass you see is just kind of wild flowers, wild grass that just kind of grows up so tall and probably what, four to six feet tall? And I wouldn't necessarily want to see that but I can see that maintained within a landscape of some sort. . . So they don't have to mow it. [B11].

Safety

Perhaps the strongest theme that arose from all participants concerning vacant lot perception was safety. Many participants cited crime as a prevalent issue and safety concerns precluded the use of any vacant lot, whether it was designed as a public or private space. Participants needed to feel safe wherever they went. As the neighborhoods changed, residents spoke of an increase in crime, from murders and illicit drug activity associated with gangs to prostitution and theft. One participants spoke about how the neighborhood changed from a tight-knit community while growing up to an area where he always had to be on his guard,

“[That] was a neighborhood, I remember walking that neighborhood. It didn’t have the danger, [the] suspicions that I have today. . . I could leave, once the sun sets and walk to the place where . . . one guy just got killed last week.” [WG 1]

As more homeowners left and vacancy increased, participants cited the increase in uninhabited areas, where crime could occur outside of the eyeshot of residents. Additionally, as the number of residents declined and the number of renters increased, participants spoke of people being unwilling to report illicit activities to local authorities out of the fear of violent retribution. One participant speaks of the retribution fear that residents, especially the elderly, have of younger perpetrators,

“I just think people are afraid to say anything. . . like an elder person – [the perpetrator] could be somebody young and then [the elder person] will think they may seem threatening to them or could be violent or . . . may be retaliated against.” [WG 6]

Even if residents had not been the victim of a crime, participants spoke of the sounds of violence and the surrounding media attention and hearsay that fed their safety concerns. One participant describes having to ensure she’s inside her house by nightfall due to hearing gunshots,

“At nighttime, before it gets dark you know to get in your house, especially senior citizens like me. You get in your house and [hear] a lot of shooting at night.” [WG 8]

Another participant speaks of hearing and reading about various crime near her area, even having alerts set up for this purpose,

“I do hear things and read things and they're not usually here . . . but it's very close to home. . . One of the alerts I have set up just tells me when things happen so I see

that there seems to be a lot of activity down by that bus transit station. Just people getting injured or shot somehow.” [B 10]

Participants often spoke of the lower police presence in their area when speaking about safety concerns. Participants noted a difference over time in their perceived ability to safely walk to church, friends’ homes, or other areas, especially at night. One resident spoke of a more visible police presence serving as a psychological boost for residents’ sense of safety while being a psychological deterrent for potential perpetrators,

“So, if you just saw the presence of police more often, I think that would make the neighborhood feel a little bit safer and maybe if the police were there more often then the people who were doing the crime would be a little less apt to do those things, because they know that the possibility that somebody would be around.” [B 5]

While a few Baden participants felt they had adequate response and presence from police, most participants in both neighborhoods felt a larger police presence was necessary. One participant spoke of attending town hall meetings where residents specifically expressed concern over the absence of police walking in the neighborhood and a general decrease in the patrolling force,

“A lot of people were saying this at the town hall meetings, why don’t police get out and walk like they used to. They used to walk through the neighborhoods versus now you don’t have but maybe one person in the car versus two.” [WG 9]

Adding to this concern, participants often spoke of the lack of relationships between the police and residential community, leading to crime going unreported. These relationships

are further strained by perceived racial injustices that black residents feel are perpetrated by white police. One participant said her mother witnessed the shooting of a young black teen on her street who was being arrested for motor vehicle theft on, despite complying with the officer's orders,

“There was a police officer that shot a fourteen-year old over here, on this street. I don't remember which house, but it was right next to a lot. My mother saw [the officer] plant the gun and then shoot and kill the boy. They were in a stolen car, [the officers] tell them to get out. [The boy] gets out, he takes off running, then [the officers] say stop. He lays down, flat-faced and they shot and killed him anyway. . . so we may have a reason for our anger a lot of times. And I think a lot of people don't understand that.” [WG 7]

Furthermore, the vacant lots were often associated with criminal activities. When one participant was asked about a sign in a vacant lot across the street from her house that read “We Must Stop Killing Each Other” she responded with a story of violence taking place on the vacant lot,

“Well, that's for a lady that used to live in that third house there. She had two daughters. They say that their mother got killed on that lot.” [WG 7]

Vacant homes were also frequently mentioned as magnets for criminal activity and injuries, which was a concern since they were often located nearby vacant lots. One participant characterized the vacant homes as refuges for criminal activity and potential injurious areas for children,

“Oh, the vacant homes? Oh, you got everything to worry about with vacant homes. You got what they call a homestead. [People] will move in the house. . . Then you have all sorts of other activities. You have the availability if I want to rape or rob somebody, I can pull them in the house. Then you got the danger of the children going in there, floors caving in, or brick falling out on you from the wall, from the outside. You got plenty of dangers with the vacant houses. . . anybody can walk in there.” [B 12]

Vegetation Perceptions: Tall and Thick Vegetation Obscures Threats and Illicit Activities

When discussing vacant lot vegetation, participants often eschewed *vegetation that was tall and thick enough to potentially hide threats and illicit activities*. One participant discussed her dislike of placing a tree farm in the vacant lots due to the lack of visibility,

“You can hide stuff in trees. See, trees aren’t safe. People can hide behind a tree and they can block things. I didn’t like the idea of a tree farm.” [WG 12]

This height and density limit seemed to apply not only to vegetation within the vacant lots, but especially around the periphery of the vacant lots. Participants feared potential harm to themselves and that the vacant lots would become hotspots for crime to take place out of eyesight, similar to what occurs with the vacant homes. One participant spoke of his concern that the vegetation on the vacant lots obscured individuals using illicit drugs and participating in prostitution,

“Well if the vacant lots have forestry that’s great, but then they can hide there and sit around and use their drugs and even do sexual favors for money so they can get drugs.” [WG 3]

Wildlife Perceptions: Wildlife Fear

Opinions of wildlife inside and outside the vacant lots were varied but often contained notes of *fear*. Concerns about wildlife ranged from fears of personal harm with animals such as snakes, coyotes, raccoons and opossums to fears of pet predation with hawks. One participant spoke of her fear of opening her trash can, always expecting to encounter a raccoon or opossum,

“I’m scared to go in the trash can at night, thinking a raccoon or opossum may be in there when I open it. It’s happened a couple of times so now I just don’t go to the trash can when it gets dark.” [WG 6]

Even participants who enjoyed seeing various wildlife were cautious about more wildlife in their neighborhood, with their minds often jumping to larger animals or stray dogs and cats, depending upon whether “wild animals”, “wildlife” or “natural animals” were discussed. One participant described his enjoyment of several kinds of wildlife, but also drew on his memories of camping trips in St. Louis County as a student at the local elementary school in the ‘80s to explain wildlife as something that could scare children who had never seen them before, and thus did not belong in the city:

“Rabbits are cool. Cardinal birds are cool. Hawks every now and then . . . some kids, if they saw wild animals, they’d probably be scared, versus if you camping you supposed to see a wild animal in the woods. And this is not a wooded area. . .

most of the kids, they don't get the chance to go and experience camping out in the woods and stuff like that. They always in the city. So they don't really see nothing like that. They might see rabbits and dogs and cats and cardinal birds or hawks, but not nothing wild, like a bear or coyote or wolf or something like that. That's more like what you'll see in those areas, I guess." [WG 9]

Smaller animals, such as rabbits, squirrels, and birds were generally not feared. Rats and mice were exceptions and consistently disliked. Birds were consistently either tolerated or desired for their aesthetics and sounds. One participant spoke about seeing multiple species of songbirds during certain times of the year and viewing them in her own yard,

"During this time of the year especially, I see a lot of cardinals, blue jays, robins . . . I run and get my binoculars and watch in the backyard." [WG 14]

Vacant Lot Use Preferences: High Visibility Fields, Fencing, Proximity to Vacant Homes

Vacant lot uses discussed often included preferences for large, open fields interspersed with widely-spaced trees to allow for shade and *high vacant lot visibility*. Particularly for smaller areas, participants spoke of wanting a cleared boundary, free of dense vegetation that could hide a person, in order to see around them and not feel as if they might be physically harmed. One participant used the example of a nearby public park with a track she refused to use to showcase how she felt a vacant lot shouldn't be managed for residential use,

"Who wants to go up there? You might get molested going around the track because they got all them bushes, they won't cut the trees off. You know what I'm talking

about? I would like to go up there. The seniors like to go up there and exercise. You can't even go up there and exercise because you're scared you might get molested."

[WG 13]

Fencing was sometimes desired to keep unwanted users (e.g. loiterers, drug users) out of the lot, particularly if participants did not trust or know their neighbors. If the vacant lot was located next to their home, most participants desired to restrict access. Vacant lots' *proximity to vacant homes* was a prevalent concern for participants. All participants said vacant homes either needed to be renovated or torn down if near a potential public use vacant lot, as these places were seen as concentrated areas of crime and would dissuade any use of the area.

Photograph Evaluations

The following section details participants' comments and scores of the vacant lots in the photo-evaluation survey. Ranked photographs were summed and are located in table 3, with H as the top ranked photograph and U as the lowest. The frequency of mentions for participants' most and least liked photographs are presented in table 4. The comments for the most liked three photographs mentioned (H, J, and C) and the least liked photographs mentioned (U, V, A) were organized into positive and negative characteristics.

Most Liked Photographs

Comments about the most liked photographs often included broad, descriptive words such as "clean" and "neat", as one participants said of photograph C,

"C looked like somebody tried to keep it clean." [WG 7]

Some participants expanded upon these descriptions by noting clear signs of maintenance that included uniform and mown grass and the absence of trash as one participant noted of photograph J,

“Yeah, I like J. It’s clean, neat, looks like the grass been mowed, no trash.” [B5]

Participants frequently mentioned enjoying the high degree of visibility inside and around the lot as well as the open space in these scenes that contributed to a sense of safety and a feeling that these areas could be used by the community or themselves. One participant favorably compares photograph J’s open space and lack of dense trees for hiding potential threats with what she sees in St. Louis County, but clarifies that shade from trees are important to her as seen in photograph H, as long as they don’t block line of sight:

“I really like J. I like it's open, it's clean, it looks fresh. It looks like out there where I work at West County. That's what it look like, it look like that somebody care about their neighborhood. J is my favorite because it looks like out there where I'm at: clean, fresh, I can see all the way down. I like that. I like open space where I can see through, because all them trees is just asking for trouble. Hiding behind them, I ain't like all that. . . maybe one or two trees planted would be nice--a little shade tree [as in H]” [WG 13]

Another participant contrasted the higher visibility and safety due to trimmed trees in a most liked photograph (C) with the trees in a disliked photograph (D),

“C is probably a like. The grass is cut. Trees are somewhat trimmed. The trees up here [in D] provide a hiding place if somebody's walking along the street at dark

and somebody wants to mug them, there's a hiding place in the trees. D has definitely got hiding places.” [B13]

Another participant focuses on J’s potential for community events as a reason for choosing the photograph as most liked,

“Oh, you can have a picnic here, in J, easily. You can have some kind of fair. You got the open space . . . to pitch a tent . . . to put down a little baseball diamond . . .to play volleyball, I could see community events happening in “J”. It’s level, it’s clear. . . I can see good that can happen there in J” [WG 4]

Participants also generally felt positive about the presence of fencing in photographs H and J. Fences were seen as deterrents of dumping and the accumulation of litter, as voiced by a participant about photograph J,

“This here, if we're looking at the lot with the drainage in there, it's been turned into a catch basin it looks like. It's mowed. It's sharp. It's fenced. It's not got a lot of brush around there. So J is going to end up being a strongly like. Not necessarily one for fences, but if it's a way to keep the dump spots out, that's the way to do it.” [WG 1]

One participant did mention a concern over fenced lots, like the water detention basin in photograph J, being “just unusable space,” and not available for community use.

Least Liked Photographs

Conversely, participants described the least liked photographs as “abandoned” and “messy” with negative comments often revolving around the presence of trash and

perceived dumping accessibility. One participant references the trash present in photograph U as a sign that the surrounding vegetation facilitates the dumping,

“I’m not in love with this area. . . the dumping tells me that it is obscured around the perimeter and accessible by large pickup trucks and that will always generate [the trash].” [B 3]

The scenes depicted in the least liked photographs were sometimes described as “unsafe”, with concerns arising over low visibility in and around the lot as expressed by one participant about the undergrowth of photograph V obscuring potential perpetrators,

“The undergrowth, all of that. Trees are okay. If you . . . keep them trimmed up somewhat. All these undergrowth here is nothing but a danger. [People can] hide. People can do things there. They can commit crime.” [B 1]

Participants often were quick to point out signs they saw of poor maintenance in the photographed lots. These signs often manifested in the form of low-hanging, untrimmed trees, general overgrowth, tall grass, fallen wood, and areas with patchy or no grass. One participant voiced his frustration with the tall vegetation present in photographs U and V that he likened to a similar vacant lot next door, where he and others struggle to constantly cut back vegetation each season,

“No, [U and V] is just what we drove by. And we start chopping away and cutting all this area up here and as soon as we get it all chopped away and cleaned up, it grows back in the winter time. We cleaned that [next door] lot up last year, twice.” [B 2]

Another participant spoke of improving the aesthetic of his least liked lot photographs, A, U, and S, by simply removing the trash or “clutter” and filling in the areas lacking grass, showcasing the perceived value of a filled in grassy area,

“You got clutter here and here. You just got a little clutter [in A] but you could just plant plain grass to . . . clean it up. Right there [in U], you could just clean that [trash] up and then it might even have grass underneath there.” [B 12]

Finally, when wildlife entered the conversation, participants typically associated the disliked photographs with a higher diversity of wildlife and in some cases, highly negative wildlife. One participants described his association between the overgrowth seen in a disliked photograph with rodent pests,

“Yeah, K. It's not maintained at all. It's overgrown with weeds. It provides habitat for animals. And chances are, most of your city animals are going to be the hairless tailed squirrels that are also known as rats.” [B 13]

Discussion

The two neighborhoods in this study are part of an ongoing project by the GCC, a group comprised of the city of St. Louis and various agencies, non-profits, and local neighborhood organizations who seek to tear down vacant homes and stage various greening interventions. This study sought to understand how vacant lot greening could benefit nearby residents while accomplishing green infrastructure and conservation goals by assessing residents' perceptions of vegetation and wildlife in the vacant lots as well as their overall preferences for vacant lot use.

For both questions, we found that residents' framed their thoughts within a larger picture of the vacant lots and the surrounding community. Residents' perceptions of wildlife and the vegetation within the lots, as well as their preferences for vacant lot use, were explained by the themes of community change, neighborhood care, maintenance effort, and safety.

Perceptions of Vegetation and Wildlife

Community Change

Participants possessed a clear sense of how their communities had changed with the increase in vacant lots, often remembering the homes and businesses that had once inhabited many of the vacant lots and vacant buildings. As such, vacant lots that contained vegetation and wildlife that did not reflect the character of neighborhood spaces people remembered, such as residential mowed yard or formal park areas with lawns, were generally not welcomed, and seen as reminders of the deterioration brought by vacancy. As homeowners, the residents in this study are likely to possess a strong

sense of place (Taylor 1996), whereby they have a strong bond with their neighborhood spaces and ascribe certain kinds of meaning and identity to them (Russ and Krasny 2017). The idea of residential spaces desired to fit into the already present landscape fabric has been shown in previous research. Similarly, Nassauer et al. (2009) found that social norms were a powerful factor in how homeowners felt their own yards should be managed, with residents desiring their front yard to match closely with other front yards in their neighborhood. This supports and explains in part how all of the most preferred vacant lot photographs possessed expanses of lawn and shared characteristics with residential yards in the study areas. A previous study in both neighborhoods found that over half of all the city-owned vacant lots were mown lawn (Moreno 2018), further reflecting the social norms for lots.

Neighborhood Care

Participants strongly desired vacant lots that signaled neighborhood care and were frustrated by the vacant lots' overgrowth, rampant dumping and litter accumulation, the city of St Louis' uneven and infrequent lot mowing, and the subsequent attraction of unwelcome wildlife to the vacant lots and surrounding properties. Studies in other settings have reported similar findings. Focus group participants in Boston, Massachusetts associated the vacant lots in their communities with divestment and a lack of neighborhood pride and care (Foo et al. 2013). Participants described their most preferred vacant lot photographs as "clean" and "neat" with no or little trash present and vegetation that had clearly been mowed or trimmed. Landscape characteristics like uniform, mown lawns and a lack of litter are commonly referred to as "cues to care" or signs that a property is intentionally being managed and cared for (Nassauer 1995).

Furthermore, evidence of care on the landscape often serves as a reflection of the assumed owner's character via the "halo effect" (Nisbett and Wilson 1977), with cared landscapes being associated with desirable neighbors and ownership pride (Nassauer 2011).

Various wildlife originated from issues of neighborhood care, namely the accumulation of trash in alleys and lots and the lack of vacant home maintenance, and were generally perceived as unwelcome. Low-income residents in Philadelphia reported similar associations and perceptions of wildlife originating from vacant properties (Garvin et al. 2013).

Maintenance Effort

While participants desired aesthetically pleasing vacant lots to beautify their neighborhoods, concerns about the maintenance effort involved focused on a lack of finances, social capital, and distrust of city maintenance. Any vacant lots with more vegetation than mown lawns, especially tall vegetation that could obscure dumping activities, were seen as exponentially more maintenance-intensive and potentially non-viable for long-term management by residents or the city. This manifested in participants preferring vacant lot photographs they felt would require less work to improve or lots protected by fencing, and disliking photographs they felt were easily accessible for dumping purposes. These vacant lot concerns have also surfaced in other studies (Pincetl and Gearin 2005, Foo et al. 2013). In a study of, inner-city, low-income residents in Los Angeles, participants expressed maintenance concerns for potential greened vacant lots and other areas due to a lack of personal income, investment from the city and an inability to locally organize (Pincetl and Gearin 2005). Communities of color across the

United States, including St. Louis, have historically experienced redlining by banks, preventing residents from receiving loans and raising insurance costs (Tighe and Ganning 2015). Echoing black participants' difficulties acquiring loans to manage a vacant lot or home, recent analysis of Home Mortgage Disclosure Act records showed that black applicants were 2.5 times less likely to receive a mortgage loan than whites in St. Louis, even when controlling for applicants' income, loan amount and neighborhood. (Glantz and Martinez 2018).

Vacant lots were also seen as sources of increased maintenance effort and financial expense for nearby homeowners, with plants overgrowing onto their properties and wildlife using the lots as staging grounds for property damage. This is corroborated by other research showing that residents may be more likely to associate vacant lots with weeds and pests (Terada et al. 2016), like ragweed (Katz et al. 2014) and mosquitoes (Little et al. 2017). Wildlife nuisances have also been well-documented in both urban, suburban, and rural settings (Lyytimäki et al. 2008). A statewide survey of Illinoisans found that about one-fifth of urban area residents reported wildlife damage to the landscape in the past year, while half reported damage to houses (Mankin et al. 1999). In high-vacancy urban settings like our study areas, where lots and homes potentially provide a large amount of wildlife habitat, the percentage of residents who experience wildlife damage may be higher.

Safety

Participants expressed many concerns surrounding the safety of the vacant lots and the vacant homes that sat upon them, including the presence of threatening users, trash, a lack of visibility due to vegetation, and limited police presence. Vegetation was

seen as essential for allowing residents to be able to see any potential threats inside or around the vacant lots; Participants saw dense, above-ground vegetation as potential hiding places for illicit activities, predators, and potentially dangerous wildlife. Similar to the findings of Talbot and Kaplan (1984), participants also preferred photographs that exhibited vacant lots with more open characteristics and lacking dense undergrowth or trees around and within the lots. Safety concerns noted by residents concerning vacant lots (Pincetl and Gearin 2005, Foo et al. 2013, Garvin et al. 2013, Rupprecht and Byrne 2014) and other kinds of urban greenspace (Burgess 1996, Brownlow 2006, Sreetheran and van den Bosch 2014) have been found in numerous studies. It's worth noting that many of the participants who felt strongest about the importance of safety were women or elderly. Women and to a lesser extent, the elderly, are more likely to see urban greenspaces, especially lower visibility, more wooded spaces, as unsafe (Burgess et al. 1988, Burgess 1996, Sreetheran and van den Bosch 2014). Threatening user groups are frequently cited as deterrents of greenspace use (Sreetheran and van den Bosch 2014), although this could be mitigated by increased police presence of security personnel (Groshong et al. 2018), as mentioned by participants. This research contributes to the body of literature about associations between urban greenspace visibility, signs of neglect (e.g. litter) and perceptions of safety (Wilson and Kelling 1982, Fisher and Nasar 1992, Jorgensen et al. 2007).

Wildlife in the vacant lots like raccoons, opossums, coyotes, rats, mice, and snakes were typically cited as creatures to be feared or left alone. Although research on wildlife fear in urban greenspaces has not been explored to a large degree, a few studies have reported fear of wildlife in greenspaces like urban woodlands (Jorgensen et al.

2007). This fear could potentially be linked to participants' past negative experiences with wildlife, especially as youth (Van Velsor and Nilon 2006). On the other hand, participants either enjoyed birds or merely felt neutral about their presence in the neighborhoods. Numerous studies have examined these perceptions and the affinity people have for birds (Jones and Reynolds 2008, Hedblom et al. 2014). Researchers in Chicago, Illinois found that urban residents generally liked all birds, only negatively associating them with unwanted nests and feces (Belaire et al. 2015).

Preferences For Vacant Lot Use

It is important to note that the above themes and their explanation of participants' preferences for vacant lot vegetation and wildlife as well as vacant lot use are not necessarily mutually exclusive. For instance, participants could prefer mowed lawn in a vacant lot due to feeling that the aesthetic looked like the residential yard that existed there previously (community change theme), that it exhibits clear signs of maintenance and care (neighborhood care theme), is cheap and easy to maintain with a lawnmower (maintenance effort theme) and allows for a clear line of sight in and around the lot (safety theme). Particularly for preferences of vacant lot use, there is significant overlap concerning the drivers for participants' preferences and the themes. Due to this, the following section is not organized by theme, but rather by the types of preferred uses and the theme or themes that may inform it.

Participants often suggested the vacant lots be managed and used as homes, park-like areas for community gatherings and events such as farmer's markets, dog parks, family reunions, and weddings, or youth recreation areas (sport areas, playgrounds). Most preferred photographs were also complimented for the open space they afforded for

community events. These use preferences have been reported in other settings. A similar study examining how low-income, immigrant communities with little access to greenspace would value the greening of vacant spaces within inner city Los Angeles found that residents greatly valued urban greenspaces for children's recreation, sports, and as places to meet others (Pincetl and Gearin 2005). Since Wells-Goodfellow and Baden have lost many long-time homeowners and continue to house an increasing number of transient residents, many neighborhood organizations and social capital sources have declined. Community gathering areas could help residents meet one another to re-form these lost social ties (Kuo et al. 1998).

Using vacant lots for youth recreational areas has also been reported in past studies of vacant lot perception (Pincetl and Gearin 2005, Garvin et al. 2013). A study examining uses of vacant lots in parts of New York City found over 40 lots used for parks and sports fields (Kremer et al. 2013). Wells-Goodfellow participants seemed far more interested in these uses than Baden participants. This could be explained due to the amount and location of available park space in each neighborhood, with Wells-Goodfellow possessing only one park on the outskirts while Baden has multiple large parks distributed throughout. While Wells-Goodfellow participants readily spoke about vacant lots and their design and use, Baden participants were often more concerned with the tearing down of vacant properties, some citing the existence of parks in the area as adequate and accessible greenspaces. However, this study did not specifically analyze greenspace access and quality in the study areas, which should be an area of future research.

Park-like uses generally entailed high-visibility expanses of mown lawn and low-maintenance structures, such as benches, statues, and picnic pavilions, sometimes interspersed with colorful features like art installations and flowers for beautification. Similarly, a study of Baltimore residents' found that vacant lots managed as parks with benches, trails, and flowers or used for the construction of new housing were some of the top preferences for vacant lot use (Rega-Brodsky et al. 2018). Interestingly, when speaking about areas that looked aesthetically pleasing, participants often drew upon observations of vacant lots and parks in wealthier areas of the city as well as places in St. Louis County, perhaps an acknowledgement that greenspace quality lags in their own area, a common theme amongst urban, low-income and minority communities (Jennings et al. 2012)

Community gardens and to a lesser extent, orchards were also cited as familiar and welcome options for food production and income. However a few residents expressed doubt that these areas would actually be maintained and used by residents due to time constraints. Indeed, the vacant lot photograph of a community garden received mixed ratings, with participants appreciating the idea but being dismayed by perceived overgrowth and messiness. This suggests that contrary to the wide array of benefits associated with community gardens (Draper and Freedman 2010), this is not a panacea, but rather one of a suite of potential uses (Németh and Langhorst 2014).

When use of the vacant lots for prairie grasses surfaced, participants viewed them as unsafe and overgrown in comparison to a typical residential lawn, even when understanding their maintenance benefits. Similar to participants' comment about

landscaping, studies show these areas could potentially be accepted when confined to particular areas and interspersed with areas of mown lawn (Nassauer 1997)

Management Implications

There are several implications of this study for urban greenspace management, particularly within informal urban greenspace amongst low-income and minority communities. This study contributes to the large body of existing literature surrounding the importance of vegetation perception and preference for urban greenspace management, while contributing knowledge about a type of informal urban greenspace, which are currently understudied despite their large potential for society and biodiversity (Bonthoux et al. 2014, Németh and Langhorst 2014, Rupprecht and Byrne 2014).

This study contributes new knowledge about the perception of wildlife in vacant lots. Wildlife were generally seen as relatively minor factors in how vacant lots should look and be used. When asked what kinds of wildlife participants would see in their top and bottom ranked photographs, participants normally noted a much higher diversity in their bottom ranked photographs, showing that the chance to see wildlife or providing habitat for a higher diversity of wildlife was not a priority. This evidence contrasts with studies of formal urban greenspaces showing that biodiversity leads to an increase in psychological benefits and quality of life (Tzoulas et al. 2007, Luck et al. 2011, Carrus et al. 2015), supporting the view of Cohen et al. (2012:284) that these assertions remain as “merely speculation” and that factors such as where people live and local norms may dominate preference and override any perceived psychological benefits (Nassauer et al. 2009, Cohen et al. 2012) None of the participants felt that they would go to a vacant lot specifically to see wildlife, contrary to findings about informal urban greenspace users in

Australia (Rupprecht et al. 2016). Most studies focusing on wildlife perceptions in urban settings typically focus on personal yard management for wildlife habitat (Kurz and Baudains 2012, Goddard et al. 2013). Additional research should continue to examine perceptions of wildlife in vacant lots in other settings and populations.

Green City Coalition Recommendations

The GCC is currently undertaking various greening interventions such as water detention basins, pocket prairies, parks, and community gardens within the vacant lots and striving to incorporate residents' needs and preferences. We make the following recommendations with residents and the GCC in mind.

We recommend that when vacant lots are greened, that there exists some area of open, mown space to serve as places of social gathering and recreation. These mown spaces should also not be surrounded by vegetation that is tall enough to potentially obscure a person, as this will preclude use. Simple structures and art such as benches and murals, may add significant beautification value to the space, while also serving as low maintenance along with the mown lawn.

Additionally, the GCC should incorporate signals that their greening intervention is intentional and the space is being cared for. The less that the intervention looks like a residential yard in the neighborhood, the greater the need for signals of intention; a native grass planting is very different from residential yards and generally associated with an unmown lawn. This type of area would be best received by residents if it was landscaped in small sections with borders, a sign showcasing what the native grasses are, as well as potentially incorporating walking paths around the native grasses. In contrast, a lot

designated to be more park-like could be clearly designated as intentional with as little as a mown lawn, a bench, and a small sign.

Vacant lot greening interventions may require the installation of a fence to prevent dumping. Iron link fences such as those around the detention basins have proven to work, but may not be cost-effective. The GCC may try implementing wooden fences or evenly-spaced posts. This may be enough to deter vehicles from attempting to access the lot to dump, while also showcasing the area as cared for and deterring littering.

The GCC should be aware that unwanted loiterers performing activities such as public drinking and drug use may still deter residents from using greened vacant lots. If police presence cannot be increased, we recommend that the GCC work with police to increase relationships with residents in the neighborhood such that residents will feel safe enough to report illicit activities on the lots.

The proximity of any greened vacant lot to vacant and inhabited homes should be strongly considered. Greened lots in close proximity to vacant homes may deter use due to vacant homes' associations with crime, so lots intended for residential use should be located away from these areas. In contrast, greened vacant lots should be located as close to inhabited homes as possible for highest use potential. Residents will feel safer and more confident using the spaces if they feel someone can see them.

While this study did not specifically evaluate measures of greenspace access and quality, the low presence and quality of urban greenspaces amongst minority and low-income communities is a well-studied environmental injustice (Wolch et al. 2014). The Green City Coalition (GCC) aims to provide residents in the study areas with quality

greenspace that provides various ecosystem services and plans to convert a network of connected vacant lots into a larger greenspace in some areas. While providing ecological benefits, the GCC should heed the dangers of placing ecological and environmental ethic needs on a pedestal above sociological ones (Dooling 2009). Vacant lots should be “just green enough” so that residents can receive benefits, but aren’t priced out of their communities due to property value increases (Wolch et al. 2014), termed ecological gentrification (Dooling 2009). Greening should occur on a small-scale such as individual lots instead of expansive, aggregated areas that could draw developers and investors seeking to capitalize on the drastically increased housing value (Wolch et al. 2014). If this cannot occur, the city should take steps to ensure the housing market immediately surrounding the greenspace network does not displace current residents due to rent hikes.

To best achieve community benefits and support, we recommend that residents be seen as co-authors in the early planning process of vacant lot greening, as part of a collaborative management. This combination of top-down and bottom-up approaches encourages communities to take ownership of their neighborhood spaces, ensuring their continued upkeep and value in the absence of City of St. Louis maintenance funds (Pediaditi et al. 2010, Erixon Aalto and Ernstson 2017).

Limitations

There are several limitations to the generalization of this study and its findings. This was an exploratory, qualitative study whose findings are specific to low-income, predominantly black, urban communities in a high vacancy, Midwest city with a specific sociopolitical and economic history. These findings should thus only be applied to studies of similar populations and urban environments. Second, only homeowners were

accessible for interviews. Future studies concerning vacant lot perceptions in St. Louis should also gather the perceptions of renters, as these residents may hold different perceptions and use preferences for the vacant lots, given their lack of private yard ownership. Photographs for the landscape evaluations were taken in the late summer, when the vegetation was green, but the prairie planting displayed was in a young stage. Subsequent landscape perception studies of vacant lots should use a mature prairie planting for residents to evaluate, as this stage is the most long-term. Lastly, the interviewer for this study was a white male originating from a middle class socioeconomic background. The interviewer acknowledges the associations and presumptions that residents in these black communities may have had based on his race and economic status, which could have prevented a full exploration surrounding the vacant lot perceptions, especially those concerning race and racism. Future interview studies in these or other predominantly black communities would best be conducted with a person of color, preferably African-American, who can better relate (or at least is presumed to better relate) to the participants' experiences as a person of color.

Conclusion

Our goal for this study was to determine how vacant lots located in a high-vacancy urban setting in the Midwest can be managed in a way that respects residents' needs while accomplishing various conservation and urban infrastructure goals. This was accomplished via determining residents' perceptions of wildlife and vegetation within the vacant lots as well as their preferred vacant lot uses.

This study contributes to the existing body of literature about vacant land, showcasing the importance of vegetation for urban residents' perceptions and future use while finding that wildlife inhabitants were minor factors. In particular, this study find that when greening vacant lots, the community history, long-term maintenance effort and intentional aesthetic of care of the lot, as well as residents' perceptions of safety should be taken into account for a space that contributes positively to the surrounding community.

Furthermore, this research shows a potentially mixed reaction to the various greening interventions implemented and planned by the GCC. Management interventions that residents connect with the existing residential landscape, like fenced detention basins, community gardens, and parks may generally be welcomed while wildlife habitat areas like prairie grass and forest may experience pushback due to their perceived sociological issues overriding their touted ecological benefits.

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Tables

Table 1.

Study Area and State Demographics

	Wells-Goodfellow	Baden	St. Louis, Missouri
Race/ethnicity			
White	0.7%	6.3%	43.9%
Black	97.5%	91.9%	49.2%
Hispanic or Latino	0.6%	0.5%	3.5%
Median Household Income per Year	\$23,000	\$29,500	\$36,800
Education (age 25+)			
> High school	25.5%	22.2%	15.5%
High school	60.1%	58.2%	45.0%
Some college or higher	14.3%	19.6%	39.5%

Table 2.

Vacancy and Greenspace in Study Neighborhoods

	Baden	Wells-Goodfellow
LRA-owned Vacant Property	32 ha	96 ha
Vacant Property Percentage	11%	30%
Public Park Space	11.2 ha	5.3 ha

Source: City of St. Louis, 2019a,b,c

Table 3.

Interview Participant Demographics

	Wells-Goodfellow (<i>n</i> = 14)	Baden (<i>n</i> = 13)	Total (<i>n</i> = 27)
Gender			
Male	6	5	11
Female	8	8	16
Race			
White	1	5	6
Black	13	8	21
Average Age	59 years old	62 years old	
Average Years in Neighborhood	37.9 years	29.4 years	
Home Ownership Percentage	100%	100%	

Table 4.

Photograph Characteristics from the Photo-Evaluation Survey

	Vegetation Structure	Maintenance Cues	Lot Visibility
A	Medium/High	Litter, overgrown path, tall grass	Medium
B	Low/Medium/High	Litter, mown and unmown grass	High
C	Low/High	Mown lawn, untrimmed trees	High
D	Low/Medium/High	Untrimmed trees and grass	Low
E	Low/High	Trash can, Uniform track marks, cleared dirt space	High
F	Low	Overgrown sidewalk and asphalt, litter, mown grass	High
G	Low/Medium/High	Dumping, overgrown asphalt, broken snag tree, flowers, mown grass	High
H	Low/High	Fencing, mown lawn, untrimmed tree	High
I	Low/High	Sparse grass with brown patches, untrimmed trees	High
J	Low	Detention basin with drain, Fencing, mown lawn,	High
K	Medium	Thick, untrimmed herbaceous plants, dead wood, wild flowers	Low
L	Low/Medium	Community garden with raised beds, individual beds with names	High
M	Low/High	Between two houses, mown lawn	High

		flag pole, brown and grassless patched around pole, trimmed tree	
N	Low/High	Mown lawn, thick trees in back	Medium
O	Low/Medium/High	Litter, untrimmed grass and shrubs, wild flowers	Low
P	Low	Mown lawn, sidewalk leading to house in back, between two houses	High
Q	Low/High	Litter, no dumping sign, mown lawn, untrimmed around trees	High
R	Low/Medium/High	Litter, house in background, untrimmed trees and shrubs, overgrown sidewalk	Low
S	Medium/High	Forest-like, Untrimmed trees and shrubs, no visibility	Low
T	Low/High	Large mown lawns, overgrown sidewalk	High
U	Low/Medium/High	Dumping, untrimmed trees and shrubs, overgrown asphalt, overgrown house in background	Medium
V	Low/Medium	Missing patches of grass, mown lawn, dead tree with vegetation unmown around it	Medium
W	Low/High	Large mown lawn, missing patches of grass, tall trees	High

X	Low/High	MDC early state restoration lot with sign, patchy grass, overgrown sidewalk, untrimmed trees	High
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Table 5.

The themes, sub-themes, and individual codes of how participants framed their perceptions of the vacant lot vegetation and wildlife as well as their preferences for vacant lot use.

Themes	Sub-Themes		
	<i>Vegetation</i>	<i>Wildlife</i>	<i>Vacant Lot Uses Preferences</i>
Community Change	Mimic Residential Yards	Signs of Decline	Repopulation and Revival; Neighborhood Aesthetic Fit; Community Areas
Neighborhood Care	Overgrowth; City Lot Maintenance Dissatisfaction	Trash Brought Unwanted Wildlife	Redevelopment, Beautification, Water Detentions Basins are Positive, Native Prairie Grasses Require Clear Maintenance Signs
Maintenance Effort	Simple Vegetation is Maintainable, Vegetation Spillover to Adjacent Properties, Tall and Dense Conceals Dumping	Wildlife Nuisance and Damage Issues	Mown Lawn, Low Maintenance Structures, Proximity to Residents, Prairie Grass As Potentially Less Maintenance
Safety	Tall and Thick Vegetation Obscures Threats and Illicit Activities	Wildlife Fear	High Visibility Fields, Fencing, Proximity to Vacant Homes

Table 6.

The photograph ranked sum scores

Photo ID	Mean	Standard Deviation
H	4.12	0.65
J	3.96	0.96
P	3.81	0.80
C	3.73	0.87
N	3.69	0.93
W	3.62	0.75
L	3.58	1.10
T	3.42	0.86
E	3.35	0.94
M	3.27	1.04
I	3.04	0.87
Q	2.92	0.80
X	2.77	0.82
B	2.69	1.01
F	2.35	0.56
O	2.27	1.08
D	2.23	1.11
K	2.08	1.20
R	2.04	0.96
G	1.81	0.75
A	1.77	0.86
S	1.73	0.87
V	1.54	0.95
U	1.04	0.20

Figures

Figure 1.

Image of Baden Neighborhood



Figure 2.

Image of Wells-Goodfellow neighborhood



Figure 3.

Entitation map showing the various cover types on the vacant lots in Baden

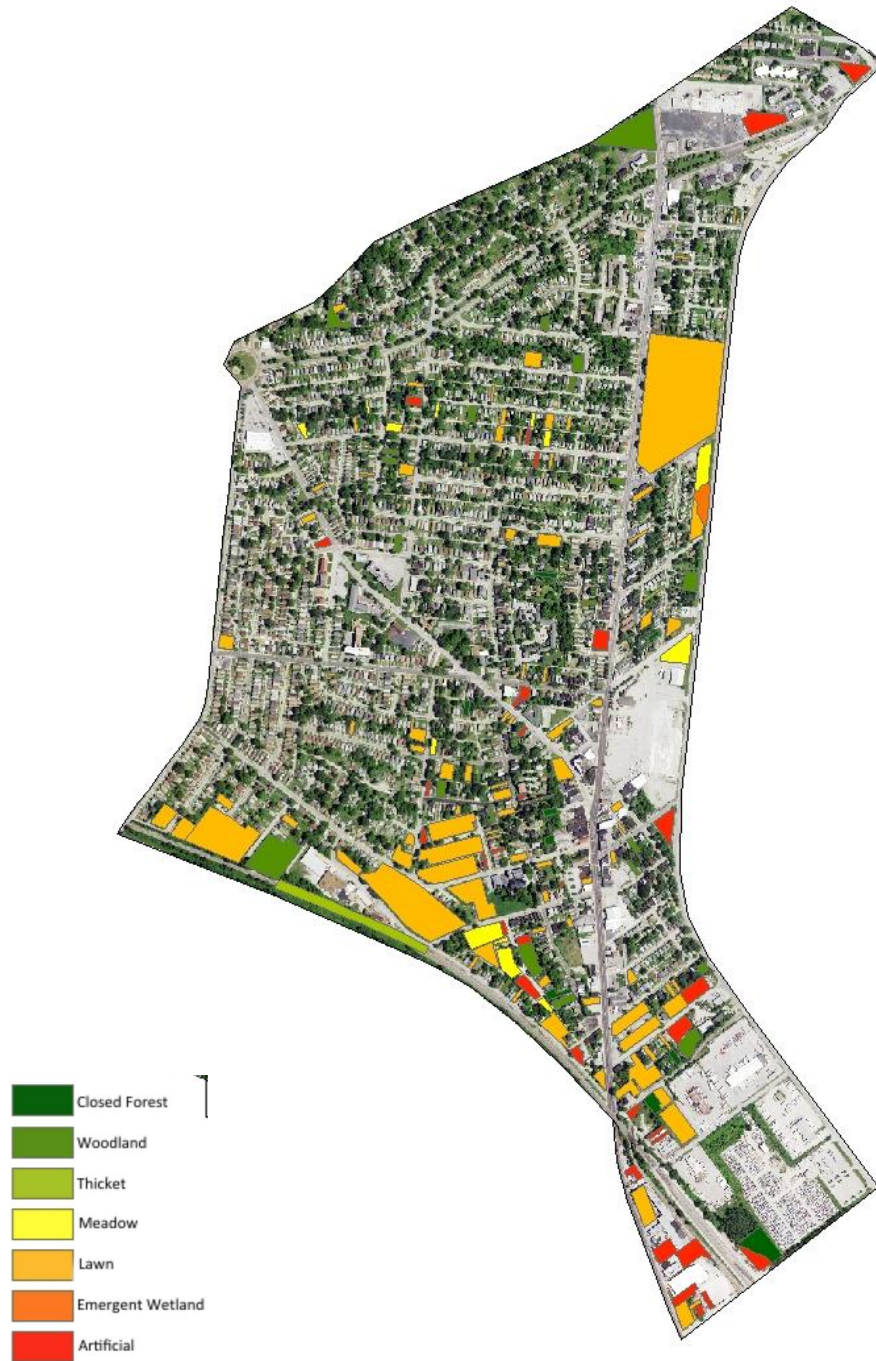


Figure 4.

Entitation map showing the various cover types on the vacant lots in Wells-Goodfellow

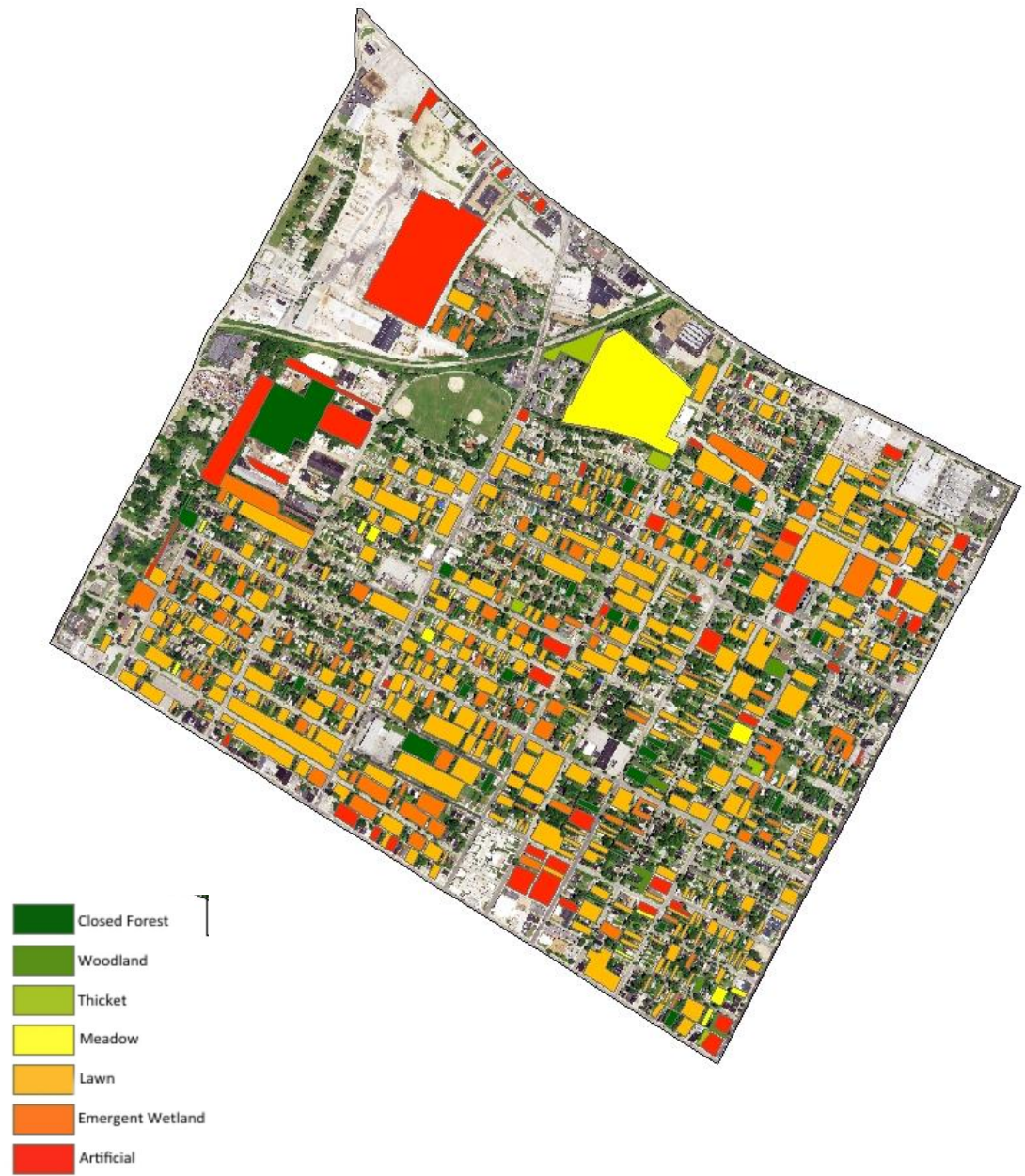


Figure 5a.

Vacant lot photographs in the photo-evaluation survey

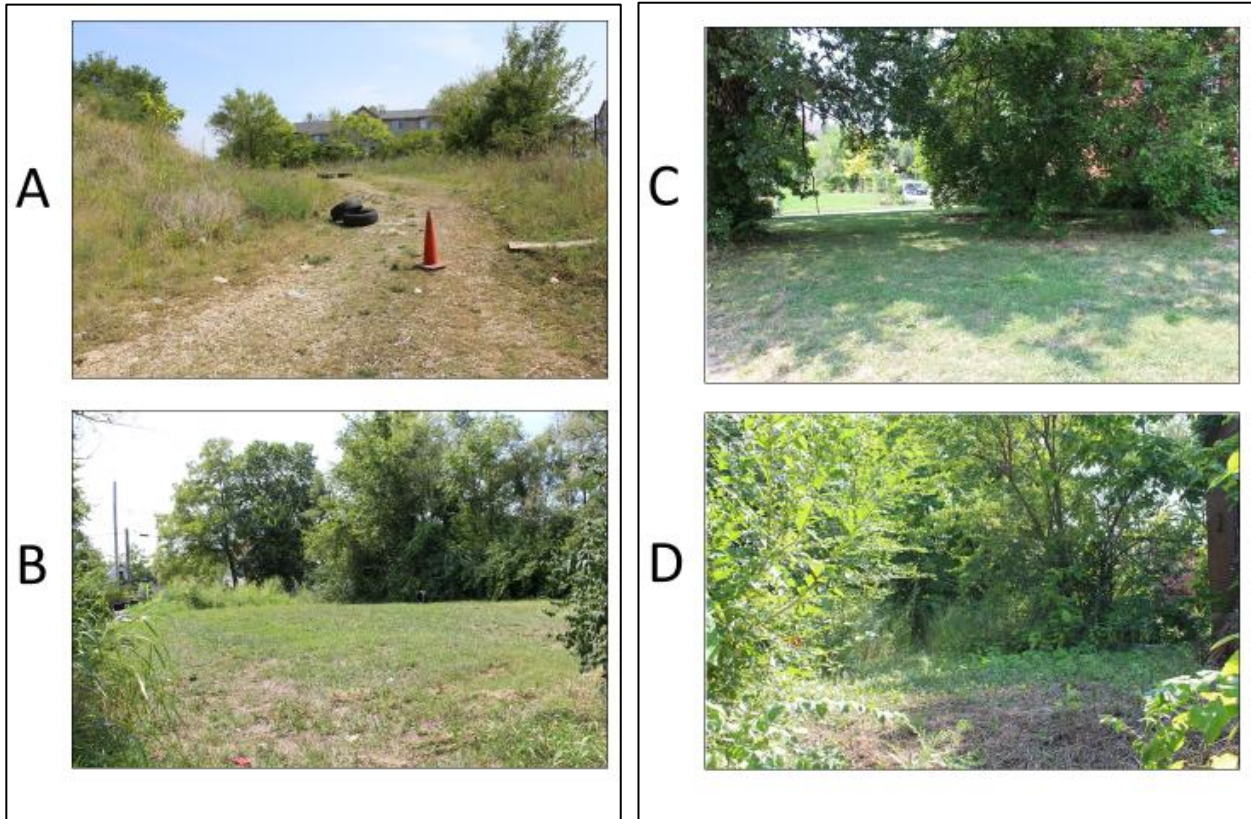


Figure 5b.

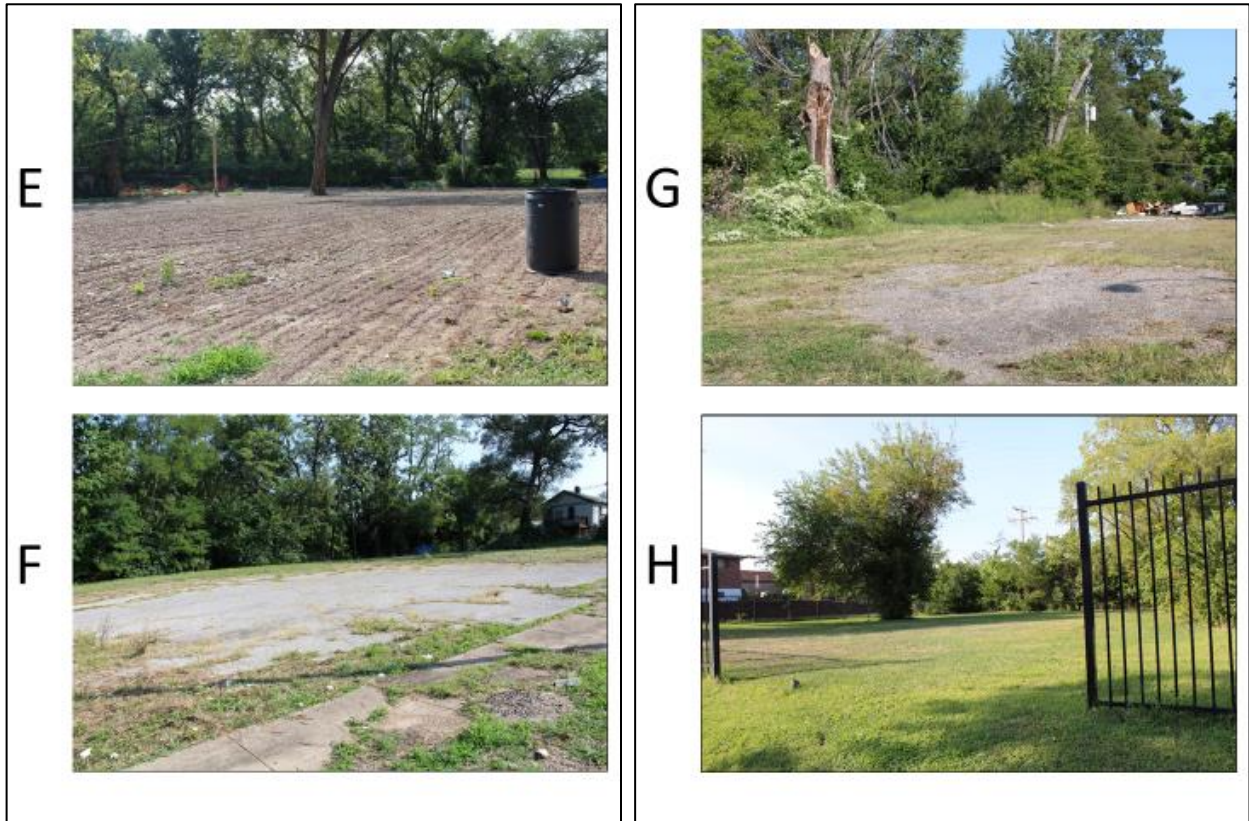


Figure 5c

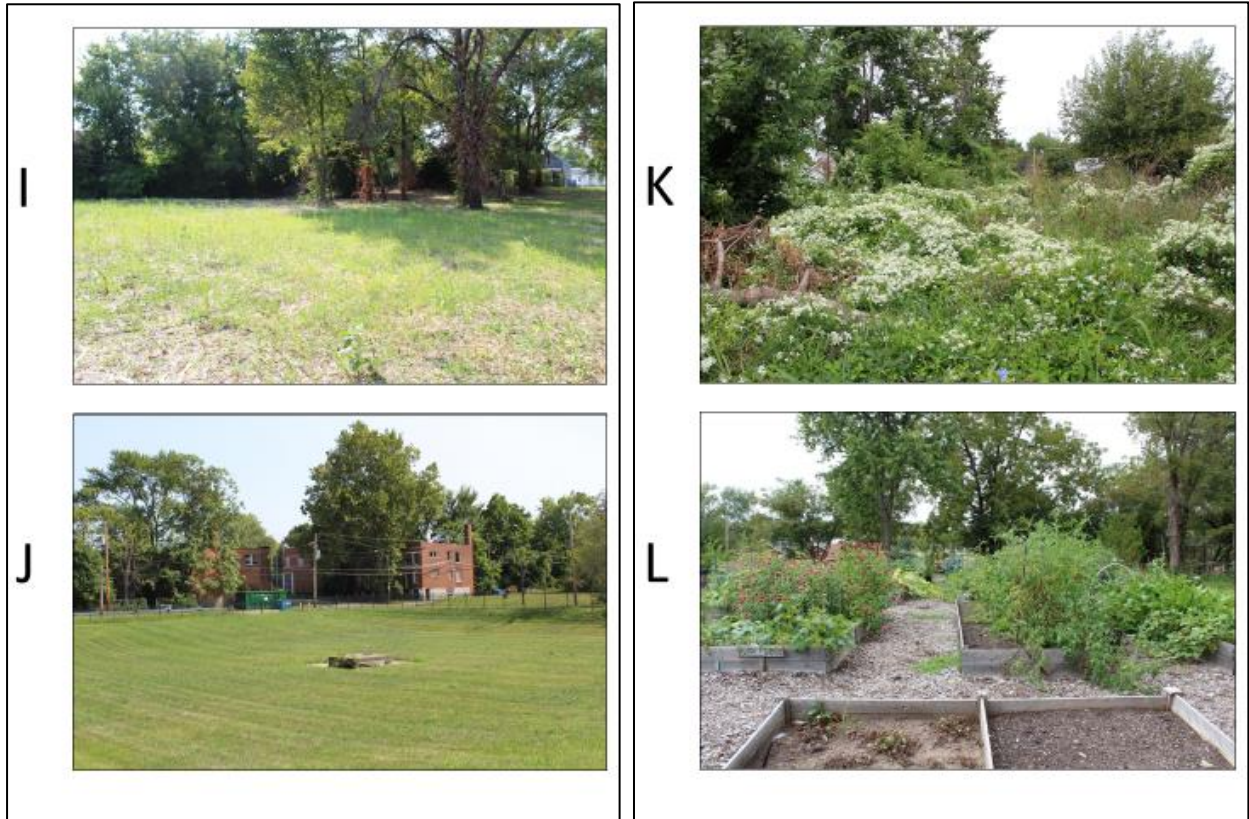


Figure 5d

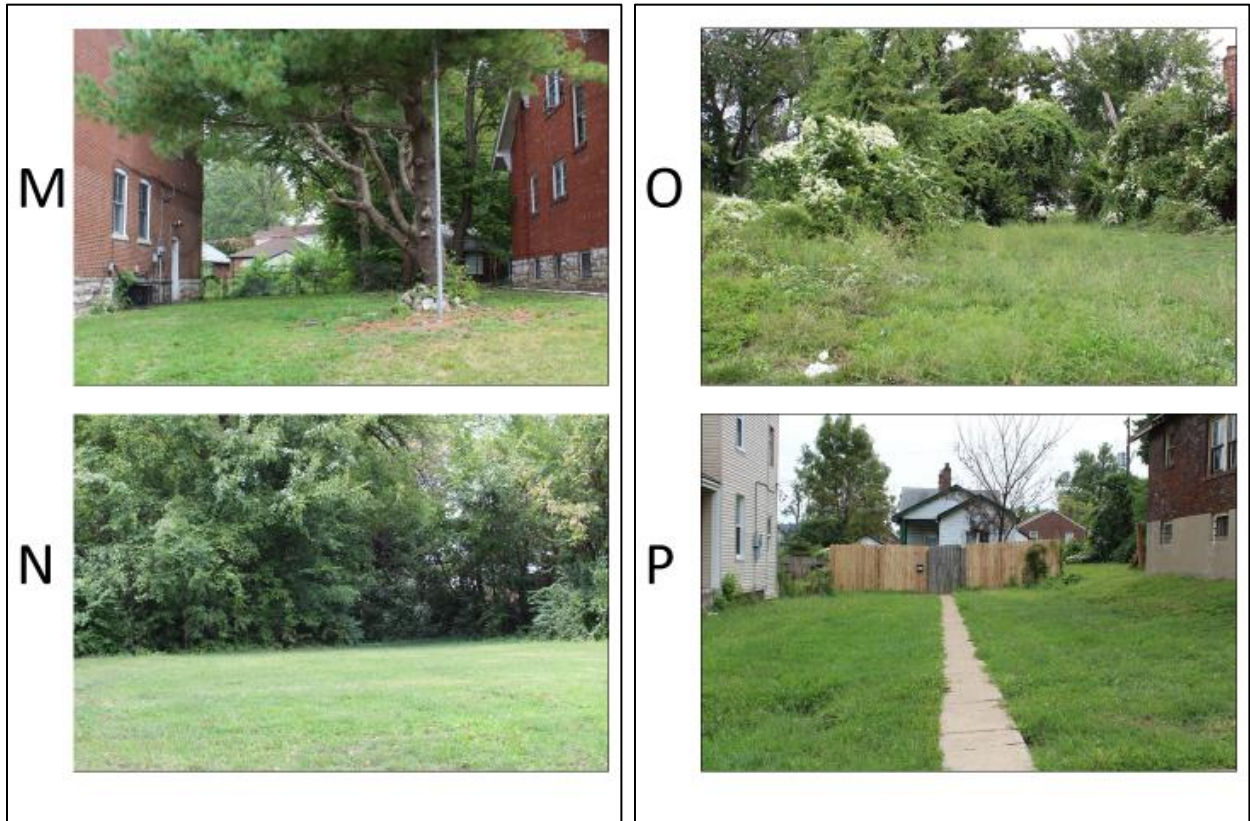


Figure 5e

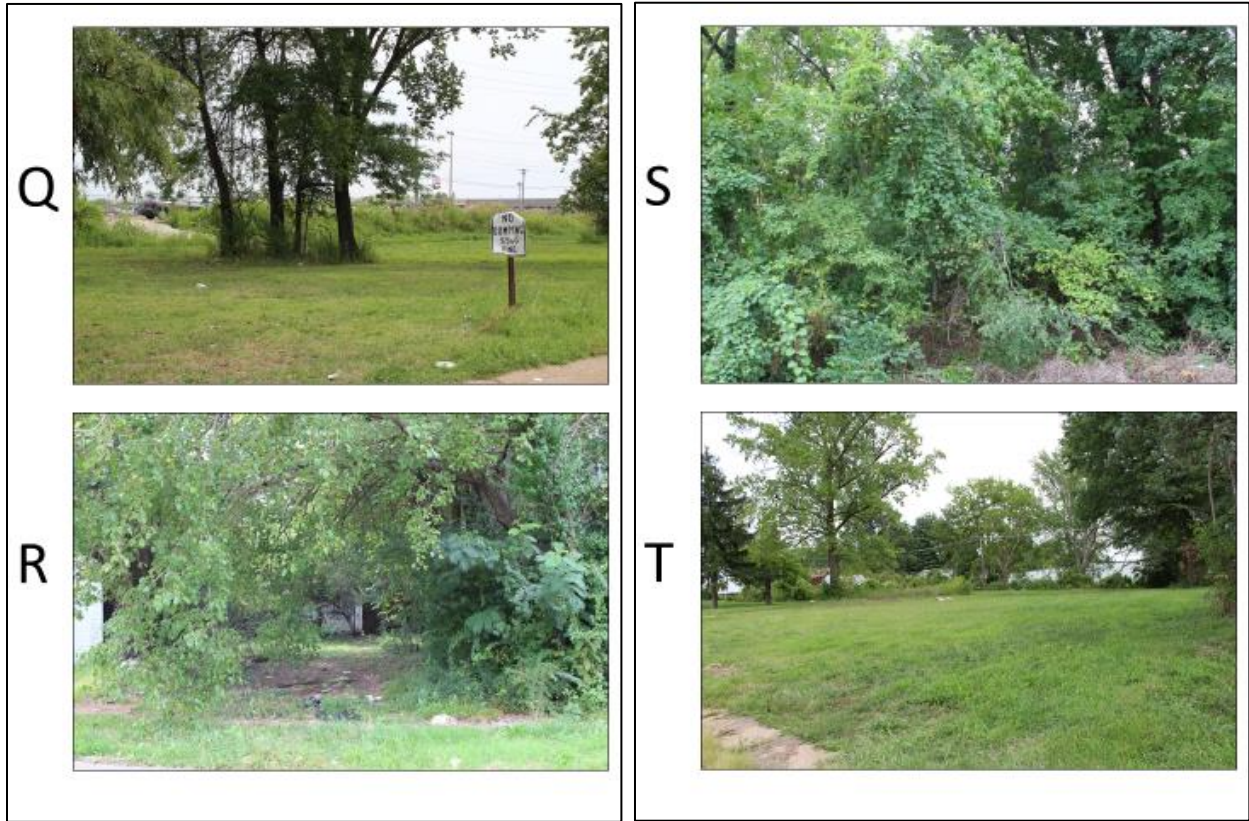


Figure 5f



Appendix

Appendix 1.

Interview guide used during interviews.

Interview Question Guide	
1.	What's your history or experience with this neighborhood? <ol style="list-style-type: none">How long have you lived here?What do you think about your neighborhood?How has the neighborhood changed?
2.	What do you think about the vacant lots in your neighborhood? <ol style="list-style-type: none">Are there many where you live?
3.	What kinds of plants do you see in the vacant lots? <ol style="list-style-type: none">How do you feel about them?What plants do you want to see?
4.	What kinds of wild animals do you see in the vacant lots? <ol style="list-style-type: none">How do you feel about them?What wild animals do you want to see?
5.	What are some of the vacant lot uses that you've noticed? <ol style="list-style-type: none">How would you like to see the lots used?

Appendix 2.

Demographic information questionnaire used during interviews.

Demographic Information Questionnaire	
1) What is your Ethnic identity?	
<input type="checkbox"/> African American/Black	<input type="checkbox"/> White
<input type="checkbox"/> Hispanic/Latino	<input type="checkbox"/> Other [Specify]: _____
<input type="checkbox"/> Asian/Pacific Islander	
<input type="checkbox"/> Native American	
2) What year were you born? _____	
3) What is your level of education?	
<input type="checkbox"/> Some high school	<input type="checkbox"/> Associate's degree
<input type="checkbox"/> High school diploma	<input type="checkbox"/> Bachelor's degree
<input type="checkbox"/> Some college	<input type="checkbox"/> Post-graduate degree
4) What was your total household income last year?	
<input type="checkbox"/> \$0-25,999	<input type="checkbox"/> more than \$75,000
<input type="checkbox"/> \$26,000-\$51,999	<input type="checkbox"/> don't know/decline to say
<input type="checkbox"/> \$52,000-74,999	
5) What is your marriage status?	
<input type="checkbox"/> Married	
<input type="checkbox"/> Unmarried domestic partner	
<input type="checkbox"/> Single	
6) Do you have any children?	
<input type="checkbox"/> Yes	
<input type="checkbox"/> No	
a) If yes, check all age groups that apply to your children	
<input type="checkbox"/> 0 – 5 years old	<input type="checkbox"/> 16 – 20 years old
<input type="checkbox"/> 6 – 10 years old	<input type="checkbox"/> 21 and over
<input type="checkbox"/> 11 – 15 years old	
7) Do you own or rent where you live?	
<input type="checkbox"/> Own	
<input type="checkbox"/> Rent	

Appendix 3a.

The vacant lot photograph evaluation questionnaire instrument

Photograph Evaluation Sheet

Please examine each photograph closely. Please rate each photograph on a scale from “strongly dislike” to “strongly like”. On the appropriate line, circle the box option that best represents how you feel about each scene.

Photo ID	Score				
A.	Strongly dislike	Dislike	Neutral	Like	Strongly like
B.	Strongly dislike	Dislike	Neutral	Like	Strongly like
C.	Strongly dislike	Dislike	Neutral	Like	Strongly like
D.	Strongly dislike	Dislike	Neutral	Like	Strongly like
E.	Strongly dislike	Dislike	Neutral	Like	Strongly like
F.	Strongly dislike	Dislike	Neutral	Like	Strongly like
G.	Strongly dislike	Dislike	Neutral	Like	Strongly like
H.	Strongly dislike	Dislike	Neutral	Like	Strongly like
I.	Strongly dislike	Dislike	Neutral	Like	Strongly like
J.	Strongly dislike	Dislike	Neutral	Like	Strongly like
K.	Strongly dislike	Dislike	Neutral	Like	Strongly like
L.	Strongly dislike	Dislike	Neutral	Like	Strongly like
M.	Strongly dislike	Dislike	Neutral	Like	Strongly like
N.	Strongly dislike	Dislike	Neutral	Like	Strongly like
O.	Strongly dislike	Dislike	Neutral	Like	Strongly like
P.	Strongly dislike	Dislike	Neutral	Like	Strongly like
Q.	Strongly dislike	Dislike	Neutral	Like	Strongly like
R.	Strongly dislike	Dislike	Neutral	Like	Strongly like
S.	Strongly dislike	Dislike	Neutral	Like	Strongly like
T.	Strongly dislike	Dislike	Neutral	Like	Strongly like
U.	Strongly dislike	Dislike	Neutral	Like	Strongly like
V.	Strongly dislike	Dislike	Neutral	Like	Strongly like
W.	Strongly dislike	Dislike	Neutral	Like	Strongly like
X.	Strongly dislike	Dislike	Neutral	Like	Strongly like

Appendix 3b.

1. Please list the letters corresponding to the three photographs you most liked

2. Please list the letters corresponding to the three photographs you most disliked

3. Describe why you chose your top three photographs (you may also tell this verbally)

4. Describe why you chose your bottom three photographs (you may also say this verbally)