

Restoring Roots:
Possibilities of increasing biodiversity through community-engaged native planting
in residential neighborhoods of Kansas City, Missouri

by

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A REPORT

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Abstract

Many urban landscapes lack native plants that are integral to wildlife habitats and biodiversity (Müller et al., 2013; Reyes-Paecke, 2019). Biodiversity is linked to environmental benefits that impact public health, safety, and welfare. Studies show that well-connected patches and corridors of wildlife habitats are critical for biodiversity in urban landscapes, and greater biodiversity and resilience to climate change are achieved through an increase of native plants. While the need for improving biodiversity through native plants has been examined from a variety of landscape perspectives, including global, regional, rural, urban, public space, and private yards, little attention has been given to strategies that consider both public and private urban landscapes as a framework for improving wildlife habitat networks. To develop such strategies in urban landscapes, there must be acceptance and support from the residents.

This study explores the possibilities for engaging residents in native plant activities to increase environmental benefits and wildlife habitats in residential neighborhoods. This is accomplished by examining the extent to which residents' awareness of native plant benefits, interaction with native plants, and involvement in the community are associated with their preferences toward native plants in public and private landscapes. This study focuses on nine historically redlined, majority single-family, residential neighborhoods along the Brush Creek Corridor in Kansas City, Missouri, as a case to explore these issues.

A spatial analysis was conducted to identify public and private areas with potential native plant and wildlife habitat connections. Survey data were then collected from residents (n=83) to assess the possibilities of engaging them in native plant activities through community involvement, public and private landscape scenarios, and landscape practices. The research findings were translated into spatial and social programming strategies and possible actions for planners and landscape architects to engage with communities through native plant activities to increase biodiversity. This study builds upon current literature by assessing variables that could impact residents' preferences and their preferences toward native plants in both the public and private realms. The resulting strategies and actions could guide the collaboration of landscape architects and city planners with residential communities, initiatives, and programs in understanding ways to collectively engage urban residents in native plant activities to increase biodiversity, wildlife habitat, and environmental benefits in their neighborhoods.

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ABSTRACT:

Many urban landscapes lack native plants that are integral to wildlife habitats and biodiversity (Müller et al., 2013; Reyes-Paecke, 2019). Biodiversity is linked to well-connected patches and corridors of wildlife habitats are critical for biodiversity in urban landscapes, and greater biodiversity and resilience to climate change are achieved through an increase of native plants. While the need for improving biodiversity through native plants has been examined from a variety of landscape perspectives, including global, regional, rural, urban, public space, and private yards, little attention has been given to strategies that consider both public and private urban landscapes as a framework for improving wildlife habitat networks. To develop such strategies in urban landscapes, there must be acceptance and support from the residents.

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Chapter 1

Introduction

INTRODUCTION

0011EDFR1LLHDURGHOREHHUIUR

marginalization. Historically, this marginalization has manifested from racial division through unjust policy regulations, such as the 1934 Housing Act that led to the redlining of several neighborhoods in many cities—the H#FWVRIZKLFKDUHVWLOOVHHQVRGDV%DQUDWH City of Kansas City Missouri - Division of Community Engagement, Policy, and Accountability [KCMO], 7KHVHH#FWVRIWHQOQXSHRUDFFHVVWR D#RUGDEOHKRXLQPHGLFDOFDUHIRRGVRXFHVVDQ environmental attributes. Environmental attributes include but are not limited to parks, sustainable infrastructure, and biodiverse green space (Gotham, 2000; Kinzig et al., 2005; McKinney, 2002). This study focuses on biodiverse green space as a resource to improve people's quality of life in historically disinvested neighborhoods.

6WGLHVVDYHVKRZQKDWBSRSHYLOVHUDEFWLRQLWK ELRGLYHUVHJUHHQSFHVSVLWLYHODHFWVWKHLU#VLFDQ mental, and social health (Cox et al., 2017; Gómez-%DJJHWKQWDO 6KKKHADOWKEHQVVGHULYH from cleaner air, reduced urban heat and noise pollution, PRUHVWDEOHVRLODQUHGKHGARGLO+RZHYHUWKH urban landscape often has low biodiversity, thereby GHFUHDVLOVKHUHVWRUDWLYHH#FWVRIELRGLYHUVHJUHH spaces on urban residents and marginalizing them from a biodiverse environment (Beninde et al., 2015; Gómez-Baggethun et al., 2013; Müller et al., 2013; Rudd et al., 2002; Ossola et al., 2019).

For an environment to be biodiverse, it needs diverse habitats, including soil, water, vegetation, and the associated wildlife that uses those habitats. Though urban landscapes often have patches of biodiversity, studies show that wildlife and other species function best in corridors or networks instead of dispersed patches. A well-connected network of landscape

patches and corridors is preferred because human recreational activities and community developments are more connected, and many species utilize multiple habitats over their lifetime (Gómez-Baggethun et al., 2013; Müller et al., 2013; Reyes-Paecke, 2019). Thus, biodiverse corridors are needed in the urban landscape to provide a more functional and healthier environment for people and wildlife. The challenge is that wildlife does not commonly abide by human boundaries like property lines —often crossing between public and private land uses that vary in policy, peoples' preference, and use. Though each land use may have green space, they are commonly disconnected. While some wildlife species can function well in urban landscapes with disconnected green space, like squirrels, rabbits, some birds, and many insects and additional mammals, many native wildlife do not function well (McKinney, 2002; Reyes-Paecke, 2019; Rudd et al., 2002). This wildlife dysfunction is partly complicated by a lack of native plants to host native wildlife.

For native wildlife to function best, they need native plants for habitat (Adams, 1994; McKinney, 2002; Müller et al., 2013; Reyes-Paecke, 2019). Native plants are essential for creating biodiverse corridors as the plants occur naturally in a region, making them most adapted to the local climate and supportive of the regional physiological framework and wildlife (Adams, 1994; McKinney, 2002; Müller et al., 2013; Reyes-Paecke, 2019). Furthermore, native plants can grow in many types of green spaces and provide structure and storage to the landscape through their roots to sequester carbon ~~BOOXWDDQPLWLJDWHODQHURVLRQHHLKRDQ~~ health and establishing healthy habitats (Adams, 1994; McKinney, 2002; Müller et al., 2013; Reyes-Paecke, 2019). Thus, native plants can help increase biodiversity in a fragmented urban landscape and improve ~~HQLURQHDOEHQWVIRUDKLJKHUTDOLWRIOLIHIRU~~ people.

This study explores the possibilities of engaging historically marginalized urban residents in native planting activities to improve their neighborhoods' biodiversity, wildlife habitats, and environmental neighborhoods, with mostly single-family homes, in Kansas City, Missouri, to explore strategies to help communities integrate native plants for increased long-term benefits. The study took the following approach (Figure 1.1). First, background information was collected to understand the current landscape. Second, literature provided a more detailed understanding of the dilemma and reasoning of questions and objectives. Third, inventory mapping and analysis of demographics and environmental characteristics were used to determine intervention areas for native plant landscapes. Fourth, a survey and analysis were used to assess the communities' current landscape preferences, and a landscape plan was developed. Finally, the study provides concluding remarks and opportunities for future research.

DILEMMA AND SIGNIFICANCE

The urban landscape has public and private land uses that vary in demographics, programs, policies, and land cover. The urban landscape is a complex and dynamic portion of the urban landscape, but has fragmented habitats and reduced biodiversity (Beninde et al., 2015; Gómez-Baggethun et al., 2013; Müller et al., 2013; Ossola et al., 2019; Rudd et al., 2002). A landscape including access to cleaner air, water, and food (Cox et al., 2017; Nyelele & Kroll, 2020). For a landscape to be healthy, it must be able to support a diverse range of life forms and provide a variety of ecosystem services.

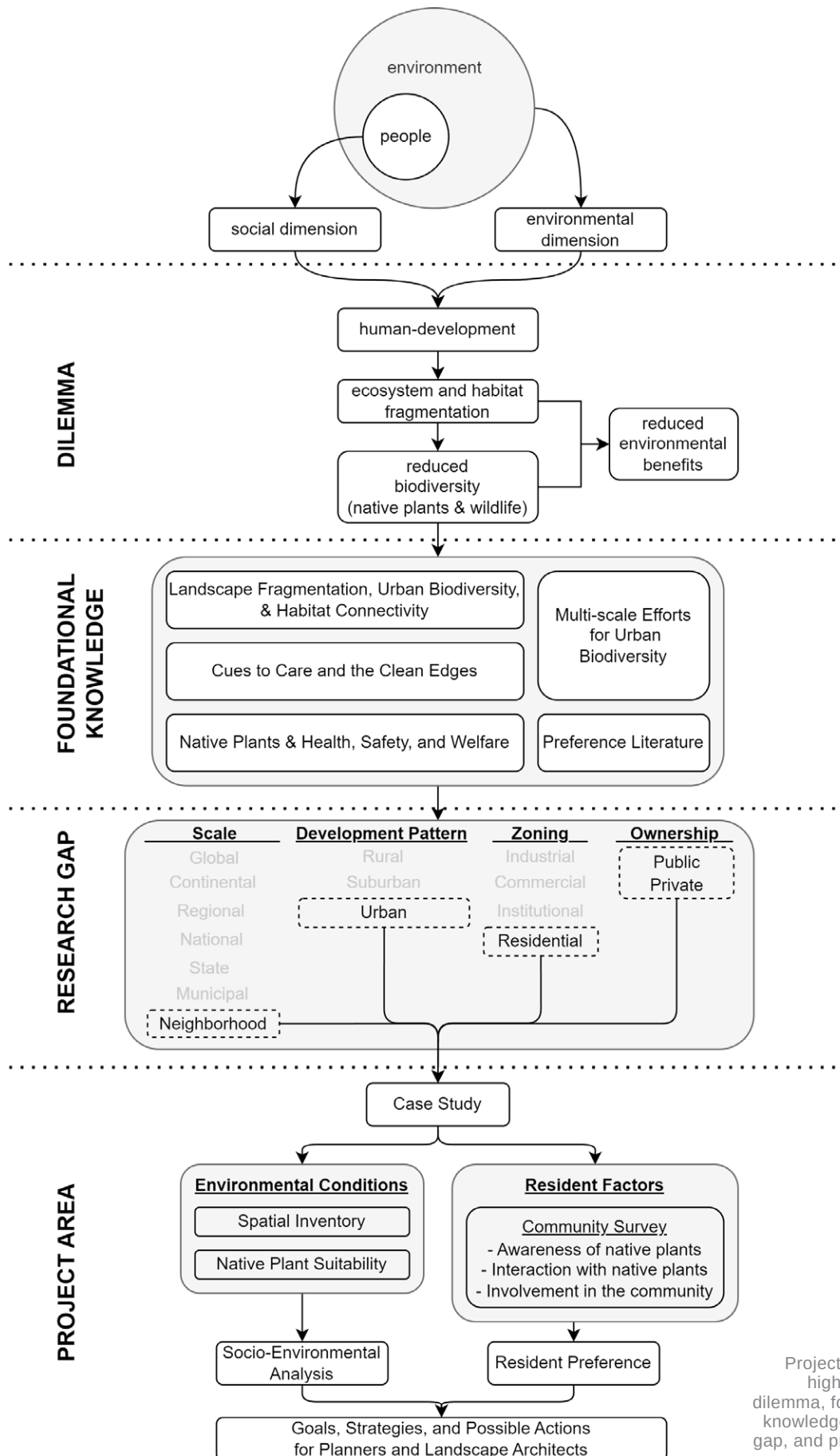


Figure 1.1
Project study map
highlighting the
dilemma, foundational
knowledge, research
gap, and project area.



Figure 1.2
A manicured lawn with no native plants in the right-of-way and frontyard of a residential neighborhood with no native plants and clear landscape edges.



Figure 1.3
A manicured lawn with patches of native tallgrass plants at a civic center near a residential neighborhood with clear mowed edges.



Figure 1.4
A landscape abundant with native tallgrass plants, a sidewalk, and naturalistic stone at a civic center.

Along with water and soil, vegetation is a crucial characteristic of the habitat necessary to meet the needs of wildlife: food, water, cover, and space to raise young. While some species have adapted to human settlement, many struggle to survive without a network of habitats (Gómez-Baggethun et al., 2013; Müller et al., 2013; Reyes-Paecke, 2019).

Although much of the urban landscape is composed of manicured lawns, there are opportunities to increase biodiversity through native plants. Residential landscapes commonly have manicured lawns (Figure 1.2). A manicured lawn of biodiversity does not greatly support habitat connectivity in the urban landscape. However, landscapes with manicured lawns hold the potential of native plants and, thus, wildlife habitat. In contrast to manicured lawns, native plants are integral to increasing biodiversity in the urban landscape (Aronson et al., 2017; Figures 1.3 and 1.4).

The potential for habitat improvement in public landscapes is broader than in private properties. Habitat improvement could be expanded through private residential properties by encouraging residents to use native plants in their front yards and backyards (Rudd et al., 2022). While many programs are engaging with local communities to improve the urban landscape, wildlife habitat, and native plants, little research has been done on how planners and landscape architects can address this engagement by impacting people's preferences for native plant landscapes to potentially increase native plant networks in both in public and private realms. Planners and landscape architects have a

unique position to shape communities and the urban landscapes through area policies, master planning of community developments and landscapes, and designing local landscapes with diverse social and environmental functions.

PURPOSE

This project explores the potential to engage residents in interventions for increasing biodiversity in an urban, historically redlined, majority single-family group of neighborhoods in Kansas City, Missouri. A study of variables that could impact residents' preference for native plant landscapes was guided by two research questions:

- *To what extent are awareness of native plant benefits, interaction with native plants, and involvement in community activities associated with a preference towards native plant landscapes?*
(Figure 1.5)
- *What are the possibilities of engaging urban residents in native plant activities to increase biodiversity, wildlife habitats, and environmental benefits?*

The study has the following overarching goals:

- First, explore associations between peoples' DZDUHQVVRIQWLYHSDQVEHQVVLQHUHDFWLRQ with native plants, and involvement in the community with preferences towards native plant landscapes that can serve as outlets to engage people in native plant activities.
- programming strategies and possible actions to help planners and landscape architects engage residents with native plant activities and designs.

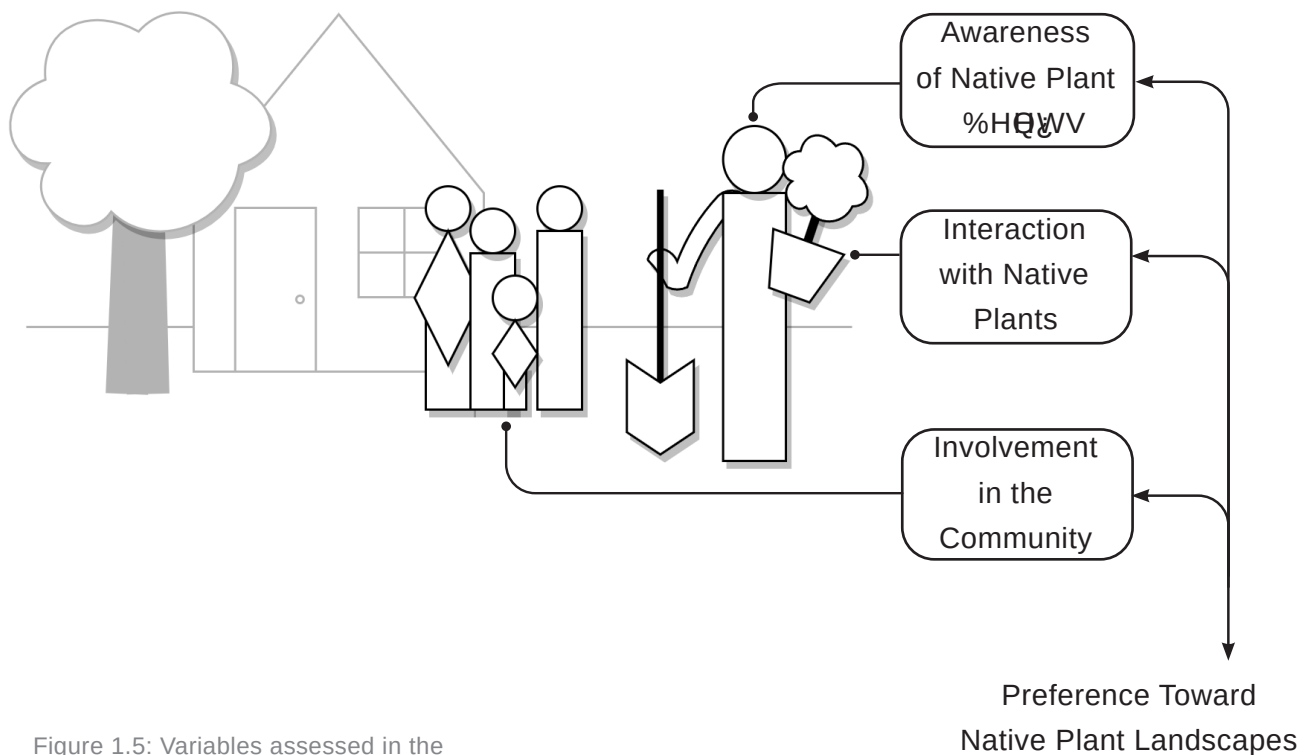


Figure 1.5: Variables assessed in the study, including factors that may be associated with residents' preferences toward landscapes with native plants.

Chapter 2

Literature Review

LITERATURE

URBAN BIODIVERSITY, HABITAT CONNECTIVITY, AND WELL-FUNCTIONING LANDSCAPES

Urban biodiversity is the variety of life interacting with human-settled landscapes (Müller et al., 2013). Biodiversity is essential to meet the basic needs of humans and wildlife, including food, water, and cover for warmth, shelter, rest, and raising young (Kinzig et al., 2005; Nesbitt et al., 2019; Adams, 1994; Reyes-Paecke, 2019).

biodiversity, the degree to which a place is biodiverse must be broken down. Biodiversity can be measured by species abundance, richness, and evenness. Abundance means the total quantity of species, richness, the number of individual species in an area, and evenness, the distribution of species across an area (Müller et al., 2013). For example, a concrete parking lot surface would have no vegetation biodiversity, but humans and some wildlife could use it for temporary residence. Manicured lawns are commonly seen in residential yards but have low biodiversity. This is because manicured lawns have low species abundance where typically one plant is planted; only select wildlife can use manicured lawns as habitat, even though lawns can serve many human functions (Gómez-Baggethun et al., 2013). Conversely, nature preserves, and water corridors like streams and rivers often have higher biodiversity due to a greater abundance of vegetation species and the associated wildlife that uses them as habitat (Gómez-Baggethun et al., 2013). Water corridors are the most connected habitats because lower topography naturally collects water that supports vegetation for wildlife human settlement due to the risk of natural disasters yet provide opportunities for human recreation. Therefore, improving or adding native plants in urban landscapes to naturally collect water would provide wildlife habitats

in more functional corridors and increase the potential for wildlife to sustain themselves. Additionally, improved wildlife habitat would provide soil stability, natural water
QWUDWLRQQFULWLFDOKRDKHDOWKUHVRMFHVDPNLQ
society more prepared for social and environmental changes (Cox et al., 2017; Nyelele & Kroll, 2020).

For society to become more prepared for social and environmental changes through improved biodiversity, Müller et al. (2013) state that the design of landscapes, structures, and transportation systems must consider landscape functions as an ecosystem to help restore urban biodiversity (Müller et al., 2013). There must be a holistic approach to biodiversity for landscapes
WRIBWLRQHOO6WELHVVDDZHOOIBWLRQQ
landscape includes the following: First, the landscape justly meets the physiological and social needs that sustain human life, such as food, water, energy, and places of connection (Kinzig et al., 2005; Nesbitt et
DO 6HFRQWKHODQVFDIUHGKHVWKHKHDOWK
DQHQLURQHQDOHHFWVRIJUHHQRXJHDVHVRQX
environment (Haines et al., 2009). Third, the landscape retains and restores species essential to a healthy environment, improving adaptability to environmental changes (McKinney, 2002).

HUMAN SETTLEMENT, LANDSCAPE FRAGMENTATION, AND NEGATIVE OUTCOMES

Over time, human settlement has removed or divided native habitats for human needs—creating fragmented landscapes (Beninde et al., 2015; Gómez-Baggethun, 2013; Müller et al., 2013; Reyes-Paecke, 2019; Rudd et al., 2002). This landscape fragmentation can serve social needs, such as building quality roadways for transporting goods and people, building infrastructure
WRUHGXHARGLOPRUDIDFLOLWIRUDKRPHOHVVVKHOWHU
or residential community to resolve a housing crisis. However, landscape fragmentation limits peoples' access
WRWKHHQLURQHQDOHHFWVRIDELRLGLYHUVHODQVFDI

This is because the wildlife habitat essential for sustaining the ecosystem is disconnected, the introduction of non-native species crowds out native species over time, and biodiversity is decreased (Beninde et al., 2015; Gómez-Baggethun, 2013; Müller et al., 2013; Reyes-3DHFNH 5XGHWDO 6RFLDOOODQVFD8 fragmentation has led to the lack of access to healthy and diverse native landscapes. Nesbitt et al. (2019) discovered that this lack of access strongly correlates with lower education levels and lower income in more vulnerable communities. Environmentally, introducing non-native species that spatially outcompete native species reduces the ecological function of a landscape, particularly in residential areas with high vacancies (Müller et al., 2013).

NATIVE PLANTS FOR SOCIAL AND ENVIRONMENTAL FUNCTION

6W&LHVVKRZWKDWQWLYHSDQVLEQUHDVHWKHZHOOEHLQRI humans, conserve water, reduce urban heat, and increase biodiversity (Larson et al., 2009; Uren et al., 2015; Nassauer, 1995). Therefore, native plants are valuable in sustaining people's health, safety, and welfare. According WRWKH\$PHULFDQRFLHWRI/DQVFD8\$UFKLWHFWV \$/6\$ WKHPLVVLRQIODQVFD8DUFKLWHFWVLVWR sustain people's health, safety, and welfare. According WR1DWXDO'HVLJQROWLRQQVXWDLQKHADOWK includes promoting physical, mental, and social health and well-being; sustaining safety includes preventing injury or death of users; and sustaining welfare refers to preserving or improving the environment and ensuring WKDWXHUVRIDOOODELOLWLHVFDQFFHVVV8FHV6HH7DEOH 2.1 for ways native plants can contribute to people's health, safety, and welfare. This information shows it is essential to provide vulnerable communities access to native plants, education, and training opportunities through individual and group opportunities to increase VRFLDODQHQVLRQHQWDOEHQVW

Native Plant Functions for People's Health, Safety, and Welfare	Source
Health:	
Filter contaminants for cleaner water (water quality)	Wise et al., 2010
Reduce the need for chemical applications	Quarles, 2003
Serve as learning and stewardship opportunities for a community	McKinney, 2002
Improve soil health and structure with deeper roots	Adams, 1994; Yang et al., 2019; McKinney, 2002
Sequester carbon for clean air	Adams, 1994; Yang et al., 2019; McKinney, 2002
Beautify an area for greater landscape satisfaction and well-being	Cox et al., 2017; Gómez-Baggethun et al., 2013
Safety:	
Planting shorter native plants to preserve public sightlines (i.e., roadway, park)	Quarles, 2003
Prevent criminal activity by preserving site lighting needs with proper spacing or maintaining at maturity	Nassauer, 1995
Maintainable to retain a particular aesthetic, fire, and utility codes and show signs of care	Nassauer, 1995
Serve as a visual or physical boundary or screen from hazards (i.e., the foresight of criminal activity, edges, utilities, or roadways)	Nassauer, 1995
Serve as a placemaking and wayfinding tool to important sight features (i.e., structures, safety call boxes, or other spaces)	McKinney, 2002
Prevent injury from high heat with shade or ground cooling	Aronson et al., 2017; McKinney, 2002
Welfare:	
Promote and conserve natural resources	Aronson et al., 2017
Provide or restore biodiversity to communities or natural areas for greater environmental benefits and wildlife habitat	Adams, 1994; McKinney, 2002; Nassauer, 1995
Create and connect wildlife habitat corridors	Adams, 1994
Protect peoples' soil from erosion with deep roots	Adams, 1994; McKinney,
Protect water quality downstream	Wise et al., 2010
Improve drainage (surface runoff and infiltration)	Wise et al., 2010
Reduce energy consumption and urban heat from less maintenance and ground cooling attributes	Aronson et al., 2017; McKinney, 2002
Sequester and redistribute carbon to the soil (cleaner air)	Adams, 1994; McKinney,
Improve area aesthetics and property values with ornamental attributes	Crompton, 2004
Reduce maintenance at maturity (versus a manicured lawn) with less overall maintenance, less operating costs, less use of polluting machines, and less water use	Nassauer et al., 2009; Nassauer, 2011, Quarles, 2003
Increase the number of native plantings in utility rights of way, front yards, and backyards	Rudd et al., 2022

Table 2.1: Native plants have functions that support people's health, safety, and welfare.

NATIVE PLANTS AND A TYPICAL LAWN: WHAT IS THE DIFFERENCE IN CARE?

According to the EPA (2013), the average American uses about 30% or 100 gallons of their daily water for outdoor uses, though this may vary per region and climate conditions. That is equivalent to taking four extra showers each day. The EPA estimates that the average American uses about 36,000 gallons of water annually. A study shows that changing the watering frequency reduces water use and associated costs in residential areas (EPA, 2013; McCormick & Walker, 2010). The Environmental Protection Agency recognizes the use of native plants for more sustainable water management (EPA, 2013). Native plants require less frequent watering once their root systems are established after one to three years, compared to typical fescue lawns (GrowNative!, 2022).

Less mowing can mean less pollutants, more carbon sequestering, and cleaner air. According to the EPA (2015), nearly 121 million gasoline-powered lawn and garden machines were used in the United States in 2011, of which 40% were lawnmowers. Their study on emissions concluded that these gas-powered lawn and garden machines emit 20 million tons (~40 billion lbs.) of CO₂ pollutants into the atmosphere (EPA, 2015). In retrospect, a mature Missouri native honey locust tree (*Gleditsia triacanthos*) can sequester ~300 lbs of CO₂ per year and store 200 lbs of carbon in its trunk. If we replaced the gasoline-powered lawn and garden machine emissions, we would need over 133 million native honey locust trees or native plants with similar carbon sequestration rates. For example, Yang et al. (2019) found that carbon sequestration is increased by restoring biodiversity with native plants in the St. Louis, Missouri, region as the native landscape is prairie, which

predominately features native plant species.

Native plants, like prairie grasses, often have deeper roots, which allow them to transport sequestered carbon deeper into the soil and store it for longer periods than WKRVHZLWKVKRUWHUURRWV86'\$86)RUHVVW6HUYLEFH n.d. b; Pett-Ridge et al., 2019). Deeper roots also mean more access to other ground nutrients, making them more drought tolerant, more restorative from natural or unnatural causes above ground, including UHVDQVWRUPVDQUHGKHGIRUIHUWLOL]HUV and pesticides that can wash into water systems if not DSLHGFRUUHFWO86'\$86)RUHVVW6HUYLEFHQE3HWW Ridge et al., 2019). Along with native trees, other native plants could be planted in abundance to sequester more carbon. After two to three years of native plant growth, less mowing and trimming would be needed—reducing carbon emissions (GrowNative!, 2022).

ODQRJUDPVR#UHHVRXFHVWROHDUQRZWRFDUH for native plant landscapes through readings or interactive training with more environmentally sensitive techniques and tools. Notable programs include the 1DWLRQO:LOGOLIH)RQDWLRQWHG6WDWHV'HSUWPHW of Agriculture, GrowNative!, Heartland Conservation Alliance, Deep Roots KC, City Roots Nursery, Bridging the Gap, and Urban Neighborhood Initiative. These programs advocate for more biodiverse environments and activate people, programs, and native plants in MEDQUHDVDFURVVWKH86)RUDGHH8UH[DPLQWLRQ of these programs, refer to the section entitled “Multi-6FDOH2UJDDQDWLRQ3URJUDPV\$Q,QWLDWLYHVIRU8UEDQ Biodiversity.”

SPATIAL DISTRIBUTION OF LANDSCAPES

Humans and wildlife require basic needs, such as food, water, warmth, shelter, and rest for survival and raising young. For creatures to obtain such needs, energy must be spent to replenish or exceed the previous energy

VWDWH6RPRUHHQJJPXWEHV8QWRUHDFKWKH
necessary resources when resources are spatially
distant. This means that landscape fragmentation has
required wildlife to travel greater lengths and expend
more energy to meet their basic needs within human
settlement.

Environmentally, native green areas contribute to
basic human needs as a source of clean air, water,
and healthy soil and provide resources to meet the
basic needs of wildlife. These native green areas
PDLEOXSHDQEDQDUGHQEXWHUA`DUGHQUD
meadow of trees and grasses - providing habitat for
various wildlife species. McKinney (2002) states that
a diverse combination of such habitats is essential to
a healthy ecosystem that meets the needs of many
ecosystem users (McKinney, 2002). The everyday
necessities of wildlife include tree canopies for birds,
ephemeral or wetland areas for amphibians, open-air
soil for burrowing insects, taller grasses for mammal
nesting, and a mix of green space for reptiles. Thus,
having a native habitat that is useful to birds, bees,
EXWHUA`HVDQRWKHUPDPPDOVDWVKRUWHUGLVWDQHV
could reduce the amount of energy needed for wildlife
to maintain the land and sustain environmental cycles
(Osborne et al., 2008; Goulson et al., 2008; Missouri
Discovery Center, n.d.).

MULTI-SCALE ORGANIZATIONS, PROGRAMS, AND INITIATIVES FOR URBAN BIODIVERSITY

Organizations, programs, and initiatives are in action
DFURVVWKH8QWHG6WDWHVWRLQ`UHDVHELRLGLYHUVLWLQ`
the urban landscape for the health of populations
and to sustain our environment. Many organizations
serve as educators, facilitators, planners, job trainers,
DQDQLDOV`BUWHUVLQ`KH`OLFDS`SLYDWH
VHFWRUV`HVFULELQ`DOOWKHH`RUWVERUJDDQDWLRQ`IRU
urban biodiversity is beyond the scope of this report.

Therefore, only some of them at national, regional, and local metro levels that are relevant to this project are highlighted in this section.

Nationally, the National Wildlife Federation has a &HFWLHG:LOGOLIH+DELWDWVSRJUDPWKDWUHDFFKHVKRDQ dominated landscapes such as cities, schools, and individual communities (National Wildlife Foundation, n.d.; Widows & Drake, 2014). Landscapes can be FHUWLHGZKHQRPPQWLHVIXQODFHUWDLQEHU of goals set by the National Wildlife Federation sets. 6RPHJRDOVLEOXSHREWDLQDOHWWHURIVBUW IURPFRPPQWJRYHUQHWRFLDOVIRUSRMHFW HIRUWVFRUGLQWLQFOHDXDQSDQLODFWLYLWLHV creating a demonstration garden at a public site with educational signs, partnering with local organizations, DQPRUH7KHSRJUDPLVDFWLYHLQKH8QWHG6WDWHV and has engaged with many communities to provide habitat for wildlife and practice sustainable gardening successfully. As of 2019, the City of Austin, Texas, had RYHU FHUWLHGZLOGOLIHKDELWDWV9HFFKLR

Regionally, Grow Native! builds awareness of native plants in the Midwest and explores how to use them to protect and restore biodiversity in the rural and urban landscape (Grow Native!, 2020). In the regional and local metro realms, about 100 organizations or programs have joined an alliance known as the Heartland Conservation Alliance (HCA), including Grow Native!. HCA conserves, protects, and restores natural and open space in the Kansas City area (Heartland Conservation Alliance, 2013). The HCA has increased civic engagement and environmental stewardship opportunities along the Blue River watershed, a prominent Kansas City River. One example is their vacant lot restoration program, which provides community resources for planning, funding, acquiring, cleaning, building, planting, and maintaining vacant lots. HCA's work is particularly important for the

research study area due to its abundance of vacant lots. HCA and many others play a crucial part locally through the Anita B. Gorman Discovery Center on Troost Ave of Kansas City, Missouri, immediately southwest of this research study area. Here, HCA, showcased native habitats and program events for the public to learn about their environment.

Locally, this section highlights four programs in the Kansas City metro area. One, Deep Roots KC, works with partners to increase regenerative native plant landscapes for the health of our planet through education, collaboration, and facilitation (Deep Roots KC, 2020). Two, Bridging the Gap provides environmental education and volunteer activities in the city (Bridging The Gap, 2019). Third, City Roots Native Plant Nursery & Landscape values sustainable native plants to beautify the region, preserve the environmental attributes, and create opportunities for wildlife habitat (City Roots, n.d). Lastly, The Urban Neighborhood Initiative cuts the cycle of poverty and lasting racial inequalities to help urban families and children thrive in their neighborhoods (Urban Neighborhood Initiative, 2019). The Urban Neighborhood Initiative varied from advocating for policies to providing vacant lot restoration resources and physically restoring vacant lots. Therefore, collaborating with city governance, organizations, and communities could ensure that vulnerable populations' social and ecological needs are met (Aronson et al., 2017). A healthier and more just city could be created by a better understanding the priorities of organizations' abilities and communities.

The opportunities for collaboration between businesses, governance, organizations, communities, and many other entities are abundant and active to

restore urban biodiversity and create healthier urban landscapes. Aronson et al. (2017) state that such needs of burdened urban populations. The McKinney (2002) study revealed that educating people about native plants can increase their management of the plants and thereby lead to greater biodiversity in areas. Thus, the programs listed and others like them are key to creating and sustaining biodiverse urban landscapes that support native habitat and wildlife function and increase human quality of life. and organizations focus or expand upon their ways of engaging with vulnerable communities with private land.

CULTURAL IMPLICATIONS AND LANDSCAPE PREFERENCE: IS IT CARED FOR?

biodiverse landscape with native plants. A biodiverse landscape may be viewed as too wild-looking in comparison to a manicured lawn that would evoke more order, but studies show landscape restoration DFWLYLWLHVDQFHUWDLQDQVFDSPDLQHQQHHRUWV FRXGLHQHSHVSHIHUHEHVWRZDUGV landscapes with native plants (Gobster et al., 2020; Nassauer, 1995; Nassauer, 2011). This study builds upon current literature by assessing residents' preferences towards native plants in both public and private realms based on associated variables such as the environmental awareness of native plants, interaction with them, and involvement in the community.

Jorgensen et al. (2007) found that some signs of care or human touch in the landscape are associated with perceptions of safety in an area, thereby having

LPOLFDWLRQIRUUHGKLOFULPH6LJQRIFDUHPD\

be pruned vegetation, a mowed edge, lack of trash, descriptive signage, outdoor yard features, well-maintained buildings, and fencing (Nassauer, 2011). Blighted neighborhoods do not often show signs of such care, making them crucial for intervention.

&XWXDOQUPVD#FWUHVLGHWVGHFLVLRQEXQWLYH

plants increases the well-being of humans, conserves water, reduces urban temperature, and increases biodiversity (Larson et al., 2009; Uren et al., 2015; Nassauer, 1995). According to Rudd et al. (2002), public education on native plants for habitat is best for increasing biodiversity in both the public and private VHFWRUV(GFDWLRQDVFXOWXDOLQGHQDORQZLWK orderly design (Nassauer, 1995). Native plants may not be widely accepted, but showcasing orderly designs with more naturalized or biodiverse landscapes could increase social desire for them (Nassauer, 1995).

Corridors of native plant habitat could be improved and developed by increasing native plants in utility rights of way, front yards, and backyards (Rudd et al., 2002).

6WGLHVVDYHIRQWKDWELJKERUKRRGVZLWKUHVLGHWVRI

low socioeconomic status, such as lesser education and income, are less likely to experience or have access to biodiverse landscapes (Kinzig et al., 2005; Nesbitt et al., 2019). Parks in higher-income areas were shown to have more native species than parks in low-income areas, while non-native species were equally distributed (Kinzig et al., 2005). Therefore, along with supporting economic and social prosperity, it is essential to provide

YDEUDEOHFRPPQWLHVZLWKDERUGDEOHQWLYHSDQV

education, or training opportunities. Based on existing literature, the following variables could impact peoples' preferences toward landscapes and native plant

RSUWQWLHVWKHPDRUPDQVHHDVEHQLDQ

People may prefer landscapes to a variety or a combination of variables. These may include but are

not limited to peoples' feelings of safety in a landscape, their ability and willingness to create or maintain a landscape, the amount of interaction with a landscape, and aesthetic choice of a landscape on the abundance of plants and clarity of edges (Nassauer, 2011). These preference variables vary in peoples' landscape expectations and desires, as described below.

Feelings of Safety Near a Landscape

People feel safe when they know what to expect or feel protected (Nassauer, 1995). Thus, peoples' preferences of a landscape could be impacted by whether they feel safe. According to Nassauer (2011), people's expectations of a safe landscape are having clear sightlines into or through the landscape, that it appears taken care of like a maintained edge or trimmed vegetation, or of it has a physical boundary or end to it like a street, sidewalk, driveway, building, or fence. This is important for planners and designers to consider the placement of native plants and their growth patterns and how they may need to be maintained over time to have clear edges.

Creation & Maintenance of a Landscape

People may want to be a part of the public process to create the landscapes because they want to have a sense of ownership in the community. This LQXSHVZDQVLQWRLQHQHFKDQHVRUDGYDQHV in the neighborhood. As for maintenance, people can maintain the landscape themselves if they have the physical ability, tools to maintain it, and know how to maintain it. People may want others to maintain certain landscapes because they may not be physically able to, lack the knowledge or tools to maintain it, or do not have the desire or time to maintain it. They may not be around their property enough to maintain native plants correctly due to work commitments or involvement in extracurricular activities. They may also have limited

PRELOLWRUDOOHUJFRQLWLRQLQSFLEHQLURQHQV

Others may need more resources to maintain the landscape, such as access to physical tools, knowledge on how often to maintain it, or what to use to maintain it. These are the basis for exploring people's attitudes toward maintaining native plants in their neighborhoods.

To plant and care for native plants, people must:

- Know what native plants are (educate self)
- Know where to obtain them (nursery, sale, neighbor, current private space)
- Have the means to obtain them (transport, QQLDOODQVFD8FDUHWRRQV
- Have the resources to plant and maintain them (landscape care tools, water, soil, etc.)
- Know how and where to plant them to thrive in the landscape (climate needs of the plants, climate conditions of the space)
- Know the long-term care needs of the plants (when to water, prune, etc.).

Interaction with a Landscape

People may regularly interact with certain landscapes EHFDXHWKHQWKHPEHQELDOWRWKHLUKHDOWK environment, and lifestyle. They may be familiar with the landscape from seeing or interacting with it from a young age and fond memories to a daily drive. They may also feel safe in the landscape, live or work near LWRULQHUDFWZLWKLWWRHQDJHZLWKRWKHUSIRSH6KK familiarity or interaction with certain types of landscapes may increase preference for a landscape.

Abundance of Plants & Edge Aesthetic of a Landscape

People may prefer landscapes they are familiar with, are pleasing to their eye, which look and feel safe, that WKHFDEDLQDLQQWKDWWKHNRQZWKHLUEHQV

(Nassauer, 1995). People may be familiar with the aesthetics of a landscape for various reasons. They may have grown up in landscapes with a particular aesthetic characteristic, or everyone around them has it, or they visit places with it, or they have seen others care for it or have cared for it themselves. They may prefer the visual quality of a landscape because it supports their lifestyle activities, or they know it

TAKEAWAYS

to improving biodiversity in urban landscapes for them to function well socially and environmentally. While human settlement is essential for sustaining environmental function. Although this has led to fragmented urban landscapes with less biodiversity, connectivity, an opportunity exists to improve biodiversity with native plants. Native plants are a critical natural resource contributing to clean air and water, healthy soil, reduced urban temperatures, and food and habitat sources. These resources are essential for people's quality of life and the function of wildlife, but cultural implications exist that limit environmental balance, organizations, programs, and initiatives have been created and are active locally and across the nation to engage with communities through restore biodiversity. Planners and landscape architects can partner with others to strategically create healthier, more biodiverse urban landscapes. The following methods were used in this study to understand how planners and landscape architects could engage with communities in the urban landscape utilizing native plants.

Chapter 3

Methods

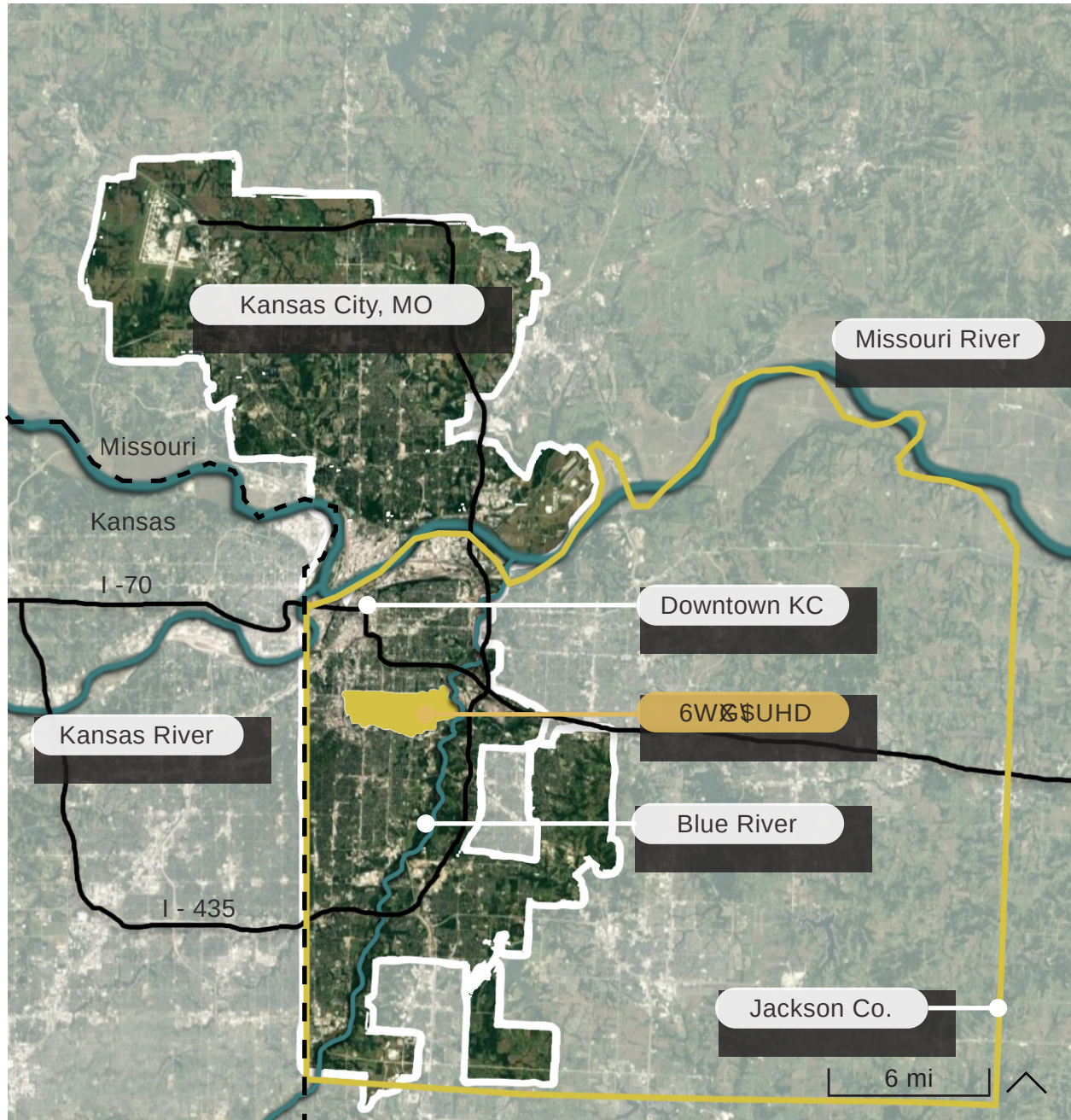
METHODS

This section describes the selected study area, approaches to site and social data collection and analysis, survey participants' demographics, and survey content, followed by a summary of methods.

STUDY AREA

This study examines nine neighborhoods along the Brush Creek Corridor in Kansas City, Missouri. These communities are burdened by blighted and vacant properties, high crime rates, poverty, and the impacts of systematic racial inequality burden these communities. Historically, racial division occurred through unjust National Housing Act 1934 policy regulations. These unjust policies have led to redlining in many cities, including Kansas City. Redlining limited the available resources needed to sustain a community's health, VDIHWQZHOIDUHHFWVWVWLOOVHHQVRGDY%QUDWH 2020; City of Kansas City, Missouri - Division of Community Engagement, Policy, and Accountability [KCMO], 2016). While improving biodiversity through native planting activities will not solve all of a community's social and environmental burdens, it FDQQUHDVHDFFFHVVRHQLURQHVDQDOOEHHQLDO landscapes, educational opportunities, and community connection as a step towards equity and sustainability (Gotham, 2000; Kinzig et al., 2005; McKinney, 2002). The nine neighborhoods are located three miles southeast of downtown Kansas City (Figure 3.1).

Figure 3.1 - Context map of Kansas City, Missouri including the Jackson County boundary and highlighted focus areas



The neighborhoods are east of Westport, a major walkable and economic urban district, and include (Figure 3.2):

6R~~W~~K+GH3DUN

- Manheim Park

,YD~~Q~~RH6R~~W~~KZHVW

,YD~~Q~~RH6R~~W~~KHDVW

2DN3DUN6R~~W~~KZHVW

2DN3DUN6R~~W~~KHDVW

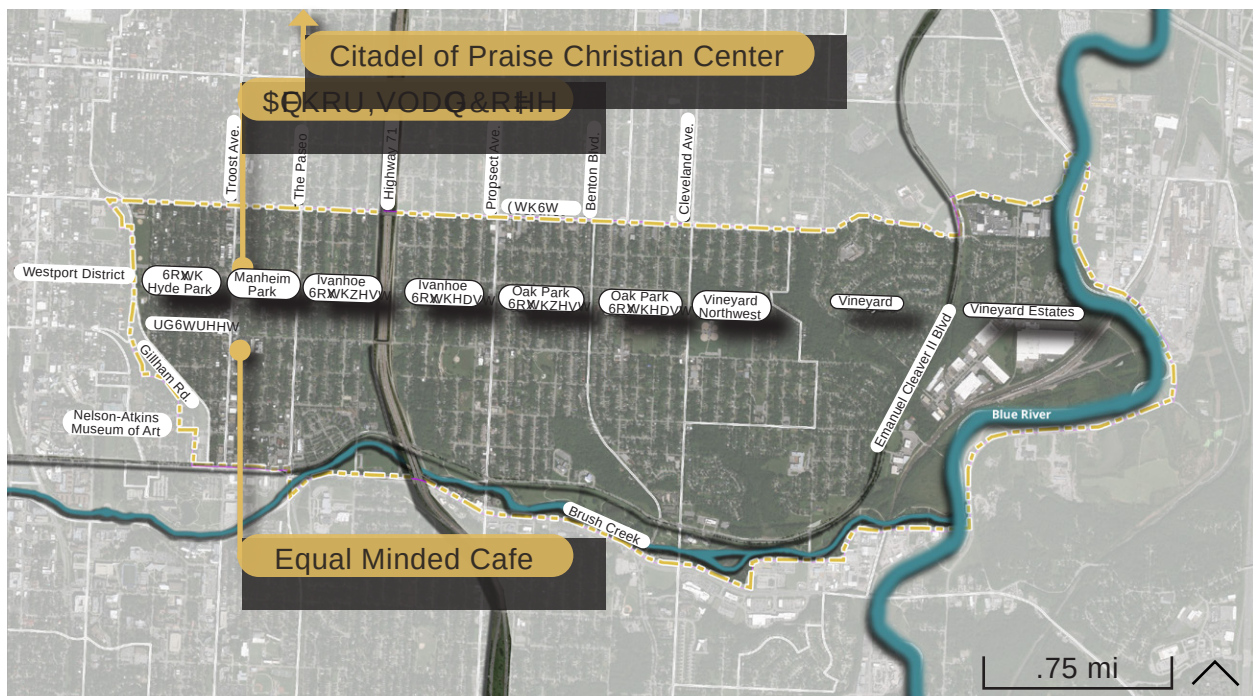
- Vineyard Northwest

- Vineyard, and

- Vineyard Estates.

6WHHS~~OR~~SVODUJHER~~D~~HYDUGVPDW~~X~~HWUHHV~~D~~UNV
homes with raised foundations and yards with retaining walls, dense living, manicured lawns, areas of scrub vegetation, wood and chain-link yard fencing, many vacant lots and homes, and some concrete and

Figure 3.2
6W~~K~~DUHDER~~Q~~DUPDRIO~~Q~~
neighborhoods with highlighted data
collection locations



vegetated creek banks characterize the study area. The neighborhoods are adjacent to Brush Creek, a secondary ZDWHUZDWRWKH%OM5LYHUWKDWÄZVLQWRWKH0LVVRXL 5LYHU6WUHDPPDQULYHUFRUULGRUVOLNH%UXK&UHHN and Blue River in Kansas City, Missouri, are primary connectors to more biodiverse landscapes outside human settlement. The dominant zoning of the neighborhoods is residential with stretches and nodes of business zoning, some manufacturing districts, and nodes of urban redevelopment zoning where there is noted blight and underdevelopment. Public and semi-public land typologies in the study area include parks, civic center land, vacant lots, and the right-of-way such as street medians and tree rows also known as outdoor furniture zones. Many right-of-way landscapes have manicured ODZQQPDWÄHWUHHV6HHD\$QL()IRUVLWHFKDUDFWHU imagery.

SITE DATA COLLECTION

Data was collected spatially through mapping, online and on-site observations, and spatial syntax to assess the community's physical capacity to increase biodiversity WKURXKQWLYHSDQV7RROVWRFROOHFWGDWDLQO\$HG;*6 for mapping, online search engines for imagery, a camera for site photography, area maps, site plans for reference and markup, and photographs or images for reference.

Before this research, I was part of a studio group of ODQVFD\$DUFKLWHFWÄHVW\$HQVLQDVWHU73URMHFW6W\$LR 1 (LAR705), where we studied the nine-neighborhood area and communicated with area stakeholders. The group study included inventory mappings and analysis WUDQODWHGWRGRHVLJQVVLLELOLWLHVZLWKYHIRFLZDWHU management, urban biodiversity, quality of life, food systems, and energy security. This study expanded upon urban biodiversity. The underlying inventory included PDSQW\$LHVIURPWKH8QWHG6WDWHVHRORJLFDQ 6NYH866WKH0LG\$PHULFD5HJLRQO&RLO

study included social and environmental information, as listed next:

- Historical redlining (Nelson et al., n.d.)

'HPRJUD&LFV86&%

- Vacant Land (OpenDataKC).

- Parks and Boulevard (OpenDataKC)

3HUPHDEOH6MIDFHV28QWD.&

- Land use (MARC)

/DQFRYHU0\$5&866

68FLHVV&WDELOLW866

- Forest restoration (MARC)

- Forest conservation (MARC)

SOCIAL DATA COLLECTION

Residents, associations, councils, ministries, RUJDQDWLRQDQEXLQVHVZHUHLGHQLEHG DV sources for community representation. A hard copy and digital survey were used to collect social data from as many participants as possible by convenience sampling and snowball sampling from study area residents. The survey aimed to collect data on residents' attitudes towards native plants, landscape preferences, and their willingness to participate in native planting activities that could connect habitat patches and corridors through &OLFDQSLYDWHODQ6HH\$8QL[&

Digital surveys were distributed by identifying and contacting community representatives through a survey mobilization plan. The plan included calls, emails, and social media messaging to participate, post, and forward the digital survey. The email included introductory information on the research with the

GLJLWDOVXYHOLQDQDNUZLWKD45FRGHIRUVLPDH
 BVWLQYLHZLQDQSLQ6HH\$SQL['IRUDQ
 H[DPDHRIWKHHPDLODQNU\$WRWDORIFRPPDW
 representatives were contacted, and 35 representatives
 agreed to receive the email. The survey brief, link, and
 NUZHUVHQRWRWKHP7KHGLJLWDOGLVWULEXLRQRFHVV
 was continued throughout the survey data collection
 process as potential participants arose.

Hard copy surveys were administered and collected at
 WKUHHORFDWLRQ\$EKRU,VODQ&R#HDQ(TDOOLQHG
 Café on Troost Avenue and at a meeting location of
 the Justice and Dignity Center Coalition, Citadel of
 Praise Christian Center, on The Paseo in Kansas
 &LW0LVVR0L)LJ0HV DQ 6MYHNUVZLWK
 digital access were distributed at the Anita B. Gorman
 Discovery Center on Troost Ave following a native plant
 ZDON)LJ0H 6HH)LJ0H IRUWKHGDWDFROOHFWLRQ
 timeline.



Figure 3.3 (bottom)
 In-person survey setup at
 \$EKRU,VODQ&R#HRQ
 Troost Ave., Kansas City,
 MO

Figure 3.4 (left)
 In-person survey collection
 location at Equal Minded
 Cafe on Troost Ave.,
 Kansas City, MO (Google)

Figure 3.5 (right)
 Native plant walk at the
 Anita B. Discovery Center
 on Troost Ave, in Kansas
 City, MO.

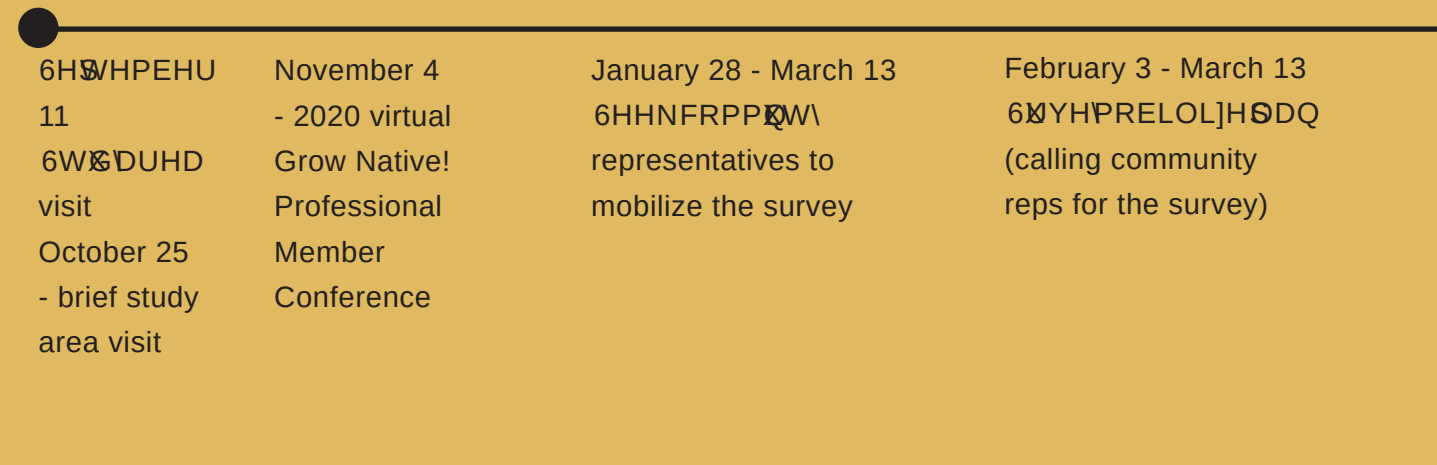


Figure 3.6
Data collection timeline

from the register to the survey pickup location. They were met with a brief introduction and research prompt and invited to participate in the survey by hardcopy or clipboard (Figure 3.7). Clipboards with surveys and a cup of pens were used to distribute and approach groups or people sitting afar (Figure 3.8).

PARTICIPANT DEMOGRAPHICS

The nine-neighborhood study area has a population of approximately 13,900. Ideally, a population sample of 5% would represent each neighborhood. Considering data collection limitations, including time and access

Figure 3.7
Hand delivering at data collection sites.

Want to be a part of research in the heart of KCMO?

Wildlife Habitat & Community Involvement

Studying in urban communities to find ways they could benefit from their environment through native planting that serves as wildlife habitat.

Questions? Contact Erich at eherb@ksu.edu

~5 minute survey

18 and up

February 22	March 5	March 12	March 13
\$QKRU,VODQ&R#H (in-person)	- Equal Minded Cafe (in-person)	- Anchor ,VODQ&R#H (in-person)	- Equal Minded Cafe (in-person)
- Justice and Dignity Center Coalition meeting (in-person)	- Native plant walk - Anita B. Gorman Discovery Center (in-person)		
- brief study area visit	- brief study area visit	6W&DUHDYLVW !	

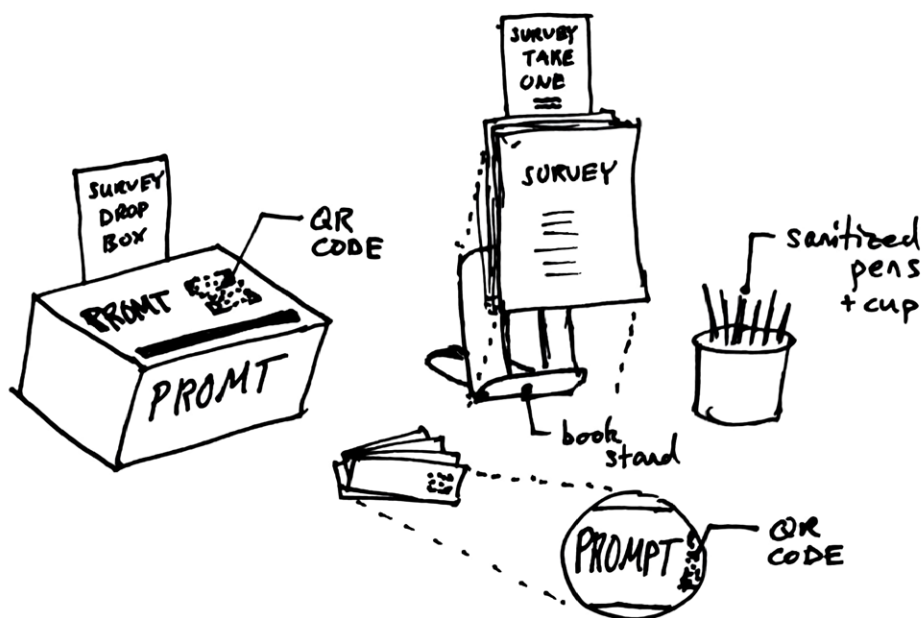


Figure 3.8
6NHWFKRILQVVRQDWD
collection tools

to people and places, a goal of 150 total surveys was set for this study. A total of 103 people participated in the survey, or less than 1% of the neighborhood study DUHDSDDWLRQZHQVYHVYHVZHUHHOLPLQWHG from the analysis because they were incomplete or the people were outside Kansas City, Missouri. Therefore, 83 participant responses were considered for analysis (n=83). The sample could have better represented the study area demographic if there was a larger sample size and more strategic areas of data collection (Figure 6MYHSDUWLFLSDQVZHUH%ODFNRU\$IUFLDQ\$PHULFDQLVSDQFRU/DWLQ\$VLDAQ3DFLE Islander, 63% White, and the remaining did not say. The survey participant's racial makeup correlates with Jackson County (Figure 3.9). Most survey participants were white, owned their residences, had an income of \$50,000+, completed a bachelor's degree, and did not live with children (Figures 3.10, 3.11, and 3.12). 6HH7DEOHIRUDFRPSULVRQIPHGLDQRXHKROG income between survey respondents, the study area, and Jackson County.

Population	Median household income
6MYHSDUWLFLSDQ	\$50,000+
6WSSUHD	\$29,672
Jackson County	\$42,834

Table 3.1
Median household income (2010 Census Data)

Figures 3.9
a) Left pie chart - survey participant racial makeup
b) Middle pie chart - study area racial makeup
c) Right pie chart - Jackson County racial makeup

Figure 3.10 (right top map)
Racial dot density of the study area by 2010 Census block group

Figure 3.11 (right middle map)
Median household income of the study area by 2010 Census block group

Figure 3.12 (right bottom map)
Property ownership of the study area by 2010 Census block group

SURVEY CONTENT

7KHVXYHKDGIKXVLJQEDQFRPSQVFRPPQW involvement, public and private landscape scenarios, landscape practices and desires, and demographics (Appendix C). The components contained questions DERXWZDUHQVVRIOQWLYHSDQVEHQVVLQROYHPHQ in the community, interaction with native plants, and preference towards native plants in public and private landscapes. Most survey questions about community involvement were based on the National Wildlife)RQDWLRQ&HUWLHG:LOGOLIH+DELWDW&HUWLEFDWLRQ Requirements for community engagement possibilities to increase urban biodiversity (National Wildlife Federation, 2016).

Racial Makeup

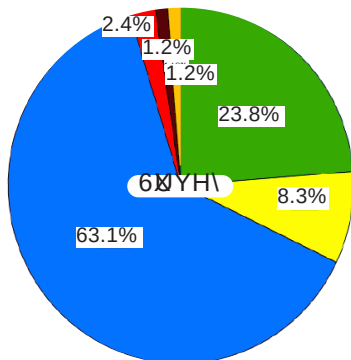


Figure 3.9 a)

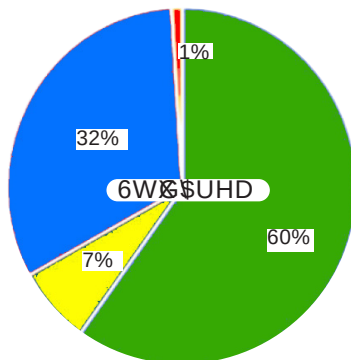


Figure 3.9 b)

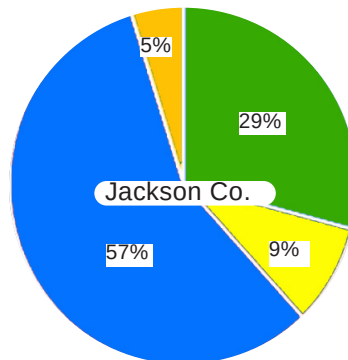
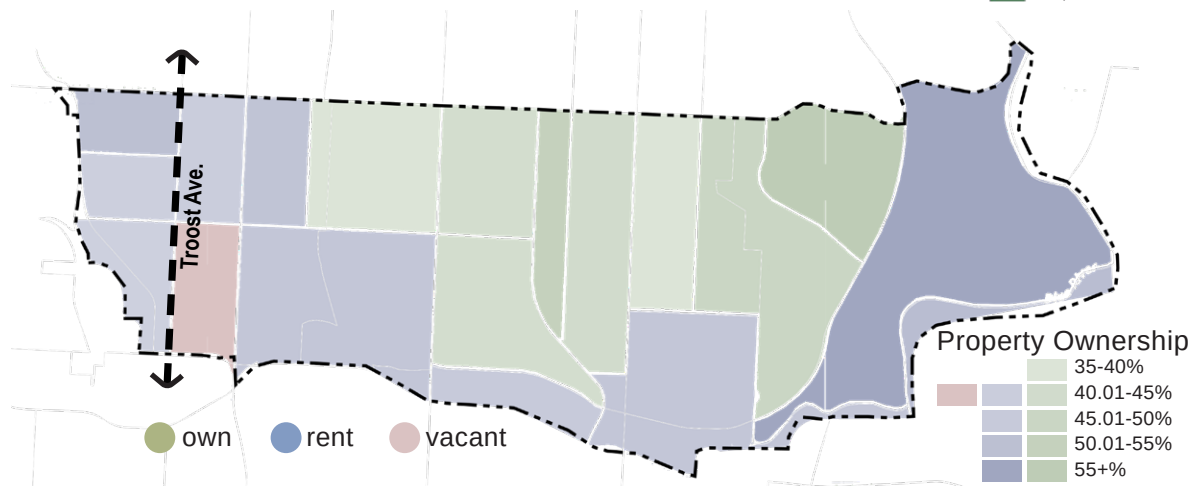
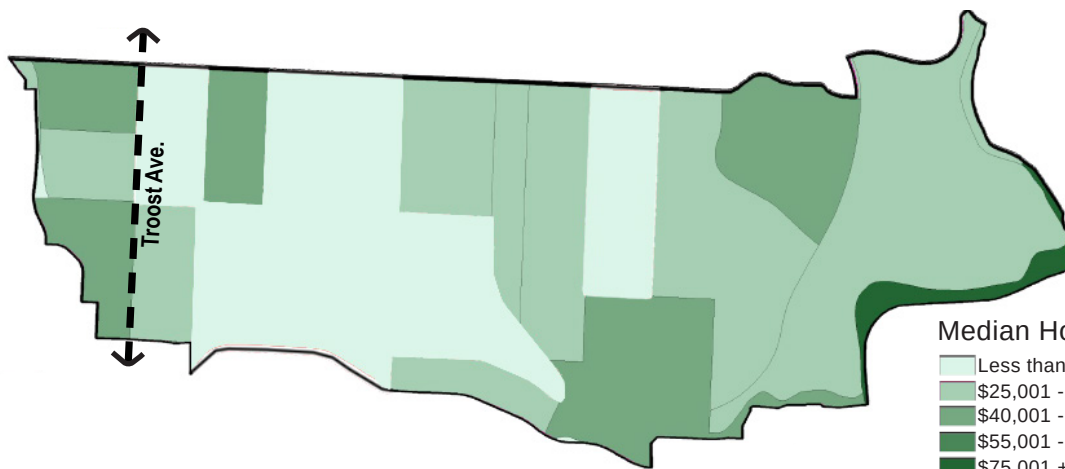
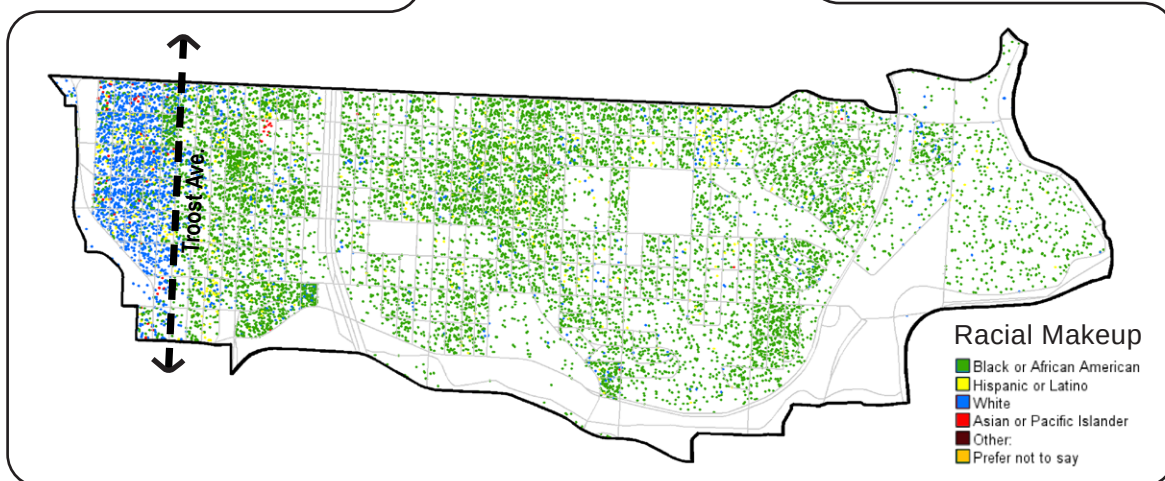


Figure 3.9 c)





First, the community involvement component presented ten questions to identify participants' awareness, engagement, and interest in community activities, organizations, policies, and personnel that could lead to an increase of native plants in the landscape. The questions were guided by three major themes: respondents' awareness of and engagement with the community, respondents' awareness of and interest in engaging with leadership and systems of power, and respondents' awareness of native plant sources and interest in engaging with environmental interventions. Six scenarios, three public and three private, to understand preferences (Figure 3.13). The scenarios depicted native plants in masses, patches, or absent with or without manicured edges based on Figures 1.2, 1.3, and 1.4 in chapter one. The abundance of native plants was used to determine biodiversity and wildlife habitat potential and connectivity; the greater the abundance, the greater the wildlife habitat and potential for increasing biodiversity and improving environmental peoples' preferences for native landscapes, including feelings of safety near them, creating and maintaining them, and the level of native plant abundance and clear focused on landscape characteristics, practices, and the participants' interactions with native plants. Lastly, the demographics section was included to identify the sample better. Participants were allowed to identify their neighborhoods as mapped in Figure 3.14.

inferential statistics. The descriptive statistics were responses based on spatial syntax (modeling and assessment) and demographics. Inferential statistics

were used to assess correlations of responses, such as residents' willingness to plant native based on their involvement in the community, awareness of the with native plants in landscapes. The following chapter presents the data analysis results.

SUMMARY OF METHODS

segregated or redlined communities with underlying engage them in native planting activities that improve physical capacity to increase biodiversity through native understand attitudes towards native plants, landscape perceptions, and their willingness to participate in native planting activities that connect habitat patches and corridors through public and private land.

Figure 3.13 (left)
Images presented to survey
participants showing three public and
amounts of native planting.

Chapter 4

Analysis & Findings

ANALYSIS & FINDINGS

LANDSCAPE ANALYSIS

mapping and social data analysis that impact the possibility of engaging residents in native planting activities to improve urban landscape.

SITE DATA ANALYSIS

the Kansas City metro area and study area that could impact a community's physical capacity to increase biodiversity around the following topics: land cover, landscape greening opportunities, wildlife habitat suitability, and landforms that impact native plants and wildlife habitat in the urban landscape.

Land Cover

Gaps as large as 15 miles exist between biodiverse water corridors across human-settled areas, as seen in Figure 7. Stronger habitat networks through strategically placed native habitat patches in human-settled spaces could increase biodiversity. About 5% of the site is naturalized areas primarily used for stormwater management. The naturalized areas were mostly woodland with higher existing biodiversity that should be conserved with the potential for increasing invasive species (Figures 4.2 and 4.3).

Zoning

On the study area scale, zoning could impact a community's physical capacity to increase biodiversity through native structures and landscape

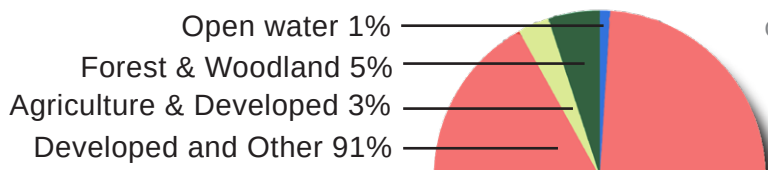
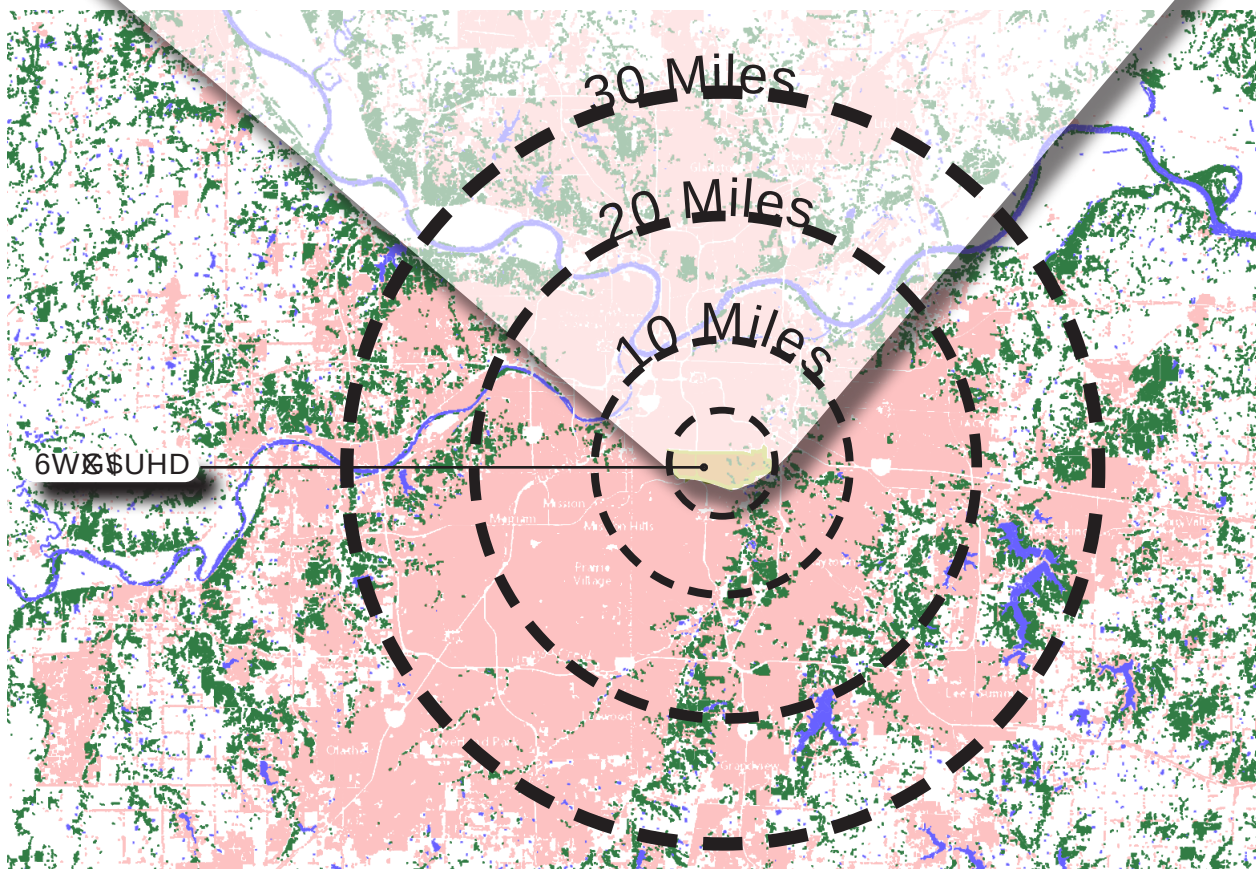
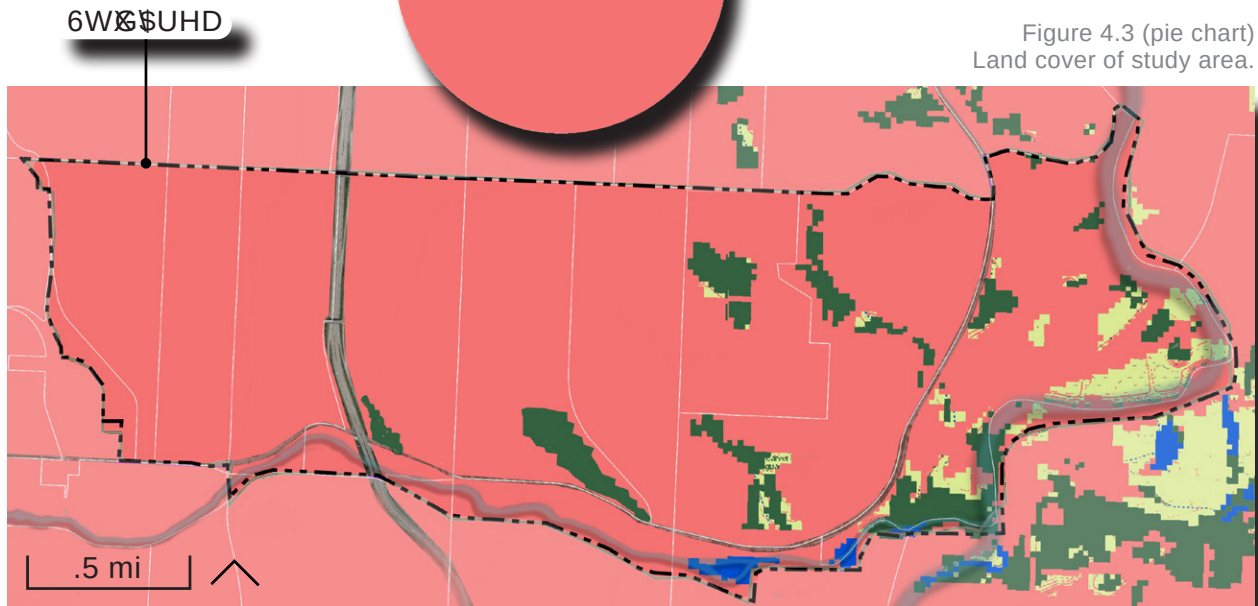


Figure 4.1 (bottom)
Context map of land cover showing disconnects
of more biodiverse habitats across human
GHYHOR8H0WDGDSWHGIURP866

Figure 4.2
Map of land cover in the study area- adapted
IURP866

Figure 4.3 (pie chart)
Land cover of study area.

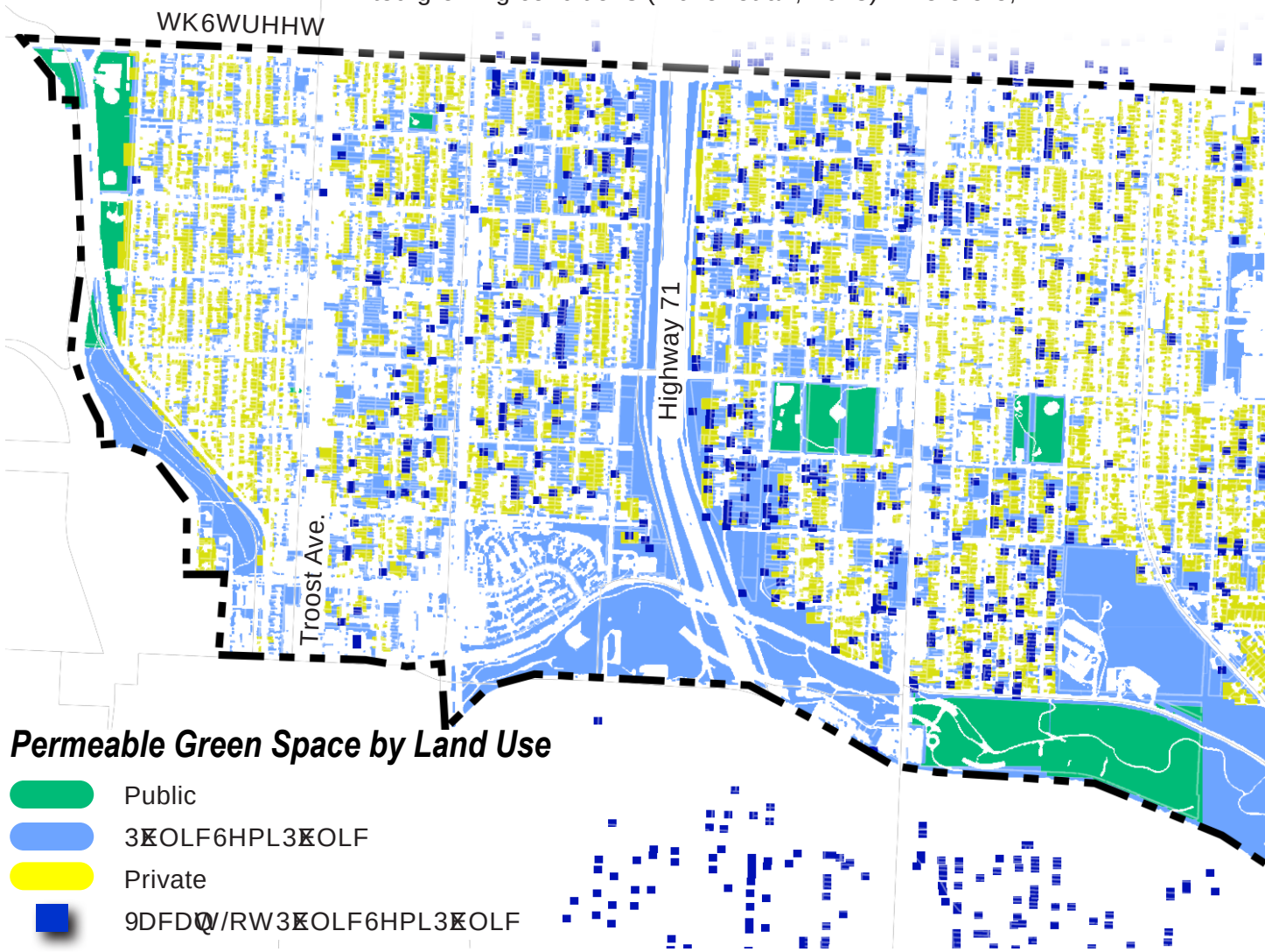


features that can exist on the property. These requirements may not suit the best design for wildlife habitat connectivity, but they could be opportunities to integrate native plants and create boundaries or with stormwater detention that could serve water-using species or through code-encouraged pollinator gardens, or with the required number of trees along the street or shrubs for screening a parking lot. Planners and designers should complete due diligence of zoning and city code to determine where biodiverse landscape corridors can be created with native plants or advocate for amendments to a zone.

Figure 4.4 (spread)
Permeable green space
delineated by land use.

Landscape Greening Opportunities

Native plants adapt most to the local climate and survive in limited growing conditions (Muller et al., 2013). Therefore,



nearly any green space could allow for native vegetation with some initial care. The map below (Figure 4.4) shows green space in the study area delineated by land use. This map can serve as a guide for planners and designers to connect wildlife habitats with the community. Non-colored areas within the study area are impervious surfaces like buildings, foundations, parking lots, some recreation areas, and roadways (Figure 4.5). Most pervious green spaces are on private property, including residential yards, commercial and school lawns, parks and boulevards, and under-activated vacant lots. Areas of manicured lawns that are not commonly used could be restored to native habitats. Vacant lots could serve as semi-public or private pilot native plant areas balanced with needed housing development.

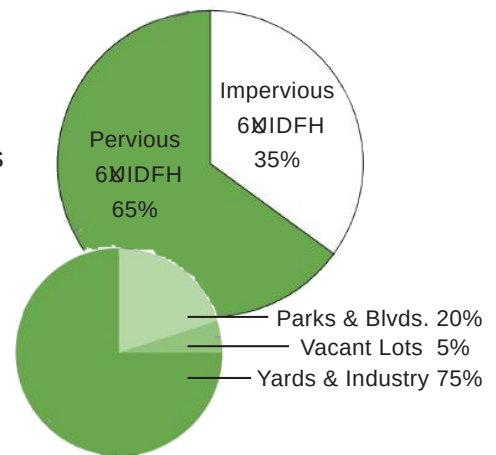
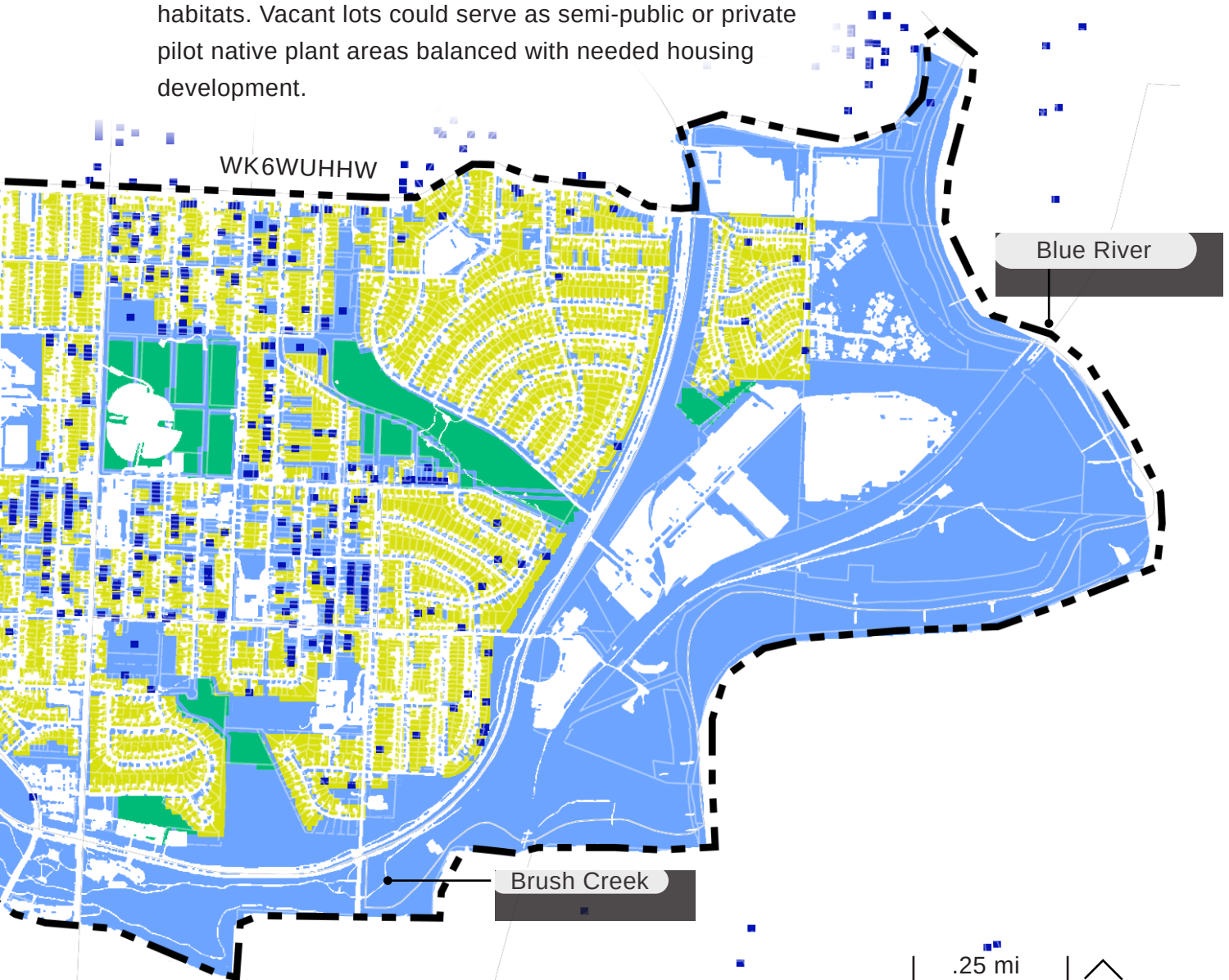


Figure 4.5
between it's pervious and impervious
surfacing. The total study area
acreage is 2650 acres.

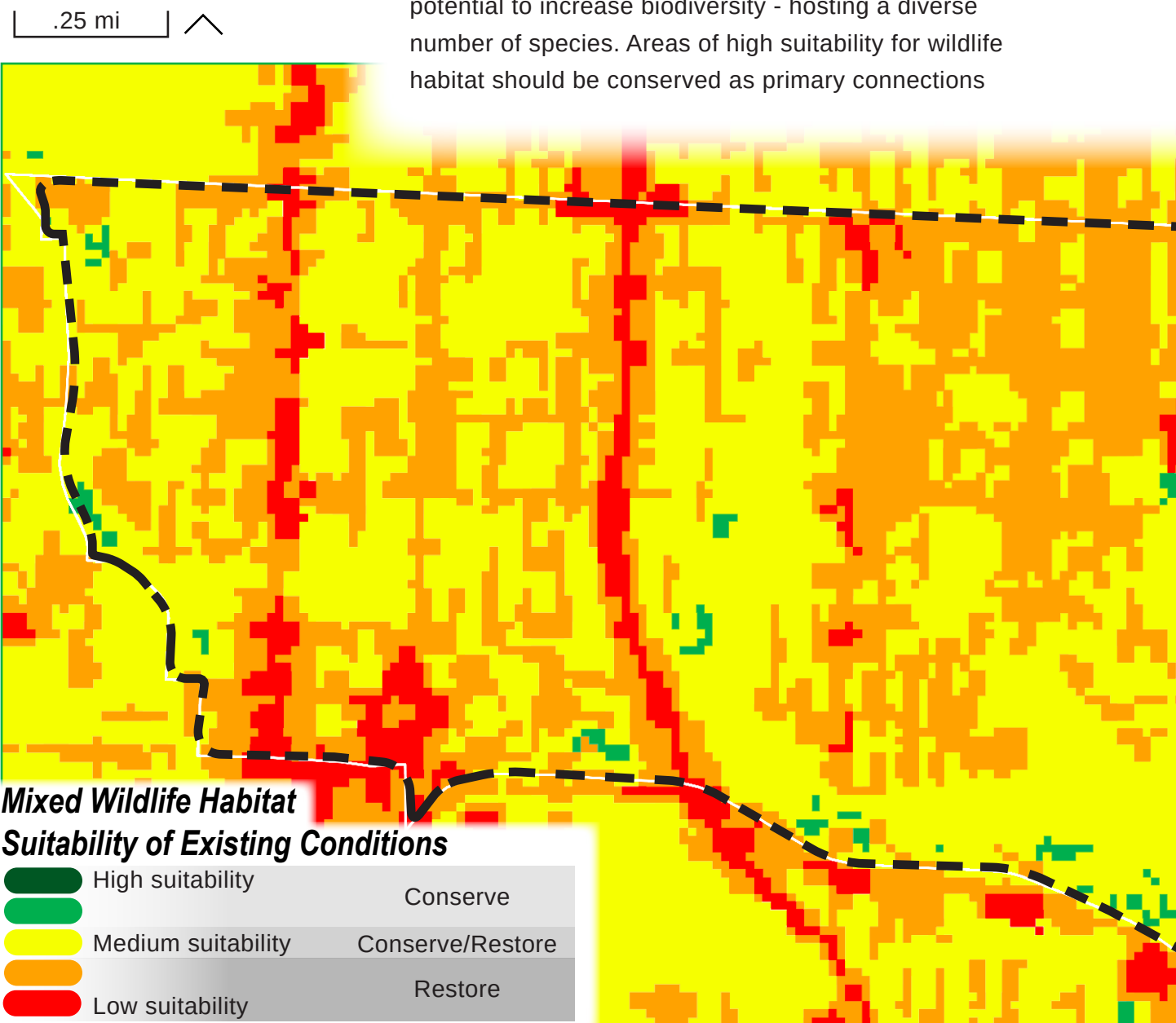


Wildlife Habitat Suitability for Conservation and Restoration

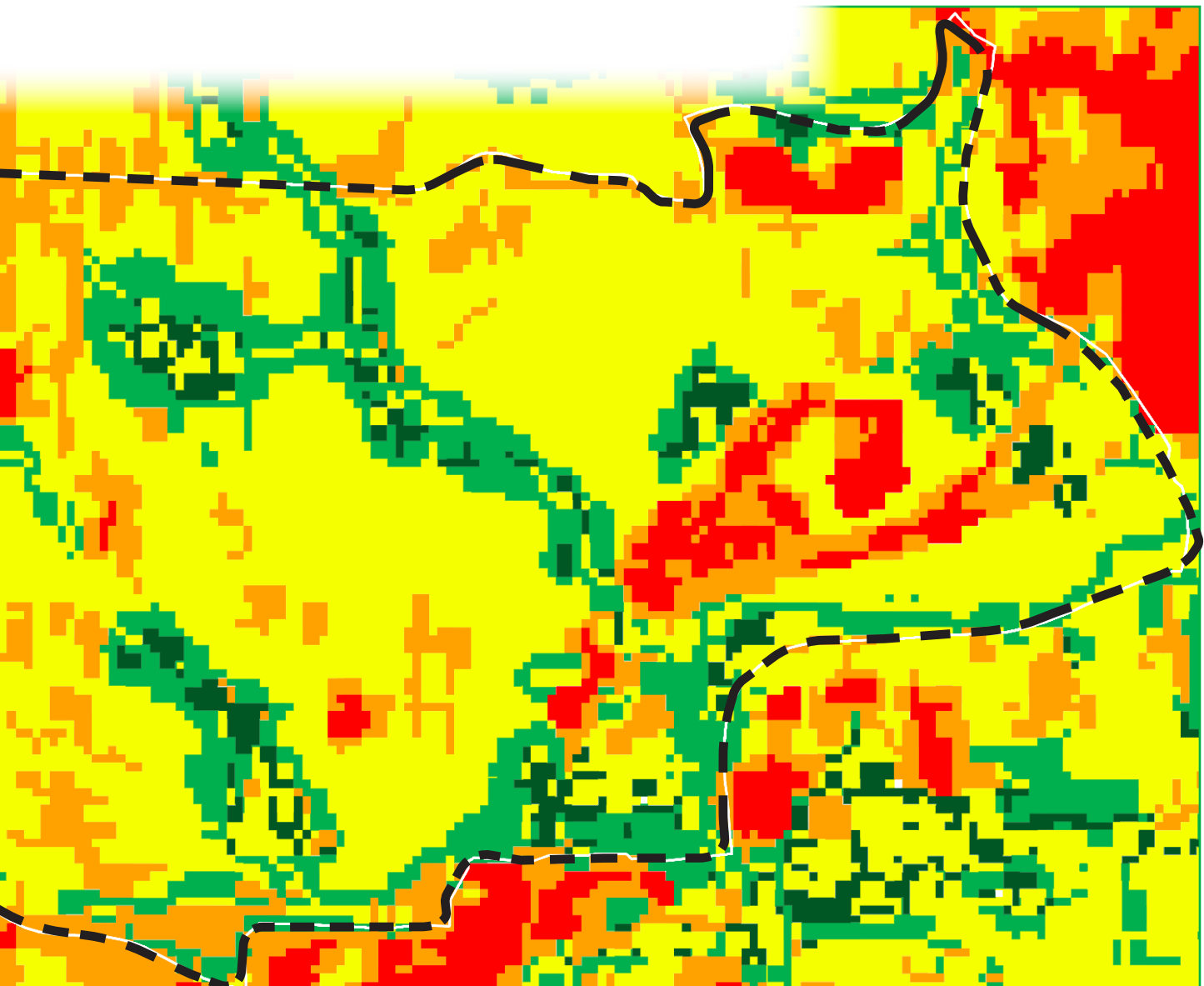
OM P M M M M P

understand habitat suitability in richness by overlaying land cover, spatial distribution, water features, proximity to wetlands, human settlement, forest edge, DQIRUHVWWUDQWLWRQUHD6KWDELOLWZDZDVVHVHVG with four types of wildlife: amphibians, reptiles, birds, DQPDPPDOV)LJXH ZDVDGDSWHGIURP866 overlaying the suitability of each wildlife type to identify areas that may have existing biodiversity or have the potential to increase biodiversity - hosting a diverse number of species. Areas of high suitability for wildlife habitat should be conserved as primary connections

Figure 4.6
Wildlife habitat suitability - adapted IURP866



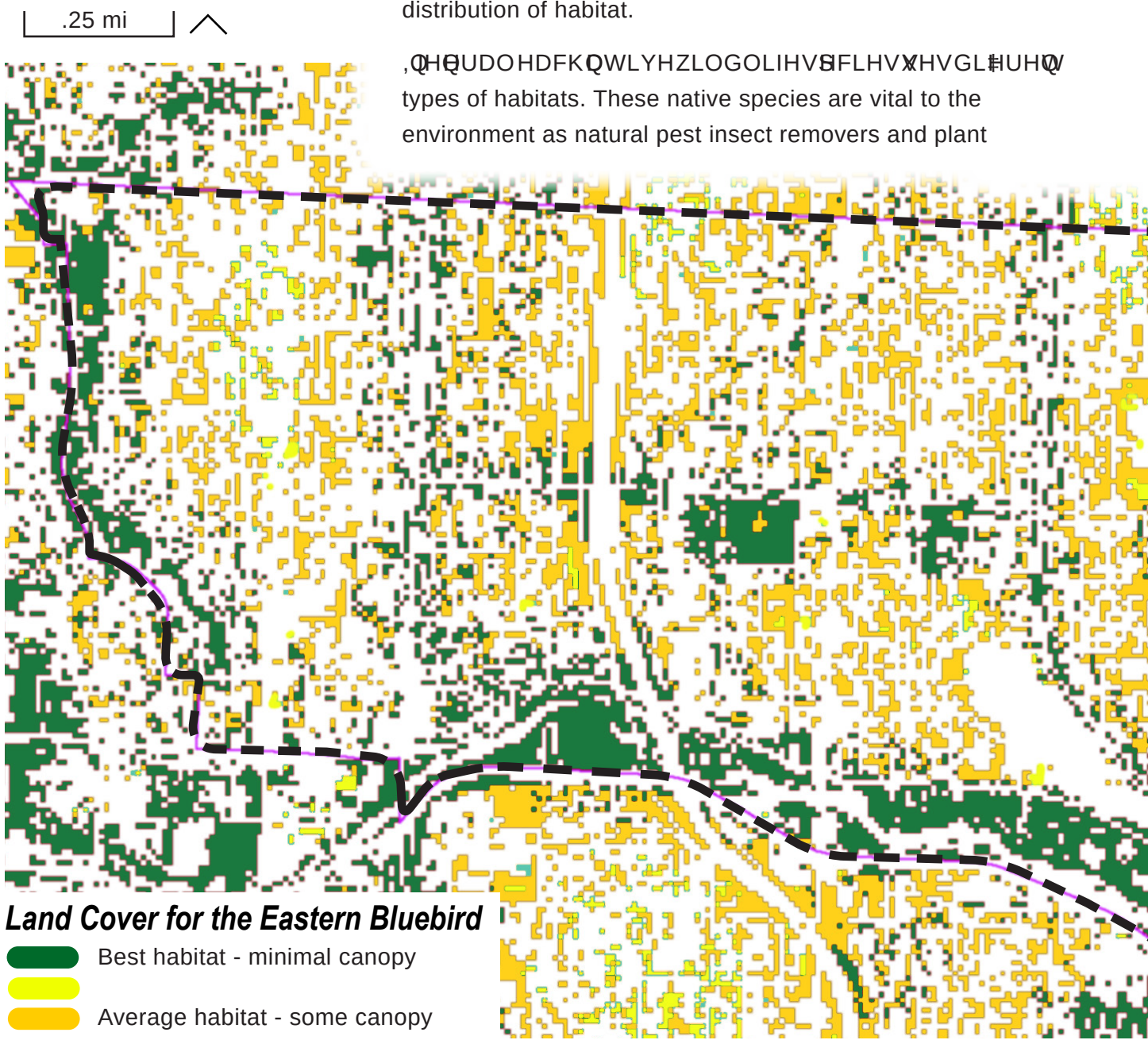
to more biodiverse creek and river networks. Areas of low suitability for wildlife habitat should focus on habitat patches that can link to more biodiverse areas. Understanding wildlife function is important in pursuing restoration for maximum wildlife attractiveness and be acknowledged that this map does not account for microclimates often created by buildings, valleys, and sharp grade changes.



Wildlife Habitat Suitability For Native Species

To better understand and assess wildlife functions for their suitability in the study area, habitats for two QWLYHVSBFLHVRI0LVVR0LWKH(DVWHU00XELUG6LDOLD sialis) and a pollinator, the yellow bumblebee (Bombus fervidus), were analyzed for spatial and habitat functions to understand ecological and social balances in engaging communities and improving wildlife habitat connectivity. The maps show land cover and the distribution of habitat.

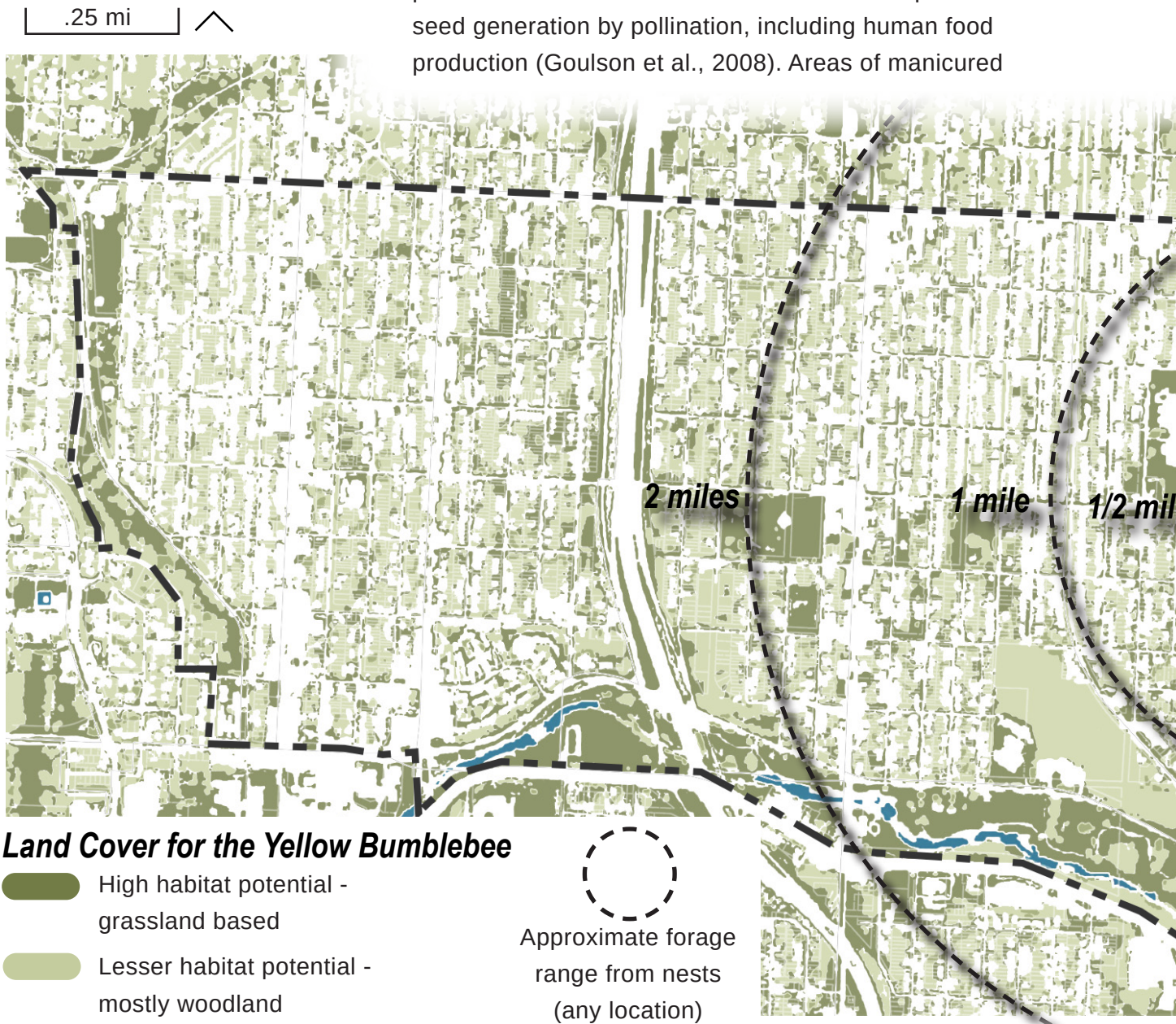
Figure 4.7
Forest restoration map adapted from MARC highlighting lack of canopy which is best suited for WKHQWLYH(DVWHU00XELUG6LD0 sialis), the Missouri state bird.



pollinators that sustain generations of plants, including crops. According to the Missouri Discovery Center, the Eastern Bluebird is rarely found in urban landscapes, establishing the importance of integrating suitable habitats. The bird prefers lightly shaded meadows and open spaces with shorter grass due to its perching and nesting behavior (Missouri Discovery Center, n.d.). They perch on stand-alone objects like poles and nest in preexisting hollows like birdhouses or vacant wildlife nests. An aerial mapping study by MARC, adapted in Figure 4.7, shows the density of forest on the site, adapted to show areas that would be suitable habitats for the bird species and areas that could be improved or restored to increase habitat connectivity.



The yellow bumblebee (*Bombus fervidus*) is a pollinator species of concern for conservation in Missouri. The species is in decline partly due to habitat fragmentation in human settlement. Increasing habitat optimal for bumble bee foraging and nesting within a half-mile radius increases the chances of the bees' survival and better seasonal management of plants WKDWSRYLGHKRDCHQWVVKDVFURS SRGKH medicines, air quality, and aesthetics. Their primary habitats are tallgrass and cropland, in which they pollinate and nest - vital for their survival and plant seed generation by pollination, including human food production (Goulson et al., 2008). Areas of manicured



grassland have a high potential to be restored into
 WDOOJUDVVKDELWDWLQO&LQWLYHZLOGRZHUV
 seen in Figure 4.8. A major food source for this bee is
 RZHULQDDQVDPQLWPDYLVLVWR RZHUV
 day, according to *NatureMapping*, *n.d.* Other habitats
 can include savanna and forested areas. The bees
 KDYHEHHQ&WR&DUOPLOHVVRPHRQZLWKLQ
 a half mile, from their nest to forage, but are likely to
 nest nearest their food sources to conserve energy
 and feed the colony (Osborne et al., 2008). They more
 commonly nest in soil but can be made from various
 items above the ground (Goulson et al., 2008).

Figure 4.8
 cover map adapted from MARC
 highlighting habitat for a native
 Missouri pollinator species, the
 yellow bumblebee (*Bombus fervidus*)
 with their approximate foraging range
 from nests.



Landforms For Biodiversity

Integrating native plants on steep and less usable slopes for social activity would build the integrity of the soil and improve habitat connections. Many properties in the study area have steep slopes near 50% grade, which limits most social activities; thus, native plants with a deeper root structure could hold VRLOLQWUDWHZDWHUGHHSULQWRWKHJURQDQ provide wildlife habitat (Figure 4.9). These slopes were often accompanied by stairways to the building fronts (Figure 4.10). Most of the existing public areas had manicured lawns on the steeper slopes.

Figure 4.9
Average slopes above 6% within the study area.

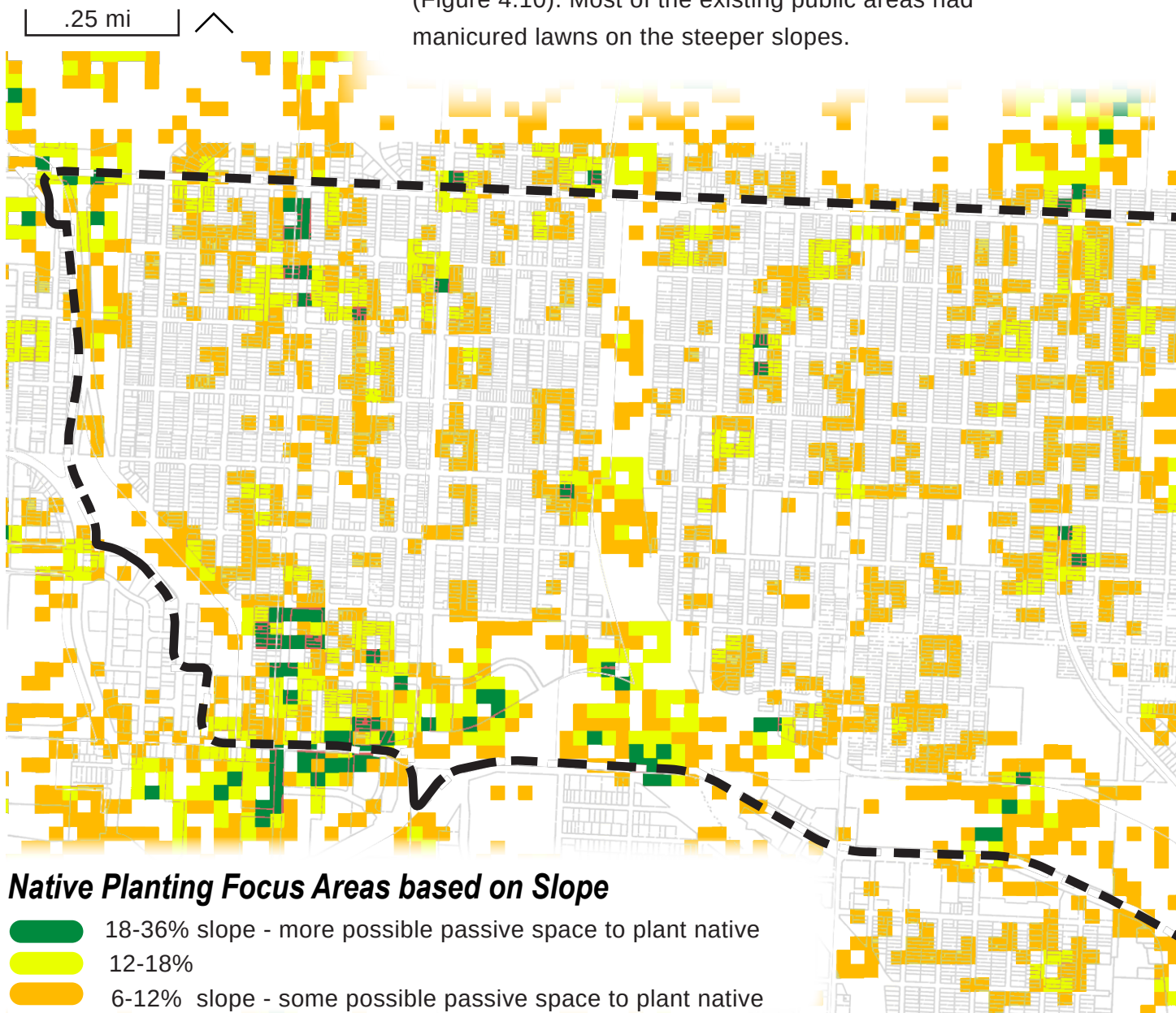




Figure 4.10
A common residential home microclimate in the study area with steep slopes on the edge of the lot. Many homes have retaining walls.

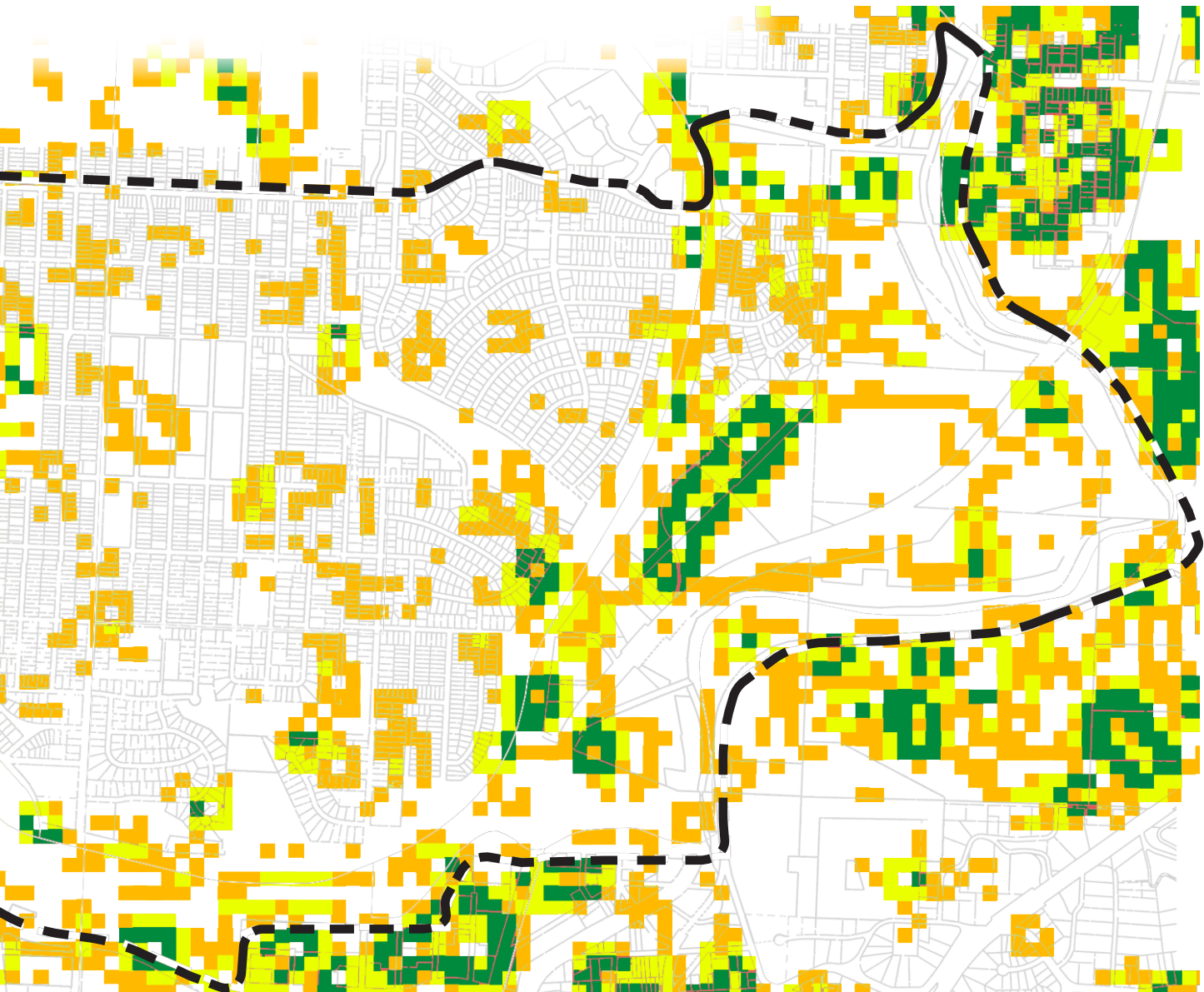




Figure 4.11
Map of select local nurseries,
urban farms, and environmental
HG&DWLRQODUHDVWWDWR#UQWLYH
plant or local produce.

Site Data Summary

LDDEZDZDLZNE

through strategically placed native habitat patches.

Large, naturalized areas, particularly water corridors, are important to preserve their existing biodiversity and increase opportunities to connect patches of green spaces. Privately owned and semi-public land, including vacant lots, are a major portion of the urban landscape outside the naturalized areas with great potential for contributing to a stronger habitat network. These land uses should be a primary focus in

UHVWRUDWLRQQFRQHUYDWLRQRUWVWRLQUHVDVHQWLYH

plants and improve habitat connectivity. There are

few local nurseries, urban farms, and environmental

HGKDWLRQHQUHUVLQKHVWSDUHDWKDWRHUUQWLYH

plants or local produce (Figure 4.11). The functions of

aerial and land-based wildlife should be considered

alongside social uses to obtain a social and ecological

balance. The following section discusses the social

analysis conducted to identify possibilities for

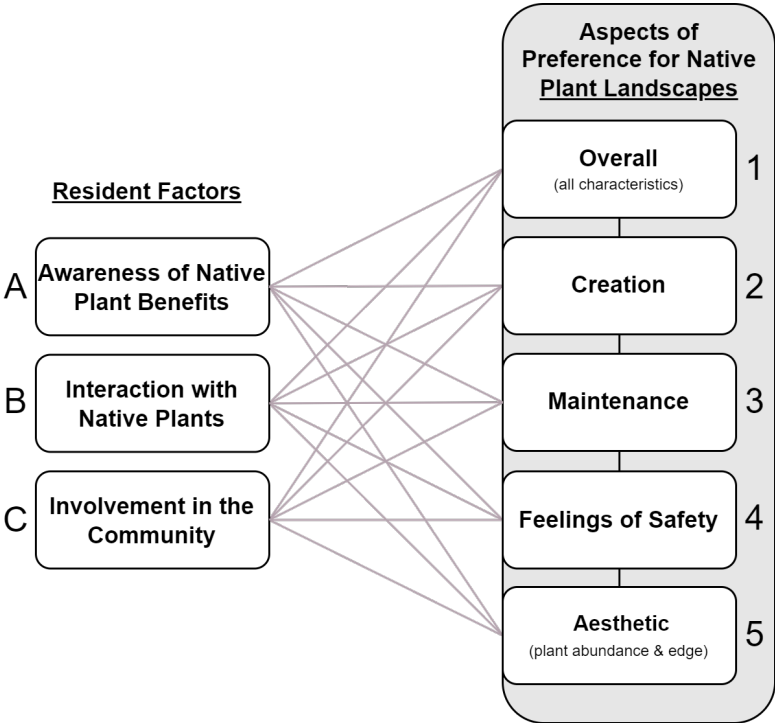
creating an ecological network through the lens of

neighborhood residents.

SOCIAL DATA ANALYSIS

This section shows the frequencies and correlations
RIWKHVXYHQLQWKURXKZULWWHQWDWHPHQV
DQLRJDULFVFIROORZHGEMRPDULHVRIQLQ
for each of the two sections. Figure 4.12 shows
the variables used in the analysis. It provides a
letter and numbering system to guide the reader
through what variables or correlations between
variables are being described in the written sections
below. The letters and numbers associated with a
variable are at the end of the paragraph headings.
Variables considered important for engaging
residents in native planting activities were checked
for correlations with variables of preference toward
native plants. The variables that did not have strong
correlations are mentioned but not visualized.
GGLLOOGGLVHHLOLHGEHHH
renters and owners to understand the potential role
RIRZQUVKLSQHVSQHVDVWOQLQVSFLF
to non-white residents were highlighted as they
represent the study area population the most.

Figure 4.12
The factors assessed in the
analysis individually and for their
correlations between them. They
are labeled with unique letters
and numbers for readability.
Left (A, B, and C)– variables
that could be associated with
peoples' preferences. Right
(1 to 5)– variables of peoples'
preference toward native
SDQLQ6HH\$BQL[(
for the comprehensive list of
correlations.



Discovered Frequencies

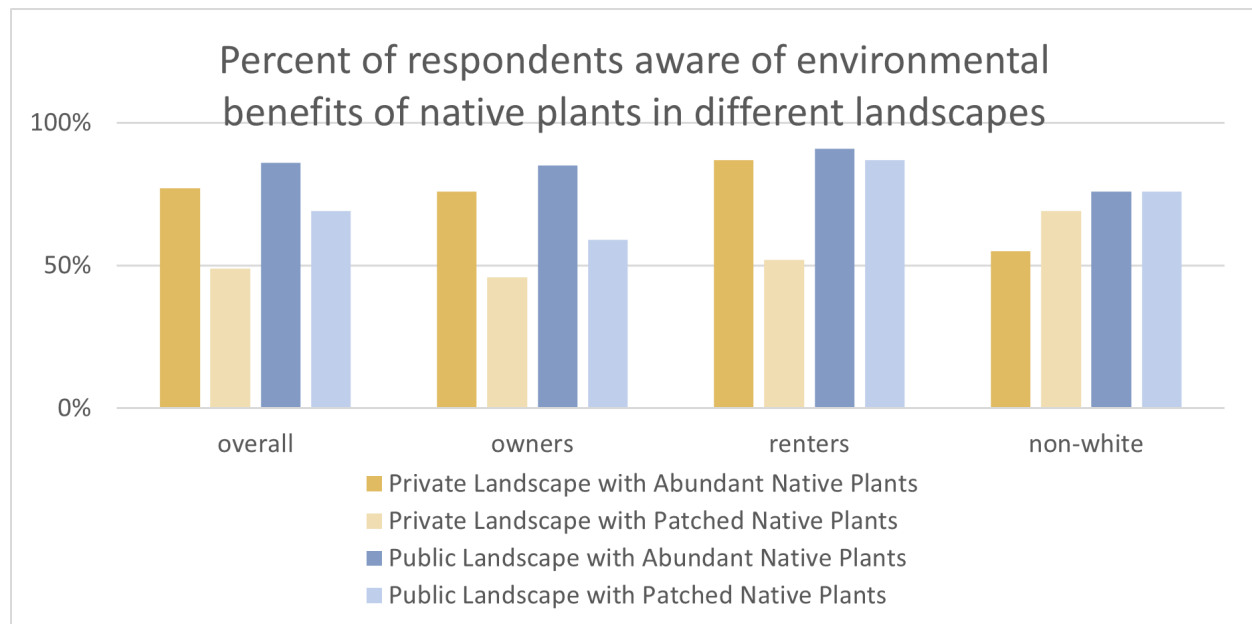
Awareness of Environmental Benefits (A)

Awareness of environmental benefits is critical

because the literature shows that awareness could impact preference over time (Gobster et al., 2020; Nassauer, 2011). If landscapes with native plants are preferred by urban residents, according to the literature, they may be more likely to engage in native planting activities. Thus, over time, native plants could be integrated into urban landscapes, and wildlife habitat could be increased.

Figure 4.13 shows how aware survey respondents and renters' responses, owners were more aware of the value of abundant, large populations of native plants than patchy areas. Comparing the overall and non-white responses, the non-white respondents showed less awareness of the value of abundant native plants than patches of native plants.

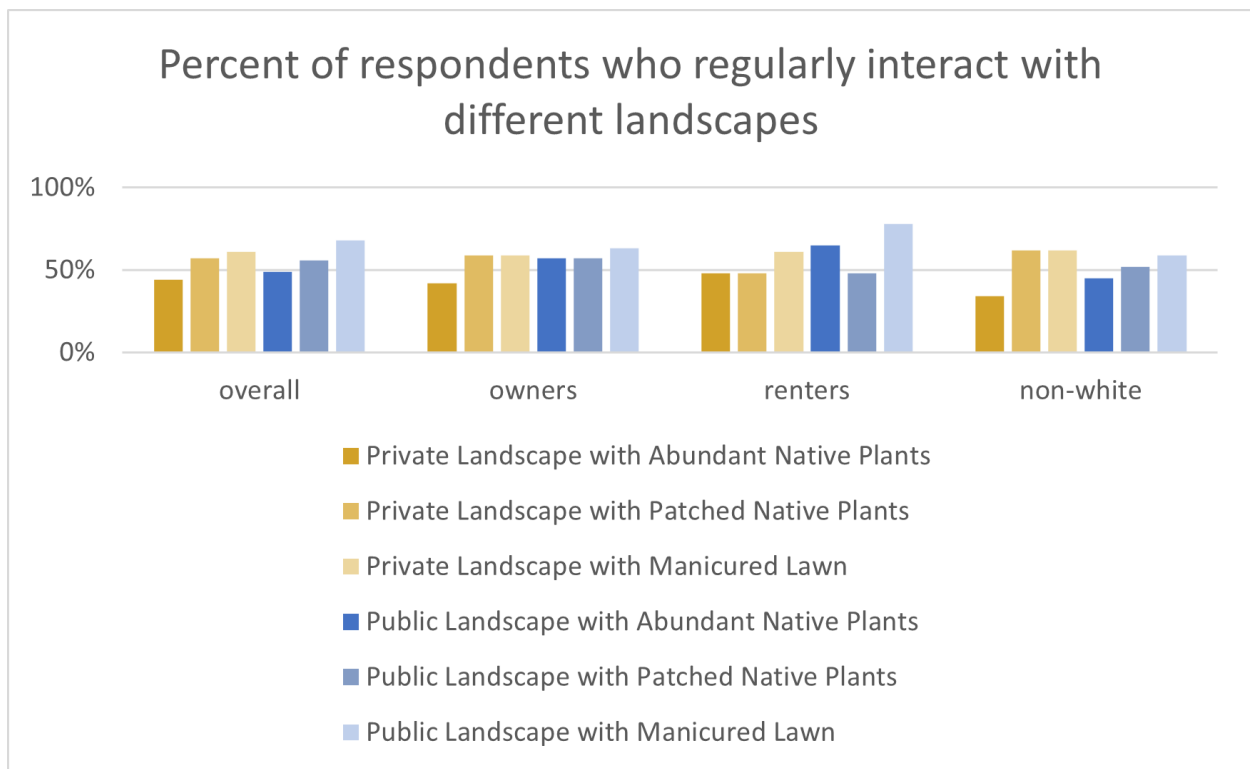
Figure 4.13
The percentage of survey respondents who
landscapes with native plants, two private
and two public, and each with varying levels
of native plants. The chart shows that
respondents who live in landscapes with
abundant native plants are more aware of
the value of native plants than those who
live in landscapes with patchy native plants.
The chart also shows that respondents who
are non-white are less aware of the value of
native plants than those who are white.



Interaction with Native Plants (B)

Overall, about half of respondents regularly interacted with a landscape. However, respondents did not regularly interact with large masses of native plants in the private landscape, where non-white respondents were the least of these. Rather, respondents, particularly renters, most regularly interacted with landscapes with manicured lawns.

Figure 4.14
The percentage of how regular respondents interacted with native plants and manicured lawns in the public and private landscape.

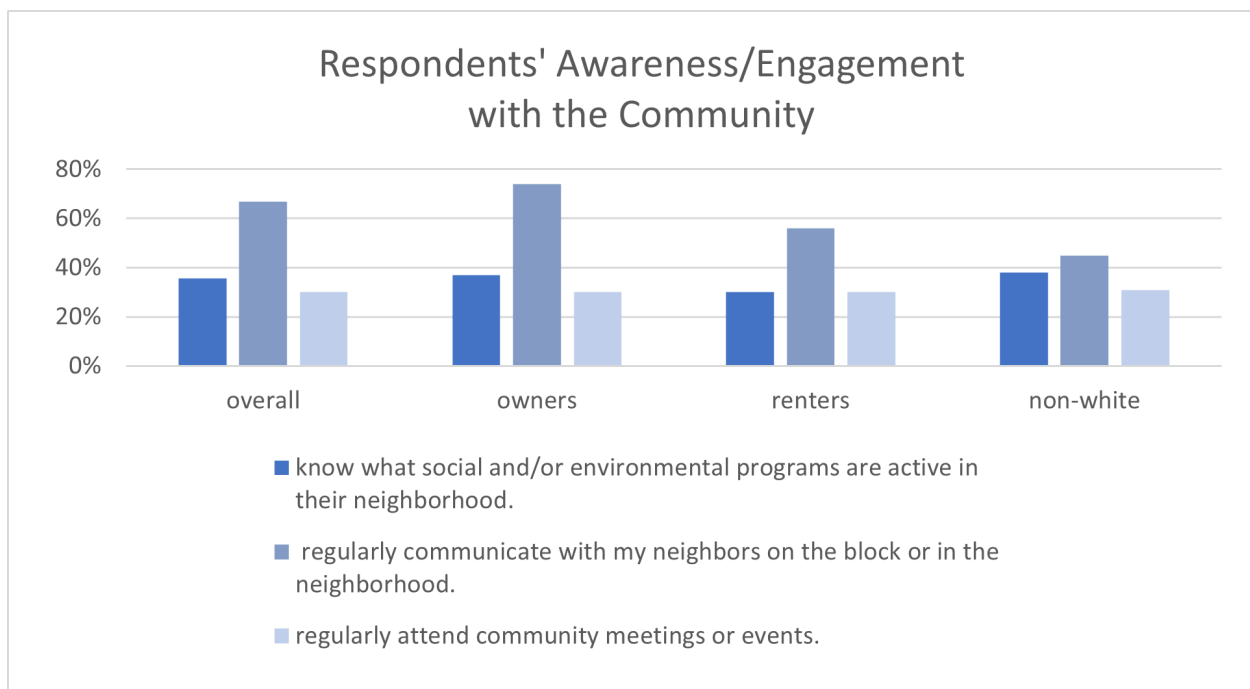


Involvement in the Community (C)

he following section describes the significant frequencies of the ten survey questions used to assess participants on community involvement. Overall, respondents saw the value in participating in community educational activities to improve the environment and restore the landscape.

The following information shows respondents' awareness of the community and their engagement with the community (Figure 4.15). Less than half of the respondents knew about social and environmental programs active in their neighborhoods. Nearly one-third of respondents regularly communicate with their neighbors, while the non-white sample communicated nearly half the time. Owners more regularly communicated with their neighbors than renters. Less than one-third of respondents regularly attend community events.

Figure 4.15
The percentage of respondents who were aware of a component of the community and engaged with the community.



Findings also show respondents' awareness of leadership and systems of power and their interest in engagement with them (Figure 4.16). Less than half of the respondents knew their JRYHUQHQRFLDOVDQORFDORUJDDQDWLRQZHOO. Less than one-third of respondents, including nearly half of the non-white sample, knew their

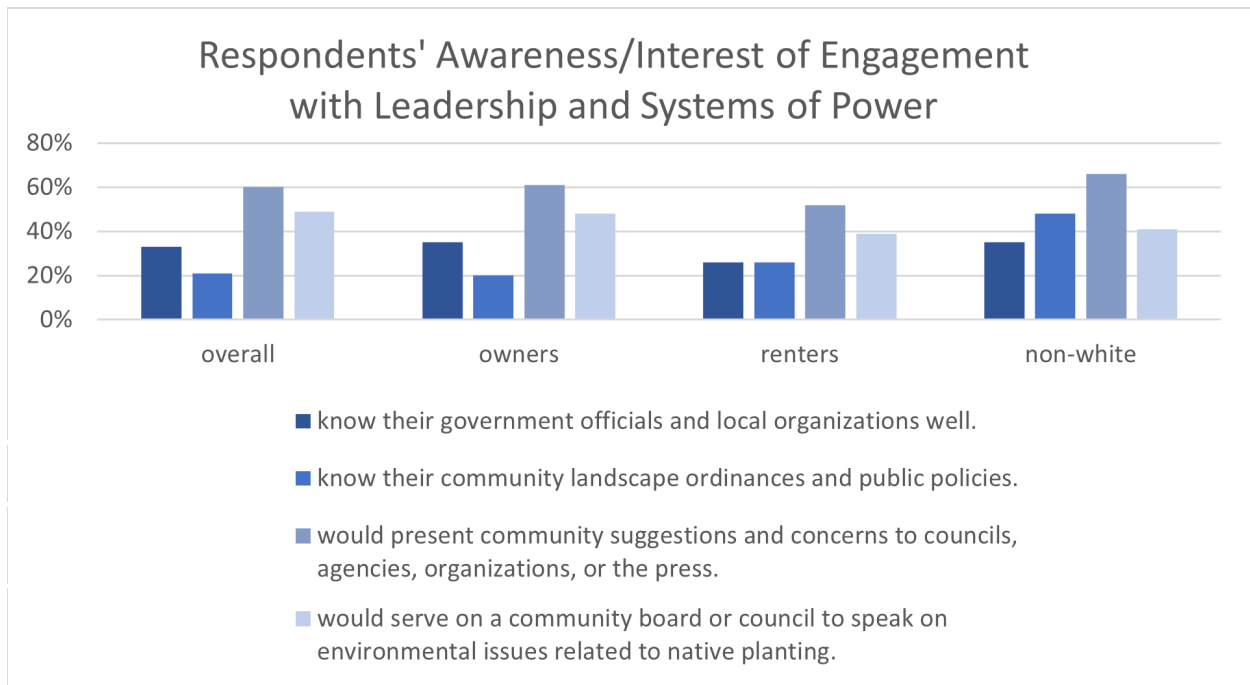


Figure 4.16
The percentage of respondents who were aware of leadership and systems of power in their community and their interest of engagement with them.

neighborhoods' landscape ordinances and public policies. Less than half of the respondents would serve on a community board or council to speak on environmental issues related to native plants.

Regarding respondents' awareness of native plant sources, owners knew where to get native plants for personal use more than renters (Figure 4.17). Comparing overall and non-white responses, only one-third of non-white respondents knew where to get native plants. Renters would not participate in community educational events as much as owners. Overall, a majority of respondents showed interest in engaging with environmental interventions.

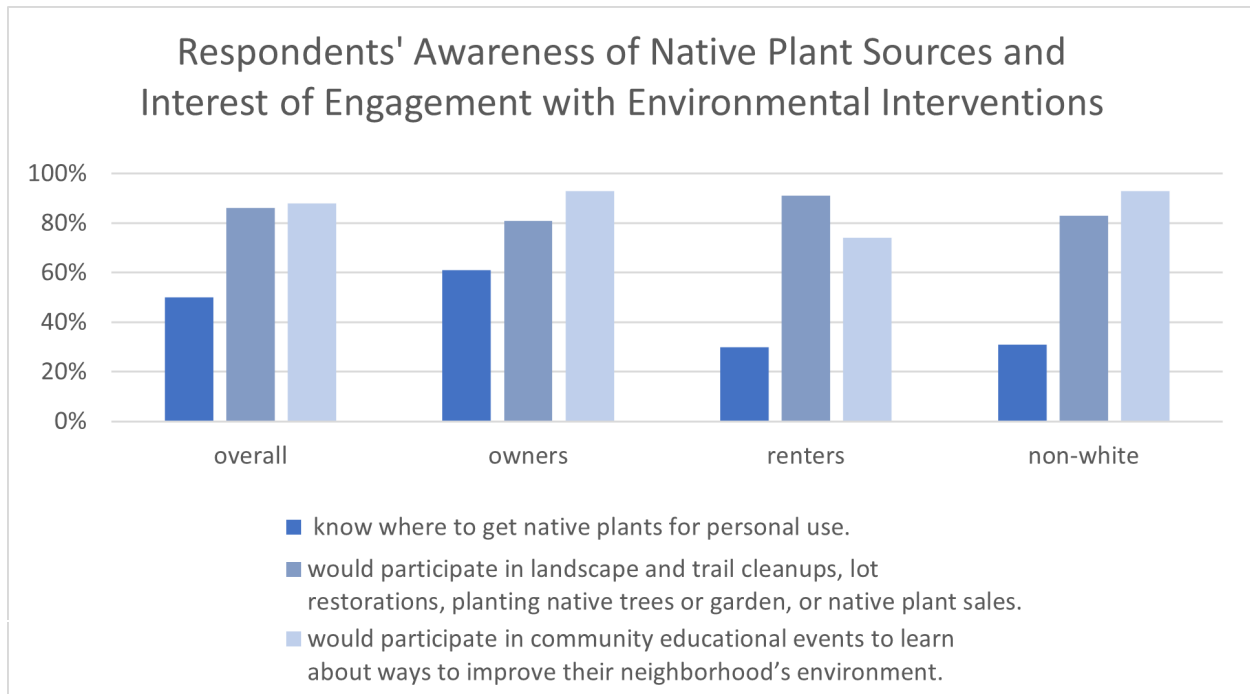


Figure 4.17
The percentage of respondents who were aware of native plant sources and interested in engaging with environmental interventions.

Overall Preference of a Landscape (1)

The following sections describe the frequencies of variables associated with preferences toward native

SDQV7KHJVVWYDULDEOHFRQLGHUHGUVBQHQV11

overall preferences. Over two-thirds of respondents preferred abundant native plants in the public

ODQVFD85HV8QHQVKDGO LWWOHGL#UHQHLQ

preference between private landscapes that are abundant and patched with native plants. Two-thirds of renters preferred landscapes with native

SDQV1RQKLWHUHV8QHQVKDGO LWWOHGL#UHQH

in preference between private landscapes abundant with native plants and those with manicured lawns. Additionally, non-white respondents preferred private landscapes with patches of native plants over other landscapes. And lastly, non-white

UHV8QHQVDOVRKDGO LWWOHGL#UHQHLQSHIHUHQH

WRZDUG8OLFODQVFD8V6HH)LJXH IRUWKH

frequencies described above.

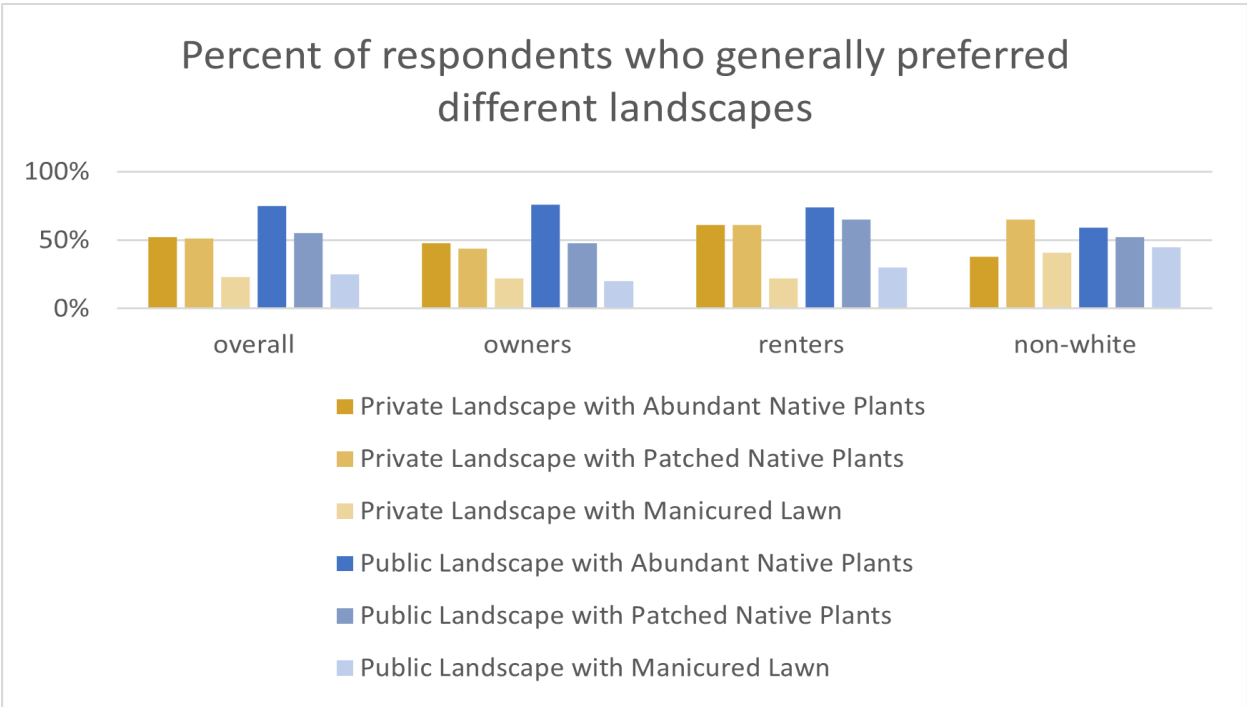
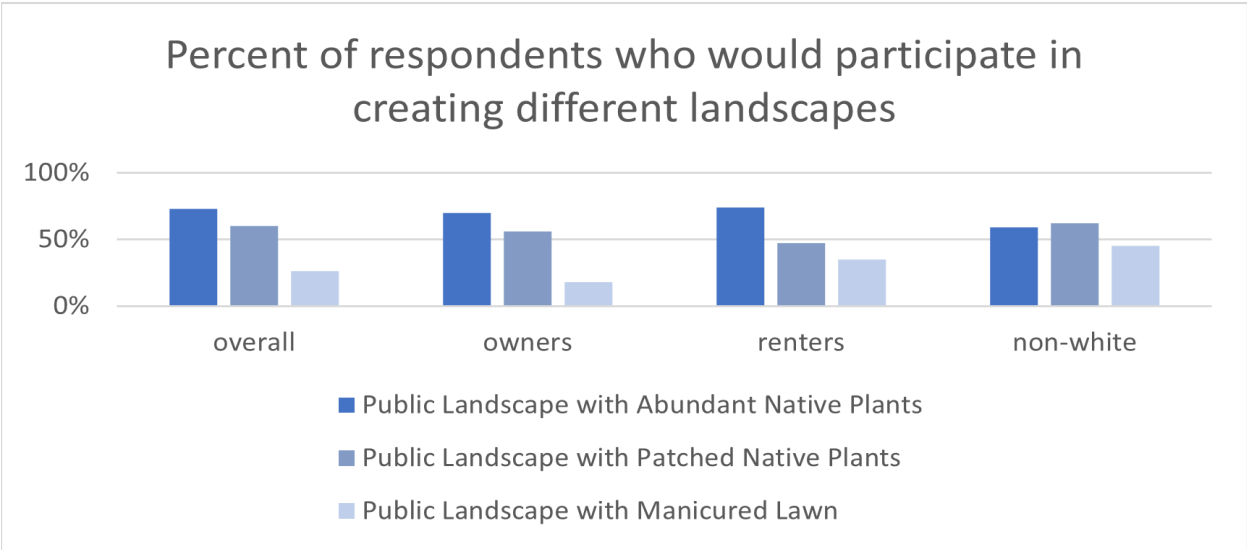


Figure 4.18
The percentage of respondent's overall preference toward public and private landscapes with varying levels of native plants. The chart shows that overall, respondents preferred public landscapes with abundant native plants (75%) over private landscapes with abundant native plants (50%).

Willingness to Create Landscapes (2)

The frequencies in Figure 4.19 show non-white respondents would participate in public activities to create landscapes with native plants nearly as much as they would landscapes with manicured lawns. On the other hand, the overall sample was more willing to participate in public processes to create landscapes with native plants than landscapes with manicured lawns.

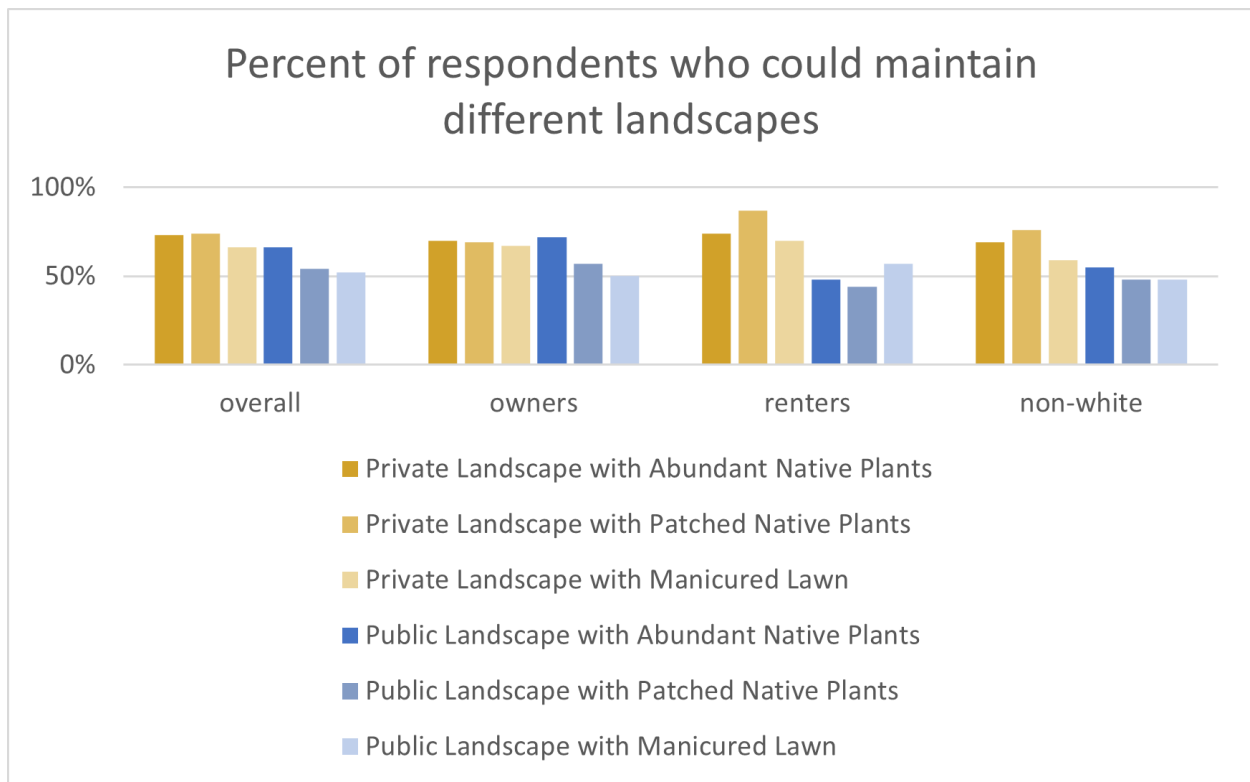
Figure 4.19
The percentage of respondents who would participate in creating public landscapes with varying levels of native plants and manicured lawns. The chart shows that overall, respondents were more willing to participate in creating public landscapes with abundant native plants (75%) than with manicured lawns (25%).



Ability to Maintain Landscapes (3)

About two-thirds of respondents reported that they could maintain private landscapes with native plants. Landscapes may include spaces between their single-family homes or adjacent vacant lots in situations where there are long-term renters. Respondents showed they could maintain landscapes with native plants more than manicured lawns (Figure 4.20).

Figure 4.20
The percentage of respondents who could maintain public and private landscapes with varying levels of native plants and manicured lawns.



Willingness to Encourage Others to Maintain the Landscape (3)

Overall, respondents were more willing to encourage others to maintain public landscapes with native plants than private landscapes with native plants. Non-white respondents would be willing to encourage others to maintain landscapes with native plants, similarly to the overall sample, but were more willing to encourage others to maintain landscapes with manicured lawns.

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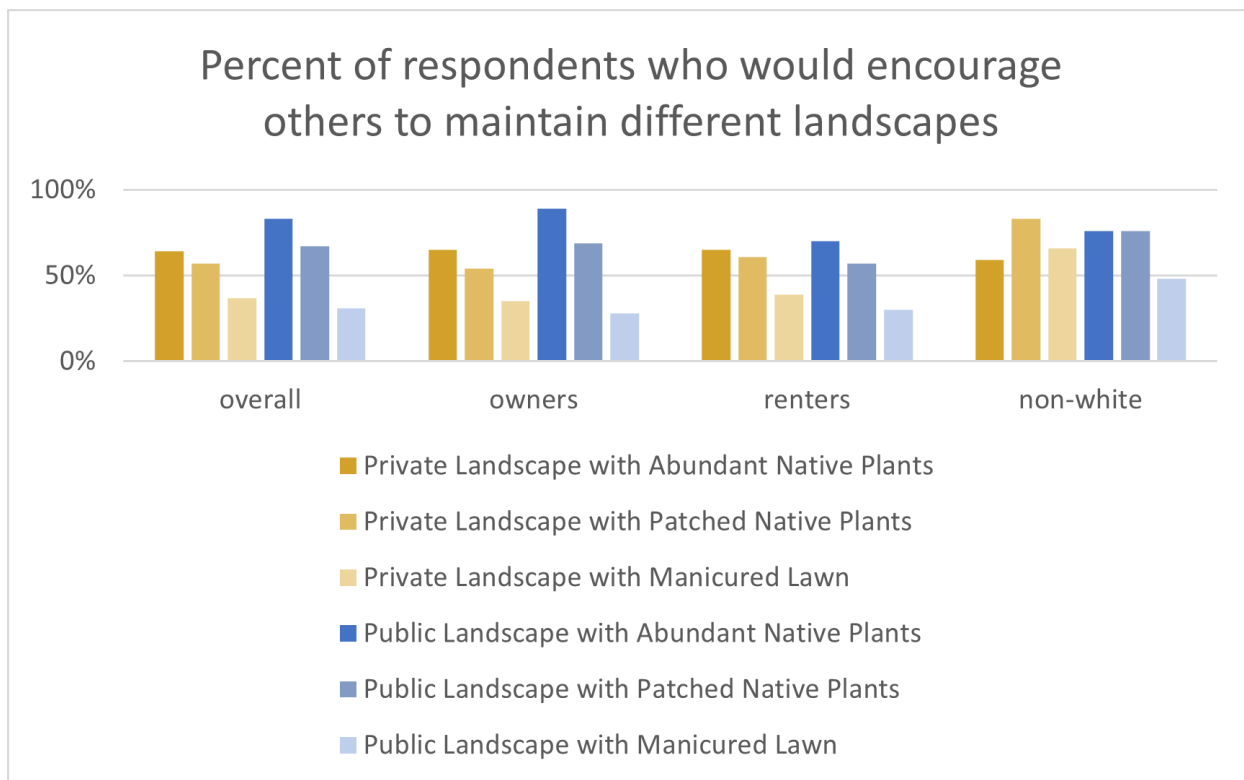


Figure 4.21
The percentage of respondents who would encourage others to maintain public and private landscapes with varying levels of native plants and

Feelings of Safety near a Landscape (4)

Generally, there were no significant differences in safety concerns for respondents across the different landscapes. However, non-white respondents and renters did not strongly feel safer near one landscape over another. Of all the landscapes presented, non-white respondents felt safest near private landscapes with patches of native plants.

This means that the edges and sightlines depicted in the survey images were clear enough for respondents to believe they would feel safe near landscapes with native plants, similar to how they would feel near a landscape with a manicured lawn. Particularly, respondents would feel safe between private landscapes and right-of-way abundant with native plants with no clear edge except the street,

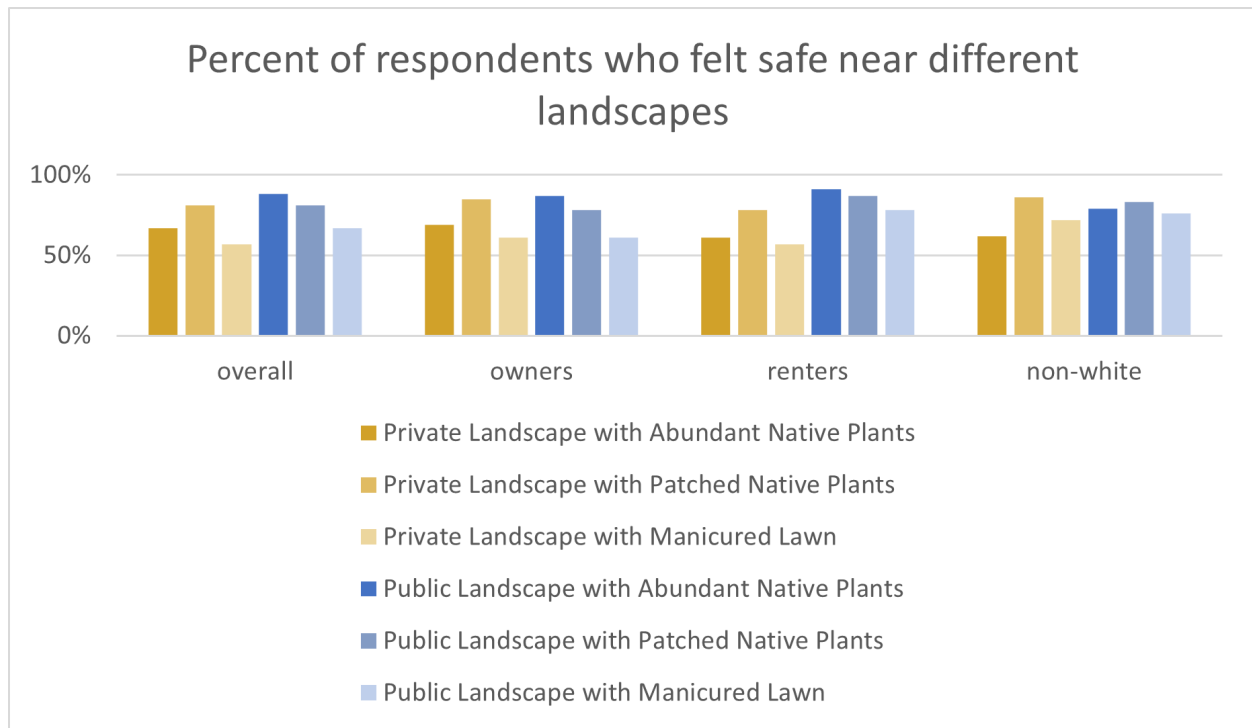


Figure 4.22
The percentage of respondents who felt safe near public and private landscapes with varying levels of native plants and manicured lawns.

driveways, and sidewalk, and clear visuals to the nearby home fronts. Respondents would also feel safe in a public landscape abundant with native plants and a mowed edge along pathways and clear

Aesthetic Preference of a Landscape (abundance of plants & edge treatment) (5)

Renters more strongly preferred public landscapes with manicured lawns than owners. Other than that, preferences were similar between owners and renters. Non-white respondents preferred the aesthetic of public landscapes with native plants, but their preference was not much stronger than

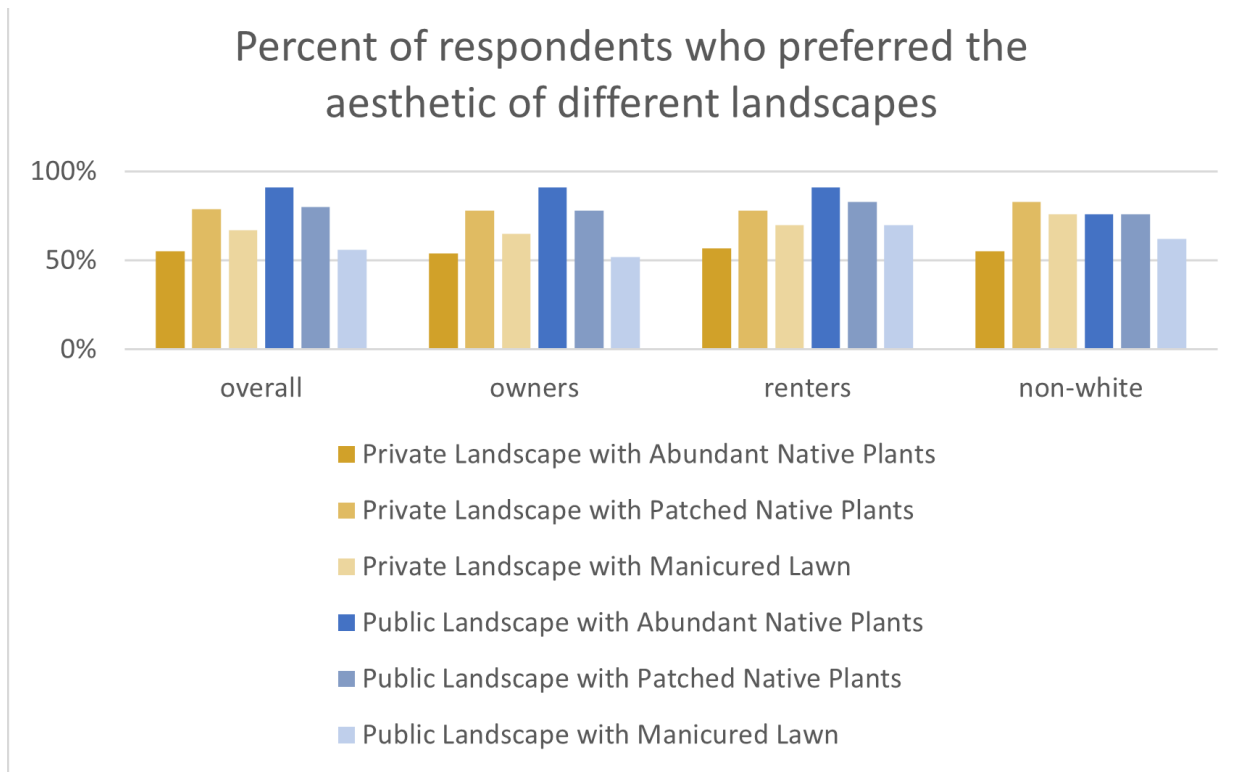


Figure 4.23
The percentage of respondents who preferred the aesthetic of public and private landscapes with varying levels of native plants and manicured lawns.

Respondents' Limitations to Planting Native Plants

Limiting respondents' ability or desire to plant native plants in their private space if they have it.

First, over half of respondents would plant native plants in their private space if they knew more about them. Second, over half of respondents would plant native plants in their private space if they knew what to do. Third, over half of renters would plant native plants in their private space if they knew the cost and had the money. Lastly, nearly three-quarters of non-white respondents would plant native plants in their private space if they knew the cost and had the money.

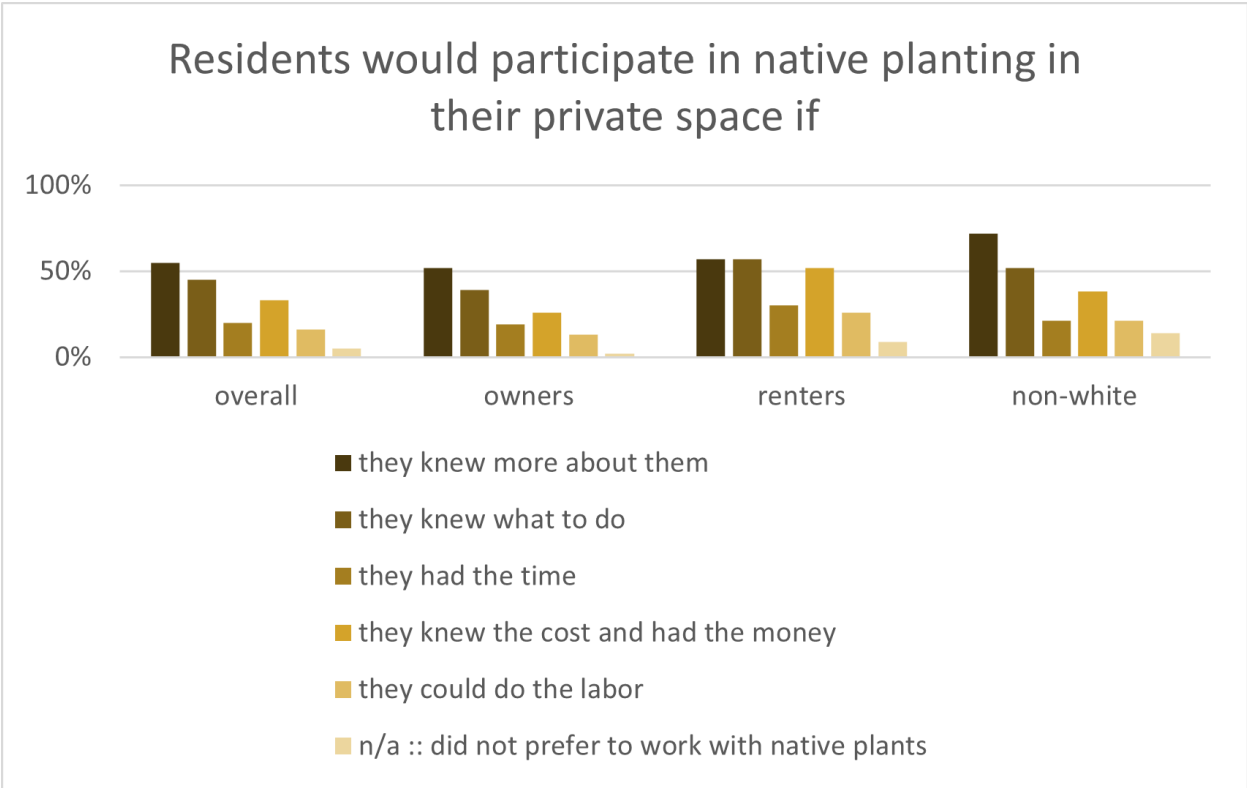


Figure 4.24
The percentage of respondents who would participate in native planting in their private space if the variables were true for them

Discovered Correlations

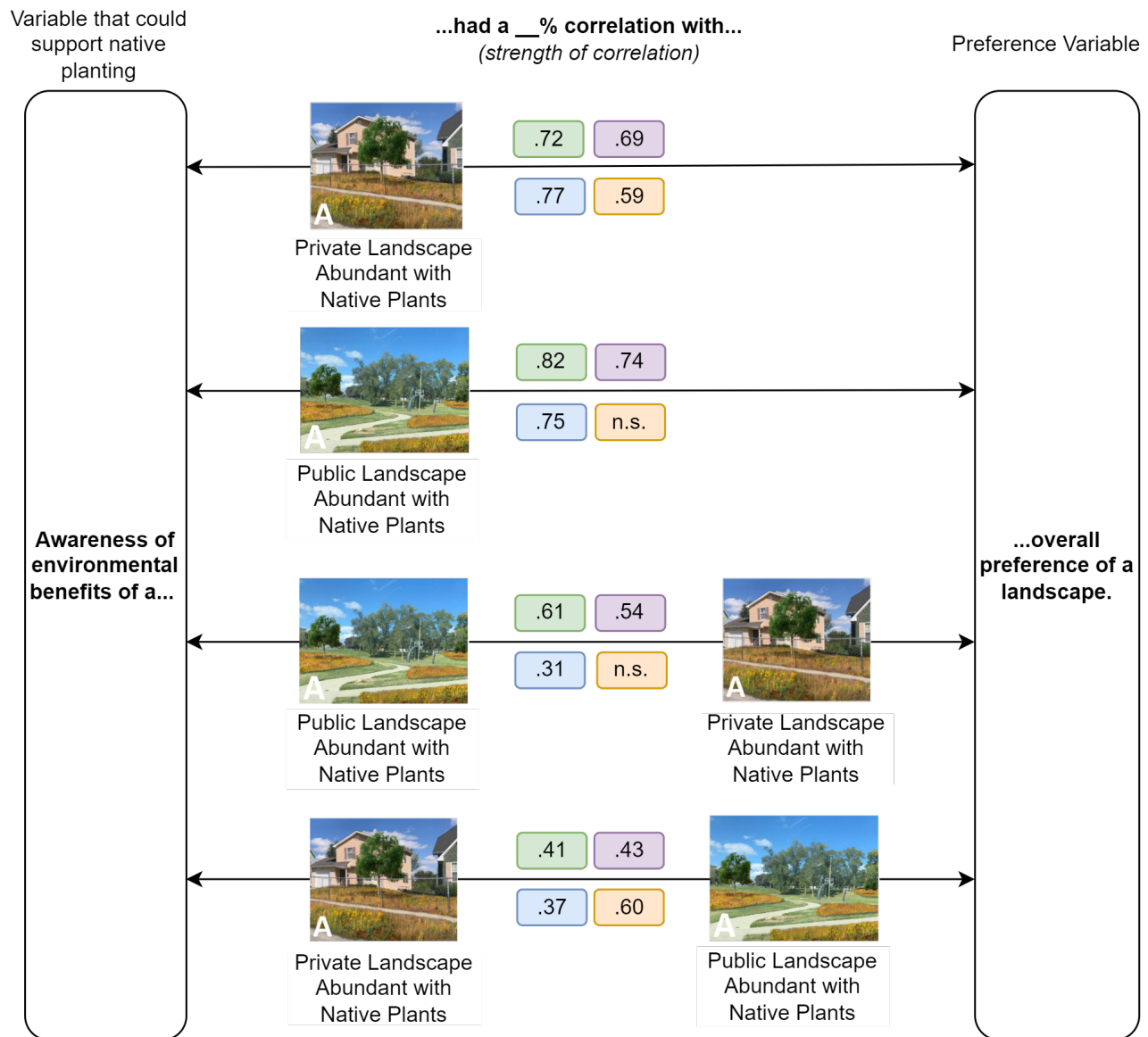
The results of Pearson Correlation analyses between multiple aspects of preferences for native plants and three variables, awareness of activities, and interaction with native plants, are discussed in this section. A comprehensive list of VWDWLWLFDOOVLJQEDQFRUUHODWLRQLVYLVDOLJHGL Appendix E.

Awareness of environmental benefits (A) correlated with preferences toward native plant landscapes.

UHHRHYLURPHWEHHWVWHWHGRU
FRUUHWRRLWUHSRGHWSUHHUHFHWRG
HWHUHRUWWRULHHYLURPHWUHH

could be a way to engage residents in native SDQLQDFWLYLWLHVWRLPSRYHHQLURQHDOEHQV DQZLOGOLHKDELWDW7KHUHVHDUFKQLQVVKRZ that awareness of a landscape's environmental EHQV\$VWURQFRUUHODWHVZLWKDSHHUHQH IRUWKHVDPHODQVFDS7KHQLQVVKRZHG that owners' responses had the weakest correlation between their awareness of the environmental EHQVVRIDSPLYDWHODQVFDSIDEXDQLZLWKQWLYH plants and their preference for the same landscape (.59, p-value <0.05). Additionally, owners' responses showed little correlation between their awareness RIWKHHQLURQHDOEHQVVRIDSOLFODQVFDS abundant with native plants and their preference for the same landscape.

5HVSGHQVDZDUHQVVRIHQLURQHDOEHQV (A) had a weak to moderate correlation with their preference between public and private landscapes abundant with native plants (1) (Figure 4.25). For example, owners' awareness of the environmental EHQVVRISOLFODQVFDSVDEXDQLZLWKQWLYH plants showed little correlation between their



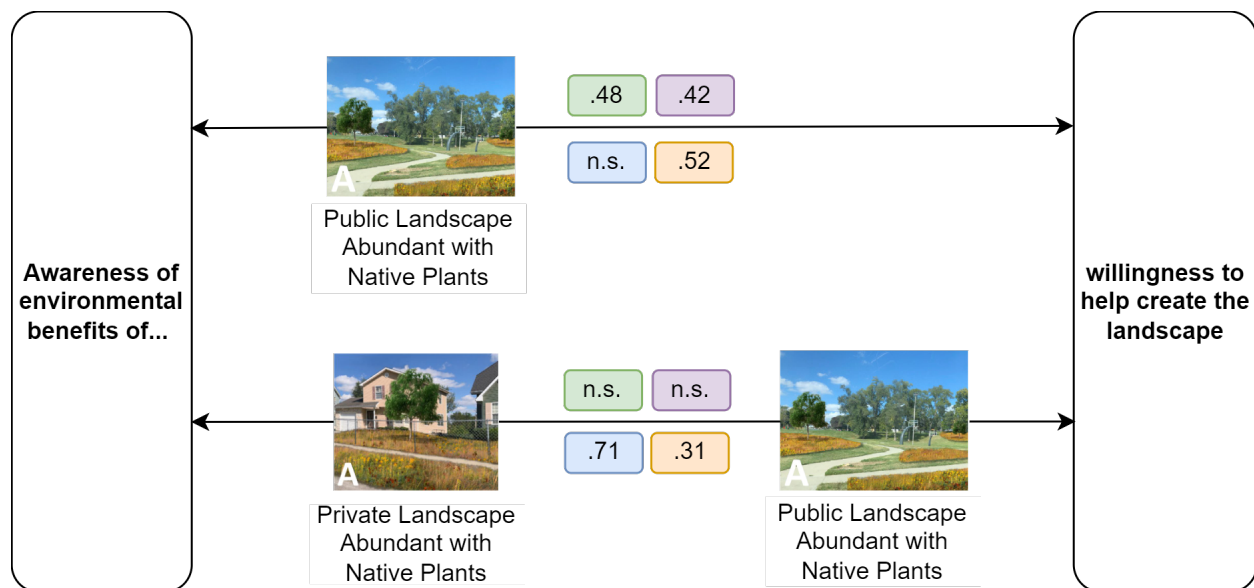
preference for private landscapes abundant with native plants. Non-white (.41, p-value <0.05) and renter (.37, p-value <0.05) respondents' awareness of a landscape abundant with native plants had a weak correlation with their preference for public landscapes with a lot of native plants.

Key:

- Non-White Sample Correlation
- All Sample Correlation
- Renter Sample Correlation
- Owner Sample Correlation
- n.s. Not Statistically Significant

landscapes with native plants (2) (Figure 4.26). These

Figure 4.25
Correlations between respondent's awareness of a landscape and their overall preference toward a landscape.



Key:

- Non-White Sample Correlation
- All Sample Correlation
- Renter Sample Correlation
- Owner Sample Correlation
- n.s. Not Statistically Significantly

Figure 4.26
Correlations between respondent's awareness of a landscape and their overall preference toward a willingness to help create public landscapes.

had little correlation with their willingness to help create public landscapes with native plants. Renters showed little correlation between their awareness of a landscape and their willingness to help create the landscape. Non-white respondents showed little correlation between their awareness of a landscape and their willingness to help build public landscapes abundant with native plants. Essentially, correlations were low between variables of private landscapes, and there was little correlation between private and public landscape variables.

Third, respondents' awareness of environmental benefits of public landscapes and their willingness to encourage others to maintain landscapes (3; Figure 4.27). There was little correlation between people's awareness of the environmental benefits of public landscapes and their willingness to encourage others to maintain landscapes (3; Figure 4.27).

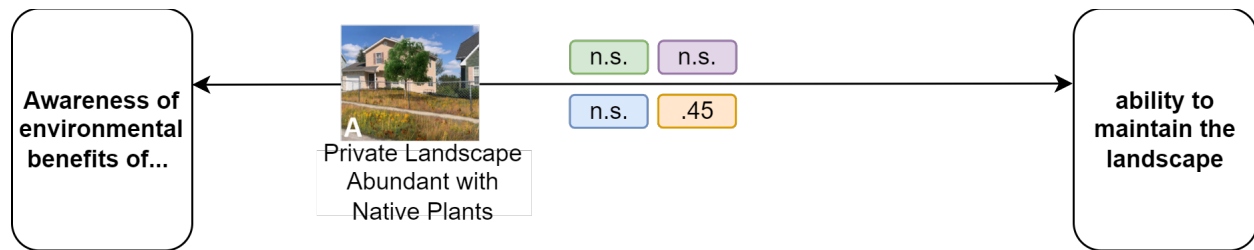


Figure 4.27
Correlations between
respondent's awareness of
landscape and their ability to
maintain a landscape.

maintain the landscapes. Renters and non-whites showed little correlation between their awareness of private landscape abundant with native plants and their ability to maintain the same landscape.

(A) correlated with their willingness to encourage others to maintain the landscape (3; Figure 4.28). Between people's awareness of the environmental benefits of private landscape abundant with native plants and their willingness to encourage others to maintain the landscapes. Overall, correlations were strong between respondents' awareness of the environmental benefits of private landscape abundant with native plants and their willingness to encourage others to maintain the same landscape (.69, p-value <0.05). Contrarily, renters and non-white respondents showed little correlation between their awareness of private landscape abundant with native plants and their willingness to encourage others to maintain the same landscape. Again, correlations were low between variables of private landscapes, and there was little to no correlation between private and public landscape variables. Additionally, renters and non-white respondents showed little correlation between their awareness of private landscape abundant with native plants and their willingness to encourage others to maintain private landscapes abundant with native plants. Lastly,

Key:

- Non-White Sample Correlation
- All Sample Correlation
- Renter Sample Correlation
- Owner Sample Correlation
- n.s. Not Statistically Significantly

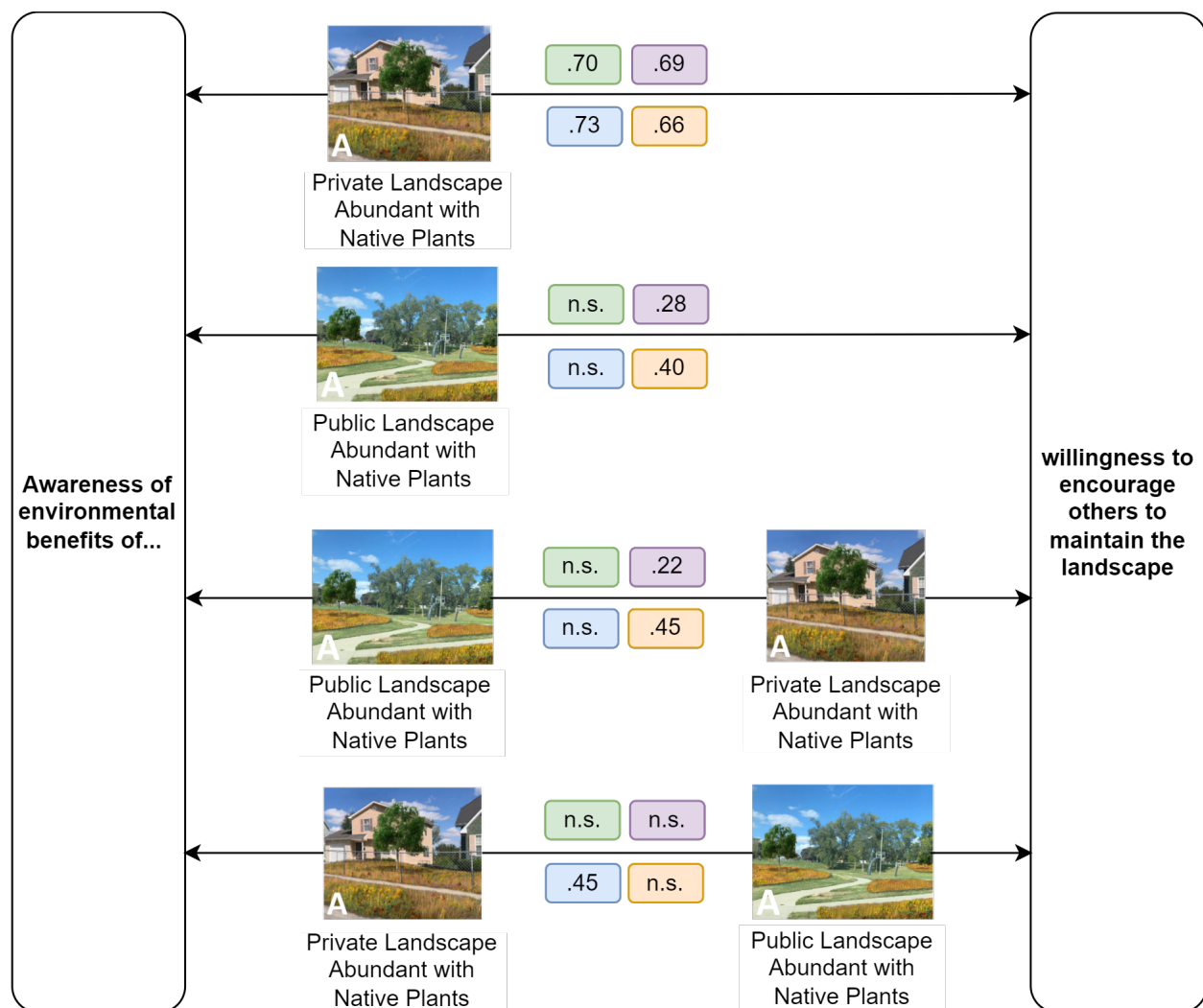


Figure 4.28
Correlations between respondent's awareness of landscape and their willingness to encourage others to maintain a landscape.

non-white owners showed little correlation between private landscape abundant with native plants and their willingness to encourage others to maintain public landscapes abundant with native plants. These correlations show that educating people on native plants to increase awareness could result in a stronger preference to create and maintain native landscapes in public or private spaces.

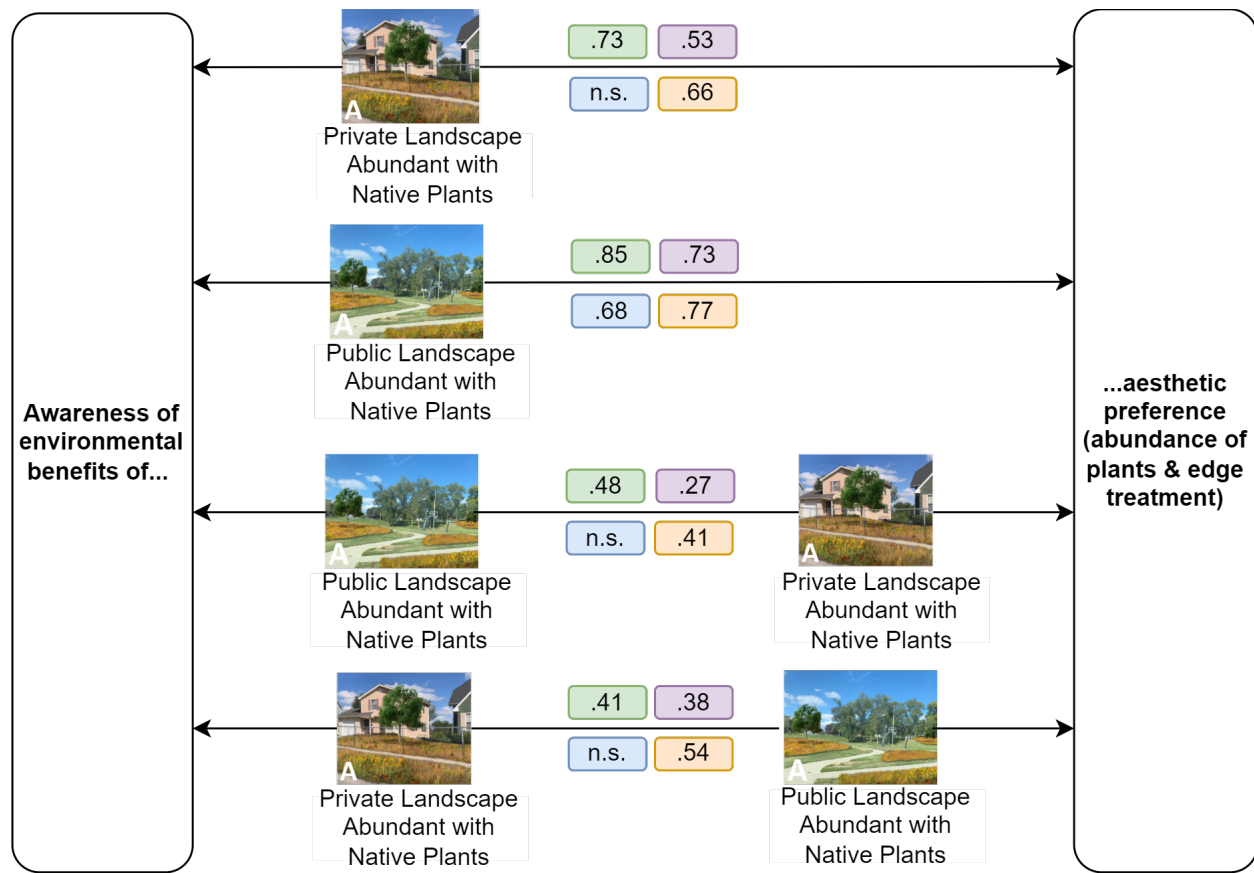
Fourth, respondents' awareness of environmental landscape safety (4) (Figure 4.29). Overall,



Figure 4.29
Correlations between
respondent's awareness of
landscape and their feelings of
safety near a landscape.

of a landscape with native plants strongly correlated with their feelings of safety near the same landscape. First, owners showed stronger correlations between their awareness of HQLURQH/DOEHQWVDQWKHLUIHHOLQVRIVDIHW near the private landscape with native plants (.85, \$DOM 6HFRQUHQWUVDQQLWH respondents showed stronger correlations to public landscapes with native plants (.85 and .82, p-value <0.05). Lastly, renters aware of the environmental EHQWVRIDSLYDWHODQVFDSDQDQZLWKQWLYH plants had a moderate correlation with their feelings of safety near a public landscape abundant with native plants (.50, p-value <0.05).

Fifth, respondents' awareness of environmental EHQWV\$FRUUHODWHGZLWKWKHLUDHVWKHWLF preference for a landscape (5) (Figure 4.30). Overall, correlations were strong between their DZDUHQVVRIHQQLURQH/DOEHQWVDQWKHLU



Key:

- Non-White Sample Correlation
- All Sample Correlation
- Renter Sample Correlation
- Owner Sample Correlation
- n.s. Not Statistically Significantly

Figure 4.30
Correlations between respondent's awareness of landscape and their aesthetic preference toward the abundance of plants and how the planting area edges are maintained.

aesthetic preference for the same landscape.

However, renters showed little correlation between private landscape abundant with native plants and their aesthetic preference for the same landscape. Additionally, renters showed little correlation between their awareness of the environmental plants and their aesthetic preference for a private landscape abundant with native plants, and vice versa.

Regular interaction with native landscapes (B) correlated with preferences toward native plant landscapes.

Respondents' degree of interaction with native plant landscapes (B) was explored for correlations with several aspects of preferences (variables 1, 2, 3, 4,

existed. One correlation was with the overall preference for a landscape (1) (Figure 4.31). However, non-white residents' regular interaction with private landscapes with native plants showed little correlation with their overall preference for that landscape.

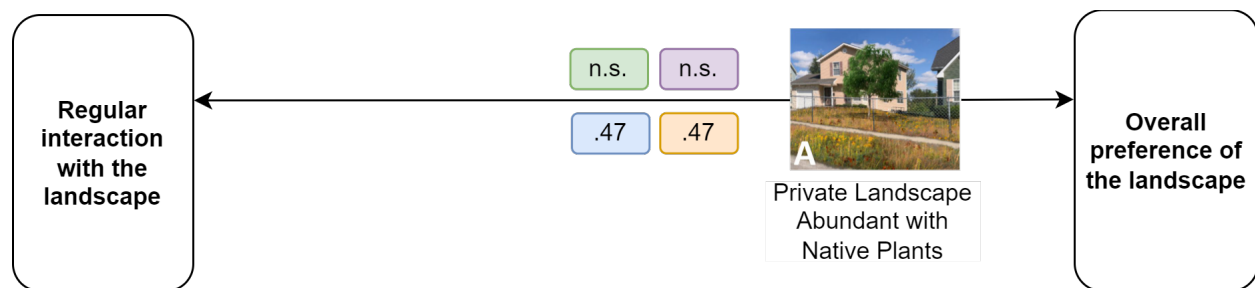


Figure 4.31
Correlations between respondent's interaction with a landscape and their overall preference toward a landscape.

Another variable of preference explored for correlation was the maintenance preference for landscapes (3; Figure 4.32). Non-white respondents' and renters' responses showed little correlation between regularly interacting with a private landscape with native plants (B) and their ability to maintain that landscape (3). Non-white respondents, renters, and owners showed little correlation between regularly interacting with a public landscape with native plants (B) and their ability to help maintain that landscape (3). Additionally, correlations with residents' willingness to encourage others to maintain WKHODQVFD8 ZHUHVWDWLWVLFDOOVLJQEDQ However, non-white respondents and renters showed little correlation between regularly interacting with a private or a public landscape with native plants (B) and their willingness to encourage others to maintain that landscape (3).



Key:

- Non-White Sample Correlation
- All Sample Correlation
- Renter Sample Correlation
- Owner Sample Correlation
- n.s. Not Statistically Significantly

Figure 4.32
Correlations between respondent's interaction with a landscape and their ability to maintain a landscape and their willingness to encourage others to maintain a landscape.

Lastly, there were correlations with respondents' aesthetic preference (abundance of plants and landscape edge treatment) of a landscape (5; Figure 4.33). However, non-white respondents and UHQUHUVVKRZHGQVLJQEDQWFRUUHODWLRQCHWZHHQ regularly interacting with a private landscape with native plants (B) and their aesthetic preference for WKDWODQVFD\$ 6HH\$BQL[(IRUWKHGDWD tables.

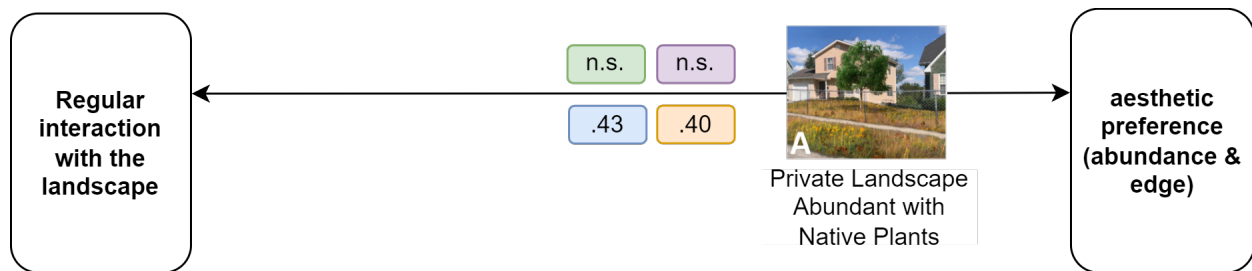


Figure 4.33
Correlations between respondent's interaction with a landscape and their aesthetic preference toward the abundance of plants and how the planting area edges are maintained.

Involvement in community activities (C) correlated with preferences toward native plant landscapes.

The following paragraphs discuss the relevant correlations between respondents' involvement in the community (C) and their preferences toward native plant landscapes (variables 1,2,3,4 and 5). First, respondents' willingness to participate in restoration activities (C) correlated with their overall preference for a landscape (1; Figure 4.34). Owners who would participate in restoration activities preferred private landscapes with native plants (.42, p-value <0.05). At the same time, non-white respondents and renters showed little correlation between their willingness to participate in restoration activities and their preference for a private landscape with native plants.

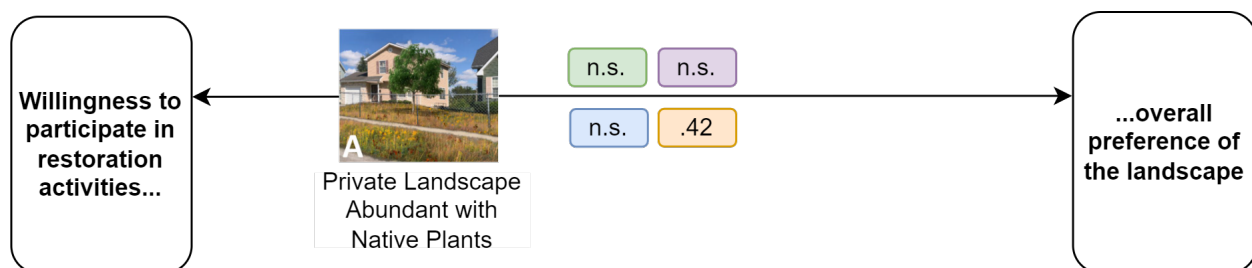


Figure 4.34
Correlations between respondent's willingness to participate in restoration activities and their overall preference for a landscape.

community (C) variable correlated with the residents' willingness to create landscapes (2; Figure 4.35). Residents who would participate in environmental education were also willing to help create a public landscape with native plants (.40, p-value <0.05).

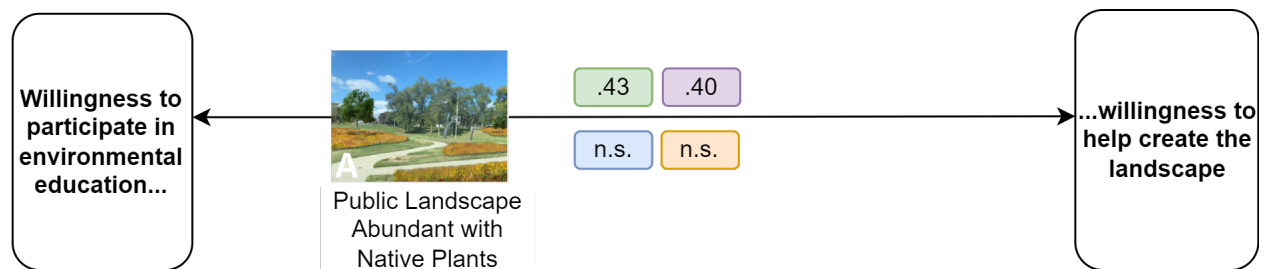
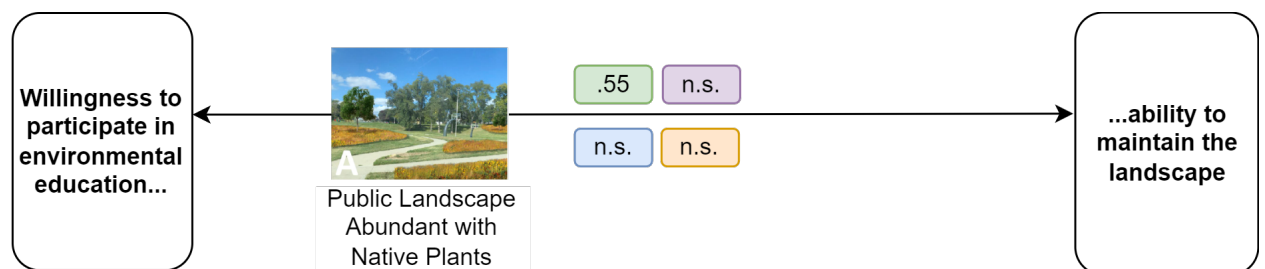


Figure 4.35
Correlations between respondent's willingness to participate in environmental education and their willingness to help create public landscapes.

Third, components of the involvement in the community (C) variable correlated with residents' ability to maintain a landscape (3; Figure 4.36). Residents, except non-white, showed little correlation between their willingness to participate in environmental education (C) and their ability to help maintain a public landscape abundant with native plants (1) (non-white, .55, p-value <0.05).



Key:

- Non-White Sample Correlation
- All Sample Correlation
- Renter Sample Correlation
- Owner Sample Correlation
- n.s. Not Statistically Significantly

Figure 4.36
Correlations between respondent's willingness to participate in environmental education and their ability to maintain a landscape.

Fourth, respondents' involvement in the community (C) variable correlated with their feelings of safety near a landscape (4; Figure 4.37). Respondents, except non-white, showed little correlation between their willingness to participate in environmental education and their feelings of safety near the public landscape abundant with native plants. Non-white residents who would participate in environmental education also felt safe near a public landscape with native plants. Correlations were only found between YDULDEOHVRI&OLFODQVFD&V6HH\$&SQL[(for the data tables.

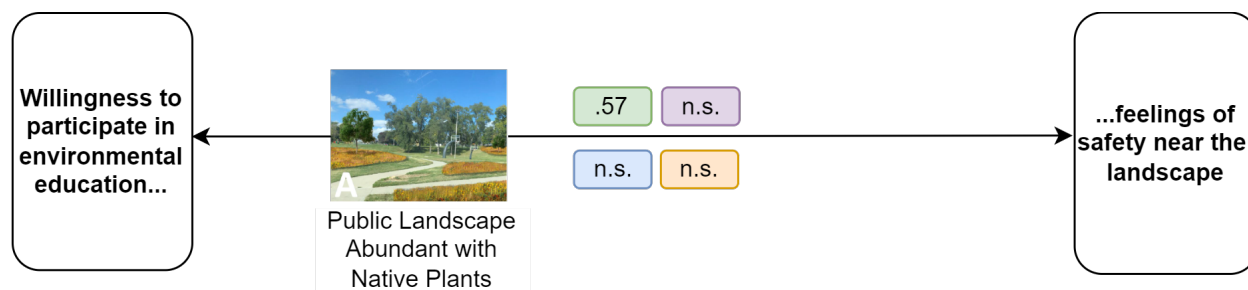


Figure 4.37
Correlations between respondent's willingness to participate in environmental education and their feelings of safety near the landscape.

Summary of Analysis and Interpretation

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PO M P PO
correlations.

Summary of frequencies

Respondents, particularly owners, saw the value of landscapes with many native plants but not patches of native plants. Mainly, non-white respondents were willing to create public landscapes with native plants, and overall, respondents would encourage others to maintain these landscapes. However, respondents could maintain landscapes with native plants more than manicured lawns, particularly in private landscapes. In contrast, respondents, particularly renters, also shared a willingness to maintain manicured lawns and more often interacted with manicured lawns.

Overall, respondents saw the value of participating in community educational activities to improve the environment and restore the landscape, but only a small portion of respondents were actively involved. However, non-white respondents and renters did not strongly feel safer near one landscape over another. Owners and renters had similar aesthetic preferences, but renters more strongly preferred public landscapes with manicured lawns. Lastly, non-white

respondents did not have a preference on whether public landscapes had native plants, patches, or manicured lawns.

These frequencies reveal six interpretations. First, owners see the value of landscapes with many native plants but not landscapes with patches of native plants. Second, owners see the value of community participation in creating public landscapes with proper maintenance by others but do not particularly see the value of native plants over manicured lawns in public landscapes. Although, respondents believe native plants would be easier to maintain in private landscapes. Third, renters see the value of landscape maintenance, particularly with manicured lawns. Fourth, renters are more exposed to landscapes with manicured lawns than native plants. Fifth, respondents generally see the value of participating in community educational activities to improve the environment and restore the landscape but are not actively involved. Lastly, renters and owners have similar aesthetic preferences, but renters and non-white residents do not see the value of public landscapes with native plants over manicured lawns.

Summary of correlations

First, respondents' awareness of the landscape with their preference toward that landscape, but not so much with landscape with native plants. This awareness did not correlate with residents' willingness to create such landscapes. Nor did respondents' ability to maintain landscapes, especially for renters and non-white residents and landscapes with native plants.

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landscape and their willingness to encourage

others to maintain landscapes were two-fold.

Respondents' awareness of environmental

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for private landscapes with many native plants.

In contrast, renters' and non-white residents'

responses correlated weakly with their preference

for both private and public landscapes with

native plants. Additionally, correlations were

weak for owners and non-white residents

between their awareness of the environmental

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many native plants. Generally, correlations

were similar between respondents' awareness

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toward native plants in public and private

landscapes.

Lastly, respondents who were aware of the

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native plants strongly correlated with their

feelings of safety near the same landscapes,

especially for owners with private landscapes

and for renters and non-white respondents with

public landscapes. This was also true with the

respondents' aesthetic preference for the same

landscape, except for renters and landscapes with

many native plants.

Findings showed that respondents' participation

in restoration activities correlated with their

ownership of private landscapes with many

native plants. Respondents' participation in

environmental education correlated with their

willingness to help create public landscapes with

native plants. Correlations also existed between

non-white respondents' feelings of safety and

ability to maintain public landscapes with native plants and their feelings of safety near public landscapes with native plants.

Non-white respondents who regularly interacted with private landscapes with native plants showed little correlation with their overall preference for that landscape. They and renters also showed little correlation between their ability to maintain that landscape, their willingness to encourage others to maintain it, and their aesthetic preference. Additionally, non-white residents, renters, and owners who regularly interacted with a public landscape with native plants showed little correlation with their ability to help maintain that public landscape. This was also true for non-white residents and renters and their willingness to encourage others to help maintain that landscape.

7KHVHFRUUHODWLRQHUHYHDOYHLQHUHSHWDWLRQ
First, respondents' awareness of the
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impact their preference for that landscape but
not their willingness to create or maintain it. It
shows that respondents are not strongly aware
RIWKHHQLURQHDOEHQWVRIDODQVFD\$ZLWK
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plants as more of a private landscape initiative.
Correlations show that respondents could be more
comfortable with native plants in their landscapes
if the landscape is well-maintained and they are
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RIWKHHQLURQHDOEHQWVRIDODQVFD\$VFRG
also lead respondents to encourage others to
maintain the landscapes, particularly with owners
but not with renters and non-white respondents.
Renters and non-white respondents may feel
they do not have the autonomy to engage with
the landscape. This autonomy or encouragement

to maintain landscapes could be a neighbor taking the initiative to beautify or help maintain someone's landscape. The correlations also mean that respondents, particularly owners and non-white respondents, may not be aware of the value of having many native plants in a landscape.

Third, improving people's awareness of the plants could improve residents' feelings of safety near those landscapes. This is particularly the case for owners and their feelings of safety near private landscapes with native plants and for renters and non-white respondents' feelings of safety near public landscapes with native plants.

Fourth, respondents' participation in restoration activities could improve owners' willingness to plant native plants in their private landscapes. Further, environmental education could improve respondents' desire to help create public landscapes with native plants. It could also improve non-white respondents' feelings of safety and their ability to maintain public landscapes with native plants. Lastly, those who interact with landscapes that have native plants reveal the following. Respondents, particularly renters and non-white respondents, may not understand the value of landscapes with native plants and, therefore, are not positively impacted by interacting with such landscapes. Each of these interpretations guides the formation of the planning and design strategies in the following chapter.

Chapter 5

Planning & Design
Goals, Strategies,
and Possible Actions

PLANNING & DESIGN GOALS, STRATEGIES, AND POSSIBLE ACTIONS

O R P M MP P M

and possible actions for landscape architects and planners to include in their design processes with urban residential communities to increase residential areas' biodiversity, wildlife habitat, and environmental EHQV7KHDFWLRQDUHLQHQHGWREHIDFLOLWDWHGE\ landscape architects and planners, but supported by national, regional, or local partners or the community for longer-term engagement and support (Table 5.1 and Appendix G).

The goals, strategies, and possible actions consider three aspects. One, they focus on the non-white responses from the survey analysis to better represent the residents' racial makeup in the study area because DVEVWDQWLDOSUWLRQIWKHVXYHQLQVUHYHDOHG that the non-white participants' responses were VLJQEDQOGLHUHQIURPWKHRYHUDOOVDPSH7ZR they consider ownership and land uses in the public and private realms because people have various levels of autonomy in these realms and varying spatial guidelines or land requirements (Figure 5.1). For example, the private realm is typically owned and managed by home and businesses owners and renters, whereas the public realm is owned by civic authorities but could be managed publicly or privately. Management of the landscape over time would need to be in the discussion early on in planning and design processes to understand the roles and abilities of entities and residents to complete the goals, strategies, and actions. And three, people may also have various preferences toward wildlife, plants, feelings of safety, aesthetics, and maintenance upkeep of the realms.

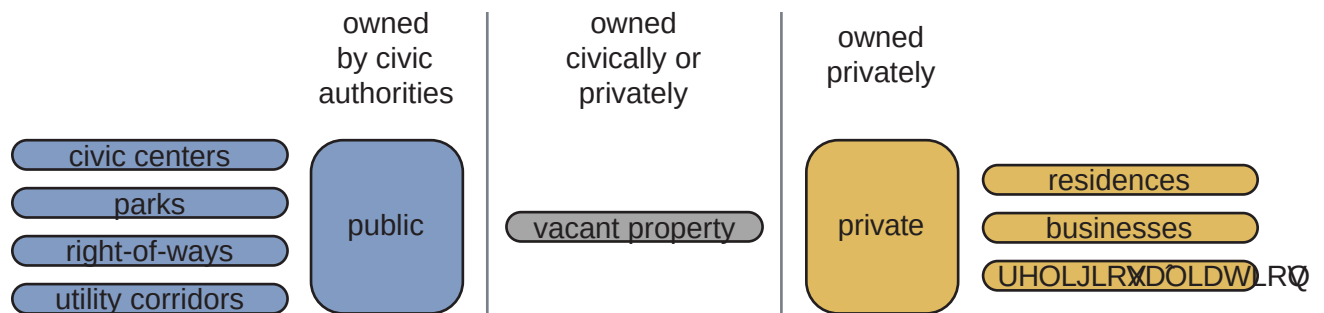
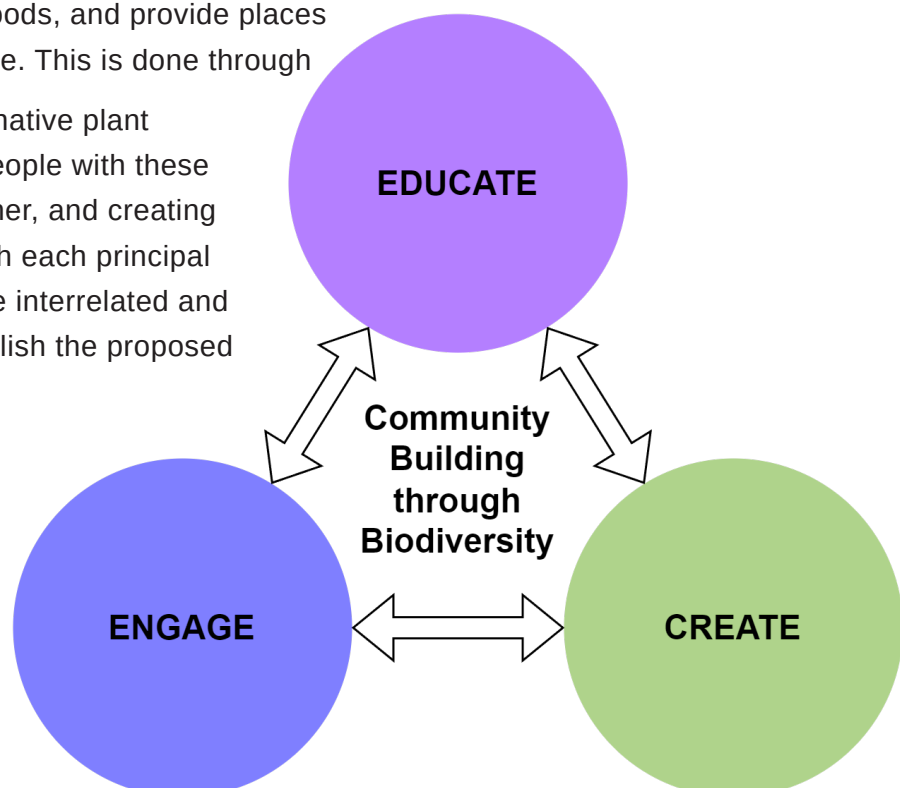


Figure 5.1
Delineation of land uses and
types of properties common for
public and private realms.

PRINCIPLES FOR ACTION

The following three proposed strategic principal actions are required to have a meaningful impact on residential communities and the built environment (Figure 5.2). These principles serve as a framework for building a community that values native plant landscapes. The purpose is to change people's perceptions of biodiverse landscapes, help them establish a sense of place in their urban neighborhoods, and provide places with a higher quality of life. This is done through educating people about native plant landscapes, engaging people with these landscapes and each other, and creating such landscapes. Though each principal action is unique, they are interrelated and work together to accomplish the proposed goals.

Figure 5.2
The principles for action and
their interrelatedness required
to have a meaningful impact on
residential communities and the
built environment.



EDUCATE

O **P** **educate** residents. **P**

This principal action focuses on increasing resident's awareness of native plants through HGKDWLRLQDULRXZDV6KKHGKDWLRLQ provides a framework of knowledge for residents. This action provides the most opportunity to make community interventions regardless of how much ELRGLYHUVLWH[LVWV7KHUHVHDUFKQLQVVKRZ WKDWHGKDWLRLQDULRXZDV6KKHGKDWLRLQ peoples' preference for native plant landscapes.

ENGAGE

The second principal action is to *engage* residents. It focuses on organizing community activities and events for residents to engage with native plants DQRDQWKHU7KLVSLELSODFWLRLQHV education on native plants with the application through interactions with native plants in the built environment.

CREATE

The third principal action is to *create* places for and with residents. This principal action focuses on creating landscapes for residents to learn and engage in activities together. A key focus is on creating pilot landscapes in residential neighborhoods to increase opportunities to interact with native plants and other residents.

The principal actions may not be sequential DVFRPPDQWLHVZLOOKDYHGLHUHQVHGVEV the desired outcome is to create native plant landscapes that increase biodiversity, wildlife KDELWDWDQHQLUREQHDOEHQV)RUH[DPSSH communities with limited native plants and who ODFNQHUVWDQLQRIWKHPPDEHQVPRUH from education on native plants or engagements

through activities like environmental cleanups before creating native plant landscapes. Creating these landscapes with native plants can also serve as an educational and engagement opportunity for the community. For example, a community with clear opportunities and support to create pilot native plant landscapes could focus on creating those landscapes together, thus creating space to engage with one another and be educated through building process and progression overtime. Findings show that residents of the study area are not well-aware of native plants, thus education is important. Findings also reveal that the study area has many opportunities to plant native plants. 7KXWKH8RSHRIWKHVW8DUHDFR8GEHEW from creating pilot native plant landscapes and engaging with one another and learning about native plants. The next few sections show possible native plant interventions in the public and private realms and with owners and renters.

CONSERVATION AND RESTORATION INTERVENTIONS

0D8LQVVKRZWKDWFRQHUYDWLRQQ restoration are both needed to increase biodiversity in the study area landscape and connect existing wildlife habitats through education, community engagement, and the creation of habitat-FRQFWLQODQVFD8V6RPHQLJKERUKRRGVPD\ have more conservation needs than restoration, but every neighborhood will have both due to microclimates. The study maps, land cover, land use, and habitat suitability each identify areas to conserve or restore. Findings in the land cover map reveal that much of the forest and woodland areas in the study area are mostly untouched and should be conserved in the neighborhoods, ,YDQRH6R8WKHDVW2DN3DUN6R8WKHDVW9LQDUG Vineyard Northwest, and Vineyard Estates.

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landscape areas should be conserved and restored
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portion of the study area is developed but has the
potential to restore biodiversity through niches of
green areas.

Land use also plays an important role in conservation
and restoration. Certain land uses could more readily
be utilized and activated. For example, planners
and designers and partners could focus on public
and semi-public land for the community to engage in
activities together in both conserving native plants
and restoring lands through cleanup and native
planting. This includes parks, vacant lots, some civic
landscapes, right-of-ways, and utility corridors.

Habitat suitability should be considered in
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needs. For example, habitat for native species may
need to be conserved or restored in an area. Many
of the highly suitable areas in the study area follow
along the woodland and forest land cover. These
areas also have some steeper slopes that should be
vegetated with deeper rooted native plants to stabilize
soils as shown in the study area slope map.

PUBLIC AND PRIVATE INTERVENTIONS

Though public land may be more readily available for
native plant intervention with the city, private land is
crucial for strengthening a network of wildlife habitats
with native plants. Findings show that the study area
has considerable potential for integrating native plants
on private land and that, on average, about 50% of
the overall respondents showed interest in private
native planting. They also show that respondents
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land preferred native plant landscapes in private
land, vice versa. The hope is that residents would

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native planting to which it would encourage them to plant native in their private land or in semi-public landscapes like community gardens or vacant lots.

Public land has the potential to increase biodiversity through many of the connected lands, from streets to parks to creeks, and the sizes of these landscapes.

The public land would also likely have fewer ownership hoops to jump through but would require

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more biodiversity, more connected wildlife habitat,

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improving quality of life. Though native plant landscapes would require an initial investment by the City to install and maintain them on public land, they would save money over time through the conservation and restoration of their landscape. Native plant landscapes would reduce energy consumption and improve the function of the land. They would reduce energy consumption by requiring less maintenance than a manicured lawn when the landscape has matured. This means the City would save from fewer operating costs, less use of carbon-producing machines and chemical applications, and less water use over time. The land would function better, providing long-term cost savings from landscape and stormwater infrastructure maintenance costs through the natural protection of soils from erosion DQLPSRYHHPHQ RIVRLOGUDLQJHDQLQWUDWLRQ 6KKIQWLRLPSRYHZDWHUTQOLWGRZQWUHP DQUHGKHPARGLOKH&LWZRQGDQVRVDYH from cooler urban temperatures and lower energy consumption by integrating native trees, shrubs, and grasses that optimize shade over structures and impervious surfaces in the summer. Alongside the environmental-based interventions, the City could save by activating their community members through volunteer opportunities to steward public land. This

could reduce the pressure of City maintenance and personnel costs and provide a sense of ownership for residents. Local partners and residents could help facilitate and organize the activities.

There is also potential for the City to earn from their investment in native plant landscapes. Native plants have ornamental attributes and hardiness that could improve area aesthetics that last and increase property values, impacting peoples' perceptions of the City and transforming the economic potential for those who live, work, and play there. And though public land could work well for integrating native plant landscapes, increasing biodiversity, and connecting wildlife habitats in the City, targeting private land interventions could bring native plant awareness and impact closer to peoples' homes.

OWNER AND RENTER INTERVENTIONS

There are some cases where owners and renters could be targeted individually for native plant interventions to take for both owners and renters. Findings show that owners are more communicative with one another and engaged in communal activities and that they are more likely to engage in public interventions. Findings also show that renters should be made to encourage renters to participate in native plant interventions in their own area. Both owners and renters showed interest in native plants in public and private landscapes. Planners and designers should include the following actions in their community engagement interventions: targeted interventions in patched private native plant landscapes, social

and environmental programs in the area, and
or initiatives that support native planting. They
should also encourage engagement in community
activities. This could be done by creating activities
and dispersing invitations. They should also create
native plant landscapes for the community to
interact with to potentially increase their preference
for the landscapes.

Planners and designers should target owners for
native plant interventions. Owners have more
autonomy with their private property; thus, it would
be easier to integrate native plants for biodiversity
through them and they may be more willing to invest
in their landscape. Findings show that building
public landscape could increase their willingness to
help create public landscapes with them and their
feelings of safety around them. Findings also show
that creating native plant landscapes for owners to
interact with could increase their ability to maintain
their private landscapes over time. Thus, it is
and create native plant landscapes for owners to
interact with.

Planners and designers should also target renters
for native plant interventions. Renters are less
likely to have autonomy over the property, where
ownership is via a landlord. Thus, they may not be
able to dedicate time or money to their landscape.
more native plants in their private space if they
knew where to get native plants, what to do with
them, the initial costs and costs over time, and
show that increasing renters' awareness of native
and create native plant landscapes for owners to
interact with.

landscapes with them and their feelings of safety around them. Thus, planners and designers and community partners should provide educational opportunities on native plants for renters in their processes that include the topics mentioned above and inform and include landlords of rental properties. The following section discusses goals, strategies, and possible actions to activate these interventions for increasing biodiversity, wildlife KDELWDWDQHQLURQHDOEHQVVLQHVLGHQLDO areas.

GOALS AND STRATEGIES TO INCREASE BIODIVERSITY, WILDLIFE HABITAT, AND ENVIRONMENTAL BENEFITS IN RESIDENTIAL AREAS.

The following goals, strategies, and possible actions described below can be found in Table 5.1.

GOAL 1: INCREASE ENVIRONMENTAL BENEFITS IN RESIDENTIAL NEIGHBORHOODS.

There are two proposed strategies to increase HQLURQHDOEHQVVLQHVLGHQLDOQLJKERUKRRGV 7KHJVVWVWUDWHJLVWRLPSRYHUHVVLGHQVDPZDUHQVV RIWKHHQLURQHDOEHQVVRIQWLYHSDQV Planners and designers can organize environmental HGKDWLRQRUNVKRSDERXWKHEHQVVRIQWLYH plants with the support of local expert partners. Workshops can be held online or in person, including presentations and demonstrations on native plants and local resources that impact native plants at various scales. Resources include local landscape policies and ordinances that could limit or uphold native plants, social and environmental programs and organizations in the area, and government and planning initiatives.

Workshops should target certain populations in four ways: First, educate homeowners and residents on

the value of landscapes with patches of native plants.

Second, educate residents on how to maintain native plant landscapes and the potential outcomes of the landscape over time. For example, a manicured lawn may be best for an outdoor play space but could have patches of native plants. For example, a residential landscape while retaining functions that do not work well with native plants. For example, a residential landscape could be planted with deep-water native plants that can be saturated in water occasionally. Third, educate residents, particularly renters and non-white residents, how native plants can coexist with manicured lawns in public and private landscapes, and how the residents can engage with the landscape. Fourth, educate renters on how to maintain native plant landscapes and the potential outcomes of the landscape over time.

The second strategy is to increase outreach to residents with educational materials and community event invitations associated with native plants. Planners and designers or partner organizations should create educational brochures or signage to disperse throughout neighborhoods that inform residents about native plants and their environmental benefits. Educational materials could be delivered about community design projects, such as native plant landscaping, through mailings, websites, and community events.

Planners and designers are suggested to include the following goals, strategies, and possible actions in their planning and design processes to increase biodiversity, wildlife habitat, and environmental benefit through the engagement of residents in native planting activities.

<u>Goals</u>	<u>Strategies</u>	<u>Principle Actions</u>		
<i>The goal is to accomplish this...</i>	<i>...with this approach....</i>			
		EDUCATE	ENGAGE	CREATE
Increase environmental benefits in residential neighborhoods.	Improve residents' awareness of the environmental benefits of native plants.			
	Increase outreach to residents with educational material and community event invitations associated with native plants.			
Increase the connectivity of wildlife habitat in residential neighborhoods.	Creat pilot landscapes to introduce patches of native plants and connect existing ones on public and private land in residential neighborhoods.			
				
	Create pilot landscapes for people to meet, regularly engage in gathering and learning activities, and voice community suggestions and concerns.			
Increase the use and interaction of native plants in residential neighborhoods. (Increase opportunities to interact with native plants.)	Improve residents' awareness of where to get native plants.			
				
				
	Improve residents' understanding of how to maintain native plants.			

<u>Possible Actions</u>	<u>Possible Partners</u>
<i>...through the these actions.</i>	<i>...with the help of...</i>
Organize environmental education workshops about the benefits of native plants.	- Civic groups, centers, and representatives (public) (i.e. discovery centers) - School or youth-based groups (semi-public) - Social and environmental initiatives (semi-public) (i.e., vacant lot programs, NWF Certifide Wildlife Habitat program) - Community groups (semi-public) (i.e., neighborhood HOA) - Local businesses and pop-up markets (private) - Religious organizations (private) - Local residents (private) *see a detailed list of possible partners and descriptions in Appendix G.
Create educational brochures or signage about native plants and their environmental and wildlife benefits and invitations about community restoration efforts and events.	
Utilize or create public landscapes in residential neighborhoods for temporary or permanent planting of native plants.	
Utilize or create private residential landscapes for temporary or permanent planting of native plants with residents willing to pilot-test their landscape.	
Design pilot landscapes on neighborhood blocks that vary in how many people can be accommodated.	
Organize monthly tours to landscape nurseries for neighborhood residents.	
Organize at least two native plant sales or giveaways at local nurseries, business fronts, organization hubs, or local parks during the planting season.	
Organize seasonal neighborhood tours of pilot landscapes with native plants.	
Organize environmental education workshops about maintaining native plants in public neighborhood landscapes or in private landscapes of willing residents.	

Table 5.1 (see also next page)
Goals, strategies, and possible actions for planning and design through the engagement of residents in native planting processes.

Planners and designers are suggested to include the following goals, strategies, and possible actions in their planning and design processes to increase biodiversity, wildlife habitat, and environmental benefit through the engagement of residents in native planting activities.

Goals	Strategies	Principle Actions		
The goal is to accomplish this...	...with this approach....			
		EDUCATE	ENGAGE	CREATE
Increase residents’ preference and feelings of safety for landscapes with native plants over time.	Create educational and interactive activities for residents to interact with one another and learn about native plants.			
	Increase residents' awareness of social and environmental programs that support native planting.			
	Encourage residents to serve on community boards or councils to speak on environmental issues related to native planting in their neighborhood.			
				

billboards, bulletin boards, or by word of mouth in conversation or door-to-door neighborhood visits. Places for postings or in-person promotions could include bus stops, civic spaces, schools, churches, and local businesses like nurseries, garden centers, restaurants, grocery stores, and FR#HVKR\$6LJQJHIRUQWLYHSDQVDFD\$V VKR\$DGH[SDLQKHODQVFD\$VVEH\$WVQW\$DO processes and maintenance activities over time, and the desired outcome of the landscape. 6LJQJHDQR\$UHDFKPDWHULDQVVKR\$GLQ\$H LPDJHURIGHVLUHGR\$FRPHVRIEHD\$WLEDWLRQQ UHVWRUDWLRQ\$RUWVDQZKDWZR\$GEHGL\$HUHQ\$OLNH

<u>Possible Actions</u>	<u>Possible Partners</u>
<i>...through the these actions.</i>	<i>...with the help of...</i>
Organize workshops on native plants for residents at public facilities or landscapes.	- Civic groups, centers, and representatives (public) (i.e. discovery centers) - School or youth-based groups (semi-public) - Social and environmental initiatives (semi-public) (i.e., vacant lot programs, NWF Certifide Wildlife Habitat program) - Community groups (semi-public) (i.e., neighborhood HOA) - Local businesses and pop-up markets (private) - Religious organizations (private) - Local residents (private) *see a detailed list of possible partners and descriptions in Appendix G.
Include local organizations that support native planting in meetings and activities for their expertise through the planning and designing of public outdoor landscapes in residential neighborhoods.	
Organize community events with council members to discuss environmental issues and efforts around native plants and make residents aware of paid or volunteer positions available on community boards and committees.	
Organize landscape restoration activities on neighborhood blocks to preserve and restore native plants and remove competing invasive plants.	
*All of the strategies should be done through targeted outreach.	

Table 5.1 (continued - see also, previous page)
Goals, strategies, and possible actions for
planning and design processes to increase
wildlife habitat connectivity in residential
neighborhoods through the engagement of residents in native
planting processes.

wildlife, upkeep, and landscape longevity.

GOAL 2: INCREASE THE CONNECTIVITY OF WILDLIFE HABITAT IN RESIDENTIAL NEIGHBORHOODS.

There are two proposed strategies to increase wildlife habitat connectivity in residential neighborhoods. This goal is best targeted toward ownership as they would have more private space to integrate native plants in their landscape. First, create pilot landscapes to introduce patches of native plants and connect existing ones on public and private land in residential neighborhoods. Planners and landscape architects should

utilize or create public and private landscapes in residential neighborhoods for temporary or permanent planting of native plants. Public garden areas, or low-disturbance areas in public parks, roadway medians, and civic facilities. Public landscapes within walking distance of renters should be targeted for the greatest accessibility. Residents willing to pilot-test their landscape with native plants could address wildlife habitat connectivity in the private realm.

The second strategy is to create pilot landscapes for people to meet, regularly engage in gathering and learning activities, and voice community suggestions and concerns. The design of the pilot landscapes should accommodate various group sizes of people throughout neighborhood blocks tables or a shelter to host group activities or allow The landscapes should provide space for outdoor educational activities, ceremonies, celebrations, and community meetings with common area features like seating, tables, and shelters. exposure to native plants, improve preferences opportunities to learn more.

GOAL 3: INCREASE THE USE OF NATIVE PLANTS IN RESIDENTIAL NEIGHBORHOODS.

There are two proposed strategies to increase the use of native plants in residential neighborhoods. awareness of where to get native plants. A collaboration of environmental organizations and businesses, planners, and designers

could organize seasonal tours of native plant landscapes for neighborhood residents through to give them multiple perspective of the landscape. These tours could be to landscape nurseries or private pilot landscapes of willing residents, such as private gardens and yards, repurposed lots, public parks, creek and river corridors, and rooftop gardens. Local businesses, landscape nurseries, and organizations could organize at least two native plant sales or giveaways during the planting season at their meeting places, property fronts, or local parks.

The second strategy is to improve residents' by planners, designers, and local partners could be made to organize environmental education workshops about maintaining native plants in public neighborhood landscapes or private space for such an event.

GOAL 4: INCREASE RESIDENTS' PREFERENCE AND FEELINGS OF SAFETY FOR NATIVE PLANT LANDSCAPES OVER TIME.

There are three proposed strategies to increase residents' preference and feelings of safety for native plant landscapes over time. First, create educational activities for residents to interact with one another and learn about native plants. A possible action includes organizing workshops on native plants for residents at public facilities or landscapes.

and environmental programs that support native plants. To activate this strategy, planners and landscape architects should organize workshops on native plants with residents in the planning and designing of public outdoor landscapes in

residential neighborhoods. They should include local organizations that support native plants for their expertise in meetings and activities. Meeting and activity hosts should lead discussions on how the organizations could support activating and stewarding native plant landscapes post-project.

Third, encourage residents to serve on community boards or councils to speak on environmental issues related to native plants in their neighborhood. Planners and designers more commonly interact in this realm and could organize community events with council members around native plants and make known paid or volunteer positions available on community made to organize landscape restoration activities on neighborhood blocks to preserve and restore native plants and remove competing invasive exposure to residents, which positively impacts their preferences in the long term. To make the events known to residents, coordinators could groups and organizations in person and online.

CONCLUDING POINTS

In conclusion, this study could provide planning and design direction on improving urban connectivity within the nine neighborhoods of Kansas City, Missouri. By taking proactive steps toward increasing biodiversity in the urban landscape through strategic community involvement and mapping with native plants, communities could maximize their environmental

EHQWV

The goals, strategies, and actions can be a foundational guide for initiating or continuing HRUWVWRLQUDHVHXMEDQLRGLYHUVLWDQZLOGOLIH habitat connectivity in residential neighborhoods through community involvement. The evidence of the study showed possible ways to improve people's awareness of biodiversity, native plants, DQHQLURQHWDQDOEHQWVIRUWKHLUKHDOWKDQZLOGOLIH6LPLODUODUWLFLSWLRQQRPPQW environmental-based events showed an increased correlation to preferences for more biodiverse urban landscapes. This participation could be LQWLDOLQRQWHUPSHIHUHQHIRUKLJK biodiversity native plant landscapes.

The strategies and actions were intended to be sources of reference and empowerment for IXWHFRPPQWHRUWVLQKHDUHDKRSQWR see growth in native plants and preference for them throughout the city. Continued focus and progression through the goals, strategies, and actions will likely bring questions to the forefront, including questions about public and private processes, the ability of renters and owners, safety concerns, and wildlife. This study shows the criticality of increasing urban biodiversity for the greater well-being of the communities and could be a framework for conversation. This study is not the only approach to reaching communities and creating well-functioning environments. However, it suggests an essential step toward improving the quality of life in communities with historically marginalized people.

Though this study's marginalized sample was VPDOOWKHUHZHUHDSUHQGLHUHQHVLPQ responses. While many marginalized residents supported lower biodiversity native plant

landscapes, there was still considerable support for KLJKHUELRGLYHUVLWQWLYHSDQODQVFD8V68UW for high-biodiversity landscapes varied between public and private land uses.

7KHDQOVLVDUPHGF RUUHODWLRQEHWZHHQRQ term preferences toward urban landscapes with higher biodiversity and the peoples' community involvement, participation in education, and LQHUDFWLRQQWLYHSDQODQVFD8V(RUWVDUH EHLQPDGHDQFRGEHPDGHEFLWRFLDOV local organizations, and communities to improve biodiversity across residential neighborhoods. Though many measures are in action already, this study provides insight, changes, or builds upon the F8UHQH8RUWVWRJHWFRPPQWLHVEHWWHULQROYHG in native planting activities and increase urban biodiversity.

LIMITATIONS

While the study outcomes could serve a broad urban audience in community involvement, QWLYHSDQLQDFWLYLWLHVDQH8RUWVWRLEUHDVH ELRGLYHUVLWVKHUHZHUHOLPLWDWLRQ\$VLJQEDQ limitation of this study was the sample population. The data collection sample could have been stronger if the demographic makeup was more representative of the study area. Additionally, data was pooled between white and non-white for a portion of the analysis to value the vulnerable populations' needs and varying responses. Although this resulted in a much smaller sample size that reduced the generalizability of the QLVWKHUHZDVP8UHVBFL8UHSHVHQDWLRQ of non-white preferences. The approach of data collection also posed a sampling bias. The convenience sampling approach limited variability in survey participants, yet it was the most feasible

approach in the short project timeline.

The sample demographic was also limited by the number and type of public gathering spaces in the study area where people could be LQURGXHGWRDQWDNHWKHVXYH&RHHVKRS were chosen for data collection areas due to the door-to-door approach not being ideal during the global pandemic at the time of this study. The average survey completion time would have also made a door-to-door process much longer. Thus, phone calls and follow-up email communication with the survey helped collect data, even though LWWRRNBUVLVWHQVHPUWVWRUHDfKFRPPQWDQ state representatives. Conversations with some community representatives showed that some communities lacked trust in surveys due to prior survey experiences and promises that had not EHHQGOHG7KHVZHUHRIWHQVNHGWRJLYHEW not given.

Another data collection limitation was through WKHLGHQLEDWLRQIWKHVDPSHVQLJKERUKRRGV Though landscape architects and planners may know neighborhoods, many people did not know what their neighborhood was called, thereby being unable to specify their location in the survey. Therefore, only a portion of the data FROOHFWHGFRGEHDSLHGWRDVFLQDUHD or neighborhood. This could be remedied by providing a general reference map of the study area in a future survey. Additionally, the survey GLGQWLEQSHWKHPVVRFLDWHGHJUHHHIGKDWLRQ level in the demographics section; thus, future surveys should include it for a more adequate sample representation. Lastly, mapping could not be used for precise spatial analysis but provided a framework and general areas to complete PRUHVLVWHVFLQDVQVLV2QLWHREVHUYDWLRQ

ZHUHOLPLWHGWRV8FLFWLPHVRIGDDQ
seasons; thus, wildlife and plant species were generalized.

FUTURE RESEARCH - WHAT IS YET TO BE STUDIED.

Research should focus on methods that best reach urban populations like marginalized communities for adequate sample representation. Future studies should consider asking similar survey questions using other data collection methods that may be more appealing or appropriate for sample populations. Research should be done on the processes of organizations, programs, policymakers, developers, and initiatives to understand better their role in the planning and design process and together within the community. Mapping analysis should be done at a higher UHVROWLRQWRWUDQODWHQLQWRVWLWHVFDQH
interventions better. More studies should be done on implementing native plants and native planting activities to facilitate community action, corridor planning and design, and wildlife habitat connectivity.

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Appendix A

Figure & Table References

List of Figures

Cover	+HUEHO(ULFKFDWELUGVWRR2DN:RRGODQV)RUHVWV)LUH&RQURUWLR5HVLOLHQ/5RRWV &RYHUJDELF5HQHULQOD\$GDS/HGL\$GREH3KRWRVKRSURPKWW\$ZZZAFNU FRP&RWRVEKWKDWFK ZLWKOLFHOH&&%<DQKWW\$ZZZAFNUFRP &RWRVRDNJHVFLHQH ZLWKOLFHOH&&%<1&1'
Figure 1.1	+HUEHO(ULFK1RYHPEHU 3URMHFW6W60DSLJUDP
Figure 1.2	+HUEHO(ULFK-DQ\0DQFHHG/DZDQVFD\$,PDJH
Figure 1.3	+HUEHO(ULFK-DQ\3DWFKHG1DWLYH3ODQ/DQVFD\$,PDJH
Figure 1.4	+HUEHO(ULFK-DQ\5\$EDQ1DWLYH3ODQ/DQVFD\$,PDJH
Figure 1.5	+HUEHO(ULFK2FWREHU 3URMHFWIDFWRUVDVVHVHVG'LDJUDP
Figure 3.1	+HUEHO(ULFK\$SLO .DQDV&LW&RQH[W0DSD\$SLO \$GDS/HGL\$GREH InDesign from Google Maps 2021.
Figure 3.2	+HUEHO(ULFK\$SLO 6W6\$UHD&RQH[W0DSD\$GDS/HG\$GREH3KRWRVKRSURP Google Maps 2021.
Figure 3.3	+HUEHO(ULFK0DUFK ,QHUVROXMYH6HW\$PDJH
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Figure 3.13b	+HUEHO(ULFK-DQ\0HGLRELRLGLYHUVLW3ULYDWH/DQVFD\$5HQHULQ\$GDS/HG in Adobe Photoshop from Kastasya Jackson.
Figure 3.13c	+HUEHO(ULFK-DQ\VRZELRGLYHUVLW3ULYDWH/DQVFD\$5HQHULQ\$GDS/HGLQ Adobe Photoshop from Kastasya Jackson.

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Figure 4.25 +HUEHO(ULFK-~~6~~YH5HV8QH0V/DQVFD8\$ZDUHQVVDQ3UHIHUHQH
'LDJUDP\$GDS\HGLQLFURVRIW([FHOIURP,%063666WDWLWLVFV

Figure 4.26 +HUEHO(ULFK-~~6~~YH5HV8QH0V/DQVFD8\$ZDUHQVVDQ&UHDWLRQ
'LDJUDP\$GDS\HGZLWK'UDZLRIURP,%063666WDWLWLVFV

Figure 4.27 +HUEHO(ULFK-~~6~~YH5HV8QH0V/DQVFD8\$ZDUHQVVDQ0DLQHQQH
\$EOLW'LDJUDP\$GDS\HGZLWK'UDZLRIURP,%063666WDWLWLVFV

Figure 4.28 +HUEHO(ULFK-~~6~~YH5HV8QH0V/DQVFD8\$ZDUHQVVDQ0DLQHQQH
2W/UHDFK'LDJUDP\$GDS\HGZLWK'UDZLRIURP,%063666WDWLWLVFV

Figure 4.29 +HUEHO(ULFK-~~6~~YH5HV8QH0V/DQVFD8\$ZDUHQVVDQ6DIHW'LDJUDP
\$GDS\HGZLWK'UDZLRIURP,%063666WDWLWLVFV

Figure 4.30 +HUEHO(ULFK-~~6~~YH5HV8QH0V/DQVFD8\$ZDUHQVVDQ\$HVWKHWLF
3UHIHUHQH'LDJUDP\$GDS\HGZLWK'UDZLRIURP,%063666WDWLWLVFV

Figure 4.31 +HUEHO(ULFK-~~6~~YH5HV8QH0V/DQVFD8,QHDFWLRQQ3UHIHUHQH
'LDJUDP\$GDS\HGZLWK'UDZLRIURP,%063666WDWLWLVFV

Figure 4.32 +HUEHO(ULFK-~~6~~YH5HV8QH0V/DQVFD8,QHDFWLRQQ0DLQHQQH
\$EOLW'DQ2W/UHDFK'LDJUDP\$GDS\HGZLWK'UDZLRIURP,%063666WDWLWLVFV

Figure 4.33 +HUEHO(ULFK-~~6~~YH5HV8QH0V/DQVFD8,QHDFWLRQQ\$HVWKHWLF
3UHIHUHQH'LDJUDP\$GDS\HGZLWK'UDZLRIURP,%063666WDWLWLVFV

Figure 4.34 +HUEHO(ULFK-~~6~~YH5HV8QH0V&RPPK\QROYHPHQDQ/DQVFD8
3UHIHUHQH'LDJUDP\$GDS\HGZLWK'UDZLRIURP,%063666WDWLWLVFV

Figure 4.35 +HUEHO(ULFK-~~6~~YH5HV8QH0V&RPPK\QROYHPHQDQ/DQVFD8
&UHDWLRQLDJUDP\$GDS\HGZLWK'UDZLRIURP,%063666WDWLWLVFV

Figure 4.36 +HUEHO(ULFK-~~6~~YH5HV8QH0V&RPPK\QROYHPHQDQ0DLQHQQH
\$EOLW'LDJUDP\$GDS\HGZLWK'UDZLRIURP,%063666WDWLWLVFV

Figure 4.37	+HUEHO(ULFK- Q 6 X YH5HV8QH Q V&RPP Q W\QROYH Q PH Q W Q Q6DIHW\
	'LDJUDP\$G Q W Q HGZLWK'UDZLRIURP,%063666WDWLWVWLFV
Figure 5.1	+HUEHO(ULFK- Q /D Q 8VH'HOL Q QDWLR Q LDJUDP&UHDWHGZLWK'UDZLR
Figure 5.2	+HUEHO(ULFK2FWREHU 6WUDWHJLF3UL Q LSHVIRU\$FWLR Q LDJUDP\$G Q W Q HGZLWK'UDZLR
Figures of Appendix F	+HUEHO(ULFK 6LWH&KDUDFWHU0 Q WLSH,PDJHV
Table 2.1	+HUEHO(ULFK2FWREHU 1DWLYH3OD Q) Q FWLR Q RU3HR Q SHV+HDOWK6DIHWD Q
	:HOIDUH7DEOH&UHDWHGZLWK0LFURVRIW([FHO
Table 3.1	+HUEHO(ULFK- Q 0HGLD Q RXHKROG,QRPHRIWKH&R Q W6W Q \$SUHDD Q Q6 Q YH\
	7DEOH\$G Q W Q HGIURPGDWDIURP86&H Q W Q % Q HDX
Table 5.1	+HUEHO(ULFK2FWREHU Q RDOV6WUDWHJLHV Q D Q 3RVVLEOH\$FWLR Q RU3OD Q Q Q
	'HVLJ Q URFHVVHV&UHDWHGZLWK0LFURVRIW([FHO

Appendix B

IRB Approval

TO: Dr. Sara Hadavi
Landscape Architecture/Regional and Community Planning
Seaton Hall



FROM: Rick Scheidt, Chair
Committee on Research Involving Human Subjects

DATE: 03/24/2021

RE: Proposal #10324.1, entitled "Habitat is Public and Private: Assessing the Possibilities of Increasing Urban Biodiversity through Community Involvement."

A MINOR MODIFICATION OF PREVIOUSLY APPROVED PROPOSAL #10324,
ENTITLED, "Habitat is Public and Private: Assessing the Possibilities of Increasing Urban
Biodiversity through Community Involvement"

The Committee on Research Involving Human Subjects at Kansas State University has approved the proposal identified above as a minor modification of a previously approved proposal, and has determined that it is exempt from further review. This exemption applies only to the most recent proposal currently on file with the IRB. Any additional changes affecting human subjects must be approved by the IRB prior to implementation and may disqualify the proposal from exemption.

Unanticipated adverse events or problems involving risk to subjects or to others must be reported immediately to the IRB Chair, and / or the URCO.

It is important that your human subjects project is consistent with submissions to funding/contract entities. It is your responsibility to initiate notification procedures to any funding/contract entity of changes in your project that affects the use of human subjects.

Appendix C

Community Survey



Community Survey

Wildlife habitat & community involvement – A study in Kansas City, Missouri

Hello, my name is Erich Herbel. I am a graduate student at Kansas State University working on my master's report to complete my landscape architecture degree. I request your assistance by participating in this survey.

The purpose of this research is to study urban communities to find ways they could benefit from their environment through native planting and connect wildlife habitat patches. Findings of this study could inform programs, initiatives, policymakers, and city governance on creating resilient environments based on community preferences.

This is a voluntary survey and there will be no penalty or loss of benefits if you choose not to participate or do not complete the survey. The data collected is anonymous. You may stop participating in this survey at any time. Thank you for your time and consideration.

Questions or Comments? Please contact Erich Herbel or Dr. Sara Hadavi.

Erich Herbel
eherbel@ksu.edu
6208770631

Sara Hadavi, PhD
sarahadavi@ksu.edu

To what extent do you agree with the following statements:

Please mark one for each statement

Statement	strongly agree	agree	neutral	disagree	strongly disagree
I would participate in community educational events to learn about ways to improve my neighborhood's environment.					
I know what social and/or environmental programs are active in my neighborhood.					
I would serve on a community board or council to speak on environmental issues related to native planting.					
I would participate in landscape and trail cleanups, lot restorations, planting native trees or garden, or native plant sales.					
I know my government officials and local organizations well.					
I would present community suggestions and concerns to councils, agencies, organizations, or the press. (i.e. mayor, county commission, HOA president)					
I know my community landscape ordinances and public policies.					
I regularly attend community meetings or events.					
I regularly communicate with my neighbors on the block or in the neighborhood.					
I know where to get native plants for personal use.					

To what extent do you agree with the following statements about the landscape in each image:

Circle a number for each image.

- 5 - strongly agree
- 4 - agree
- 3 - neutral
- 2 - disagree
- 1 - strongly disagree

I would feel safe by this private landscape.

Image A	5 4 3 2 1
Image B	5 4 3 2 1
Image C	5 4 3 2 1



I believe this private landscape benefits my health.

Image A	5 4 3 2 1
Image B	5 4 3 2 1
Image C	5 4 3 2 1



I believe this private landscape benefits the environment.

Image A	5 4 3 2 1
Image B	5 4 3 2 1
Image C	5 4 3 2 1



I regularly interact with this type of landscape.

Image A	5 4 3 2 1
Image B	5 4 3 2 1
Image C	5 4 3 2 1

To what extent do you agree with the following statements about the landscape in each image:

Circle a number for each image.

- 5 - strongly agree
- 4 - agree
- 3 - neutral
- 2 - disagree
- 1 - strongly disagree

I believe this landscape looks organized.

Image A	5	4	3	2	1
Image B	5	4	3	2	1
Image C	5	4	3	2	1

I would be able to maintain this landscape.

Image A	5	4	3	2	1
Image B	5	4	3	2	1
Image C	5	4	3	2	1

I would encourage others to maintain these landscapes.

Image A	5	4	3	2	1
Image B	5	4	3	2	1
Image C	5	4	3	2	1

I would like to have this type of private landscape.

Image A	5	4	3	2	1
Image B	5	4	3	2	1
Image C	5	4	3	2	1



To what extent do you agree with the following statements about the landscape in each image:

Circle a number for each image.

- 5 - strongly agree
- 4 - agree
- 3 - neutral
- 2 - disagree
- 1 - strongly disagree

I would feel safe in this public landscape.

Image A	5 4 3 2 1
Image B	5 4 3 2 1
Image C	5 4 3 2 1

I believe this public landscape benefits my health.

Image A	5 4 3 2 1
Image B	5 4 3 2 1
Image C	5 4 3 2 1

I believe this public landscape benefits the environment.

Image A	5 4 3 2 1
Image B	5 4 3 2 1
Image C	5 4 3 2 1

I regularly interact with this type of public landscape.

Image A	5 4 3 2 1
Image B	5 4 3 2 1
Image C	5 4 3 2 1



To what extent do you agree with the following statements about the landscape in each image:

Circle a number for each image.

- 5 - strongly agree
- 4 - agree
- 3 - neutral
- 2 - disagree
- 1 - strongly disagree

I believe this landscape looks organized.	
Image A	5 4 3 2 1
Image B	5 4 3 2 1
Image C	5 4 3 2 1

I would be able to maintain this landscape.	
Image A	5 4 3 2 1
Image B	5 4 3 2 1
Image C	5 4 3 2 1

I would encourage others to maintain these landscapes.	
Image A	5 4 3 2 1
Image B	5 4 3 2 1
Image C	5 4 3 2 1

I would like to have this type of public landscape in my private landscape.	
Image A	5 4 3 2 1
Image B	5 4 3 2 1
Image C	5 4 3 2 1

I would like to be a part of the public process in creating spaces like this.	
Image A	5 4 3 2 1
Image B	5 4 3 2 1
Image C	5 4 3 2 1



What characteristic is most important about your **private** landscape?
-->write as much as desired in the space provided

What characteristic is most important about your **public** landscape?
-->write as much as desired in the space provided

What are your current landscape practices?

Circle all that apply.

mowing	trimming	tilling	aerating
watering	planting	weeding	mulching
clean-up	fertilizing	pesticides	herbicides

Do you have native plants in your private space?

☐yes ☐no ☐I don't know

I would participate in native planting in my private space if:

- ☐ I knew more about them
- ☐ I knew what to do
- ☐ I had time
- ☐ I knew the cost and had the money
- ☐ I could to do the labor
- ☐ Other - I prefer not to work with native plants

Which neighborhood are you a resident of?

☐ Ivanhoe ☐ Oak Park ☐ Vineyard ☐ Other: _____

What is your gender?

☐ M ☐ F ☐ other: _____ ☐ Prefer not to say

What age range do you fit into?

☐ 18-19 ☐ 20-29 ☐ 30-39 ☐ 40-49 ☐ 50-59 ☐ 60-69 ☐ 70+

Do you live with children? ☐ Yes ☐ No

What household income range do you fit into?

☐ <\$20,000 ☐ \$20,000 - \$30,000 ☐ \$30,000 - \$50,000 ☐ \$50,000+

What best describes your living situation? ☐ Rent ☐ Own ☐ Live with family/friend

What is the highest degree or level of education you have completed?

☐ Some High School

☐ High School

☐ Bachelor's Degree

☐ Master's Degree

☐ Ph.D. or higher

☐ Trade School

☐ Prefer not to say

What race do you affiliate with?

☐ Black or African American

☐ Hispanic or Latino

☐ White

☐ Native American or Indian

☐ Asian or Pacific Islander

☐ Other: _____

☐ prefer not to say

What is your current employment status?

☐ work full-time

☐ work part-time

☐ student

☐ homemaker

☐ retired

☐ volunteer worker

☐ searching for employment

☐ other: _____

☐ prefer not to say

How do you travel for daily activities?

☐ walk

☐ bicycle

☐ personal vehicle / motorized bike

☐ bus

☐ train / rail

Appendix D

Digital Survey Communication



Wildlife Habitat & Community Involvement

Help advance research in your neighborhood!

Who am I?

My name is Erich Herbel. I am a graduate student at Kansas State University studying landscape architecture.

What is this about?

Studying in urban communities to find ways they could benefit from their environment through native planting that serves as wildlife habitat.

(wildlife like birds and bees & habitat like trees, grass, flowers, water)

(native plants - originate from the Missouri and Kansas landscape)

Who & Where? Residents & workers of Kansas City, Missouri

Why your feedback matters.

Research shows that native landscapes increase human well-being, can beautify communities, provide seasonal foods, save water, reduce urban heat, and provide food and shelter for wildlife that keep humans and plants healthy. Your input and preferences will help advance research on creating resilient environments for communities.

How you can help.

Complete the anonymous survey through the online link/QR and share the link & flyer with your neighbors, co-workers, friends, and family near you by social media or email.

Questions?

Contact me (Erich Herbel) at eherbel@ksu.edu or (620) 877-0631.

Thank you in advance,

Conversation Topics for Calling/Voicemail:

- Introduction: a brief statement of who I am, where and what I study,
- Introduction: a brief prompt about my research in their neighborhood and the need for their help,
- 4XVWLRQWRJDZHWKHLUZLOOLQGVVWRKHOSUKHDUPRUH
- Clarity: more detailed description of my research purpose and outcomes,
- Did not accept: Thank them for their time,
- Accept: ask for contact method, provide a time they can expect an email/message with more information and the survey link, notify to check junk mail, and thank them.
- Voicemail: leave brief intro, prompt, name, and contact.

Appendix E

Raw Data Analysis Results

Independent Samples Test (White/Non-White)							
Landscape Type	Assessment Category	Variable	Levene's Test for Equality of Variances				
			F	Sig.	t	df	
n/a	awareness	Where to get native plants	Equal variances assumed	0.52	0.47	-2.31	80.00
			Equal variances not assumed			-2.33	58.55
n/a	participation	Regularly communicates with neighbors	Equal variances assumed	6.96	0.01	-2.20	80.00
			Equal variances not assumed			-2.03	46.20
private	awareness	High-biodiversity landscape health benefits	Equal variances assumed	8.11	0.01	-2.63	79.00
			Equal variances not assumed			-2.43	44.34
	awareness	High-biodiversity landscape environmental benefits	Equal variances assumed	10.04	0.00	-2.62	80.00
			Equal variances not assumed			-2.37	43.75
	preference	High-biodiversity landscape	Equal variances assumed	0.10	0.75	-2.28	78.00
			Equal variances not assumed			-2.23	49.32
	awareness	Medium-biodiversity health benefits	Equal variances assumed	2.84	0.10	3.19	77.00
			Equal variances not assumed			3.54	72.65
	awareness	Medium-biodiversity environmental benefits	Equal variances assumed	7.65	0.01	4.65	77.00
			Equal variances not assumed			5.23	71.39
	preference	Medium-biodiversity landscape organization	Equal variances assumed	0.10	0.75	2.18	77.00
			Equal variances not assumed			2.34	63.73
	participation	Medium-biodiversity - advocating for others to maintain the landscape	Equal variances assumed	10.46	0.00	4.64	76.00
			Equal variances not assumed			5.60	75.49
	preference	Medium-biodiversity landscape	Equal variances assumed	7.43	0.01	3.40	77.00
			Equal variances not assumed			3.79	69.92
	preference	Low-biodiversity landscape feelings of safety	Equal variances assumed	1.01	0.32	2.72	75.00
			Equal variances not assumed			2.78	50.23
	awareness	Low-biodiversity landscape health benefits	Equal variances assumed	2.18	0.14	2.81	74.00
			Equal variances not assumed			2.50	36.12
	awareness	Low-biodiversity landscape environmental benefits	Equal variances assumed	4.59	0.04	4.44	75.00
			Equal variances not assumed			4.05	38.00
	preference	Low-biodiversity landscape organization	Equal variances assumed	2.70	0.10	3.31	75.00
			Equal variances not assumed			3.75	65.43
	participation	Low-biodiversity - advocating for others to maintain the landscape	Equal variances assumed	0.00	0.96	5.14	75.00
			Equal variances not assumed			4.91	42.28
	preference	Low-biodiversity landscape	Equal variances assumed	5.21	0.03	4.36	76.00
			Equal variances not assumed			4.01	40.62
	awareness	Native plants in their private space	Equal variances assumed	0.63	0.43	-2.94	80.00
			Equal variances not assumed			-3.01	62.16
	awareness	Would plant native if they knew more about them	Equal variances assumed	12.15	0.00	2.24	80.00
			Equal variances not assumed			2.31	62.95
	preference	Prefers not to work with native plants	Equal variances assumed	46.90	0.00	2.88	80.00
			Equal variances not assumed			2.12	28.00
	participation	Plants in their private space	Equal variances assumed	10.94	0.00	-2.12	80.00
			Equal variances not assumed			-2.01	49.55
public	awareness	High-biodiversity landscape health benefits	Equal variances assumed	11.64	0.00	-2.34	78.00
			Equal variances not assumed			-1.99	36.20
	awareness	High-biodiversity landscape organization	Equal variances assumed	20.40	0.00	-2.11	79.00
			Equal variances not assumed			-1.69	32.02
	preference	High-biodiversity landscape	Equal variances assumed	28.60	0.00	-2.48	79.00
			Equal variances not assumed			-2.10	36.07
	awareness	Low-biodiversity landscape health benefits	Equal variances assumed	0.14	0.71	2.95	75.00
			Equal variances not assumed			3.06	55.43
	awareness	Low-biodiversity landscape environmental benefits	Equal variances assumed	3.01	0.09	3.15	74.00
			Equal variances not assumed			2.90	40.89
	preference	Low-biodiversity landscape organization	Equal variances assumed	1.63	0.21	2.30	75.00
			Equal variances not assumed			2.42	58.13
	participation	Low-biodiversity - advocating for others to maintain the landscape	Equal variances assumed	0.24	0.62	2.88	75.00
			Equal variances not assumed			2.81	47.09
	preference	Low-biodiversity landscape	Equal variances assumed	1.63	0.21	3.03	75.00
			Equal variances not assumed			2.91	45.02
	participation	Low-biodiversity - public process to create spaces	Equal variances assumed	0.43	0.52	2.31	75.00
			Equal variances not assumed			2.28	48.42

t-test for Equality of Means					
Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		
			Lower		Upper
0.02	-0.76	0.33	-1.41		-0.11
0.02	-0.76	0.33	-1.41		-0.11
0.03	-0.56	0.25	-1.06		-0.05
0.05	-0.56	0.27	-1.11		-0.01
0.01	-0.72	0.27	-1.26		-0.17
0.02	-0.72	0.30	-1.31		-0.12
0.01	-0.66	0.25	-1.16		-0.16
0.02	-0.66	0.28	-1.22		-0.10
0.03	-0.70	0.31	-1.31		-0.09
0.03	-0.70	0.31	-1.33		-0.07
0.00	0.74	0.23	0.28		1.20
0.00	0.74	0.21	0.32		1.16
0.00	1.11	0.24	0.64		1.59
0.00	1.11	0.21	0.69		1.54
0.03	0.42	0.19	0.04		0.81
0.02	0.42	0.18	0.06		0.79
0.00	1.15	0.25	0.66		1.65
0.00	1.15	0.21	0.74		1.56
0.00	0.98	0.29	0.41		1.56
0.00	0.98	0.26	0.47		1.50
0.01	0.66	0.24	0.18		1.15
0.01	0.66	0.24	0.18		1.14
0.01	0.75	0.27	0.22		1.28
0.02	0.75	0.30	0.14		1.35
0.00	1.22	0.27	0.67		1.77
0.00	1.22	0.30	0.61		1.83
0.00	0.74	0.22	0.30		1.19
0.00	0.74	0.20	0.35		1.14
0.00	1.42	0.28	0.87		1.98
0.00	1.42	0.29	0.84		2.01
0.00	1.27	0.29	0.69		1.85
0.00	1.27	0.32	0.63		1.91
0.00	-0.63	0.22	-1.06		-0.20
0.00	-0.63	0.21	-1.06		-0.21
0.03	0.25	0.11	0.03		0.48
0.02	0.25	0.11	0.03		0.47
0.01	0.14	0.05	0.04		0.23
0.04	0.14	0.07	0.00		0.27
0.04	-0.22	0.10	-0.43		-0.01
0.05	-0.22	0.11	-0.44		0.00
0.02	-0.47	0.20	-0.87		-0.07
0.05	-0.47	0.24	-0.94		0.01
0.04	-0.43	0.20	-0.83		-0.02
0.10	-0.43	0.25	-0.94		0.09
0.02	-0.69	0.28	-1.25		-0.14
0.04	-0.69	0.33	-1.36		-0.02
0.00	0.85	0.29	0.28		1.42
0.00	0.85	0.28	0.29		1.40
0.00	0.85	0.27	0.31		1.39
0.01	0.85	0.29	0.26		1.44
0.02	0.61	0.26	0.08		1.13
0.02	0.61	0.25	0.11		1.11
0.01	0.78	0.27	0.24		1.31
0.01	0.78	0.28	0.22		1.33
0.00	0.88	0.29	0.30		1.45
0.01	0.88	0.30	0.27		1.49
0.02	0.67	0.29	0.09		1.24
0.03	0.67	0.29	0.08		1.25

an independent samples t-test

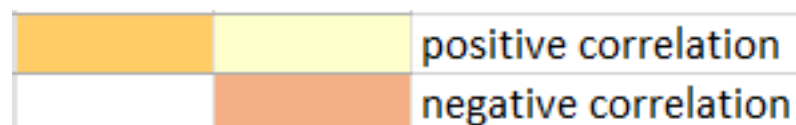
				Awareness	Awareness
Land Use	Landscape 6FHQULR (level of biodiversity)	6ØYH\ Assessment Category	Variable	of active social & environmental programs	of where to get native plants
PRIVATE	High Biodiversity	Awareness	of health benefits	.253	.231
		Awareness	of environmental benefits		.273
		Participation	by interacting		.387
		Participation	in maintaining the landscape	.246	.375
		Participation	in advocating for others to maintain the landscape		.245
		Preference	in feelings of safety	.273	.267
		Preference	of aesthetic		.256
		Preference	of the landscape		.260
	Low Biodiversity	Awareness	of health benefits		
		Awareness	of environmental benefits		-.263
		Participation	by interacting		
		Participation	in maintaining the landscape		
		Participation	in advocating for others to maintain the landscape		-.363
		Preference	of the landscape	-.222	-.425
PUBLIC	High Biodiversity	Awareness	of health benefits		
		Awareness	of environmental benefits		
		Participation	by interacting		.332
		Participation	in maintaining the landscape	.232	.235
		Participation	in advocating for others to maintain the landscape		
		Participation	in the public process to create the landscape		.269
		Preference	in feelings of safety		.227
		Preference	of aesthetic		.241
		Preference	of the landscape		.238
	Low Biodiversity	Awareness	of health benefits		-.348
		Awareness	of environmental benefits		-.266
		Participation	by interacting	.294	
		Participation	in advocating for others to maintain the landscape		-.284
		Participation	in the public process to create the landscape		-.403
		Preference	of the landscape		-.345

		positive correlation
		negative correlation

6XVH\$VVHVVPHQ&DWHJRU\							
Awareness	Awareness	Participation	Participation	Participation	Participation	Participation	Participation
Community Involvement and Knowledge Variable							
of government officials & local organizations	of landscape ordinances and public policies	in environmental education events	on a community board	in restoration activities	in voicing community concerns to councils, etc.	in community meetings or events	in regular neighbor communication
			.233	.482	.221		
				.308			
	.250		.277				
	.244	.258	.396	.314	.345		.241
.230			.226	.309			.239
.220		.237		.271			.246
.274							
.327		.240	.222	.344	.296		
					-.277		
		-.240	-.279		-.328		
						.312	
	.249					.324	
				.249			
				.265			
	.260						
		.286	.248				.248
		.282			.258		.241
.225		.397		.345			
		.344		.319	.227		
		.236			.270		
		.248			.275		.279
			-.238				-.277
					-.261		
				.284			
		-.232			-.320		

\$006DP5H&RPPQW\QROYHPHQ/DQ.QZOHGJH
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\IJQEDQYDULDEOHFRUUHODWLRQ@

				Awareness	Awareness
Land Use	Landscape 6FHQULR (level of biodiversity)	6XJYH\ Assessment Category	Variable	of active social & environmental programs	of where to get native plants
PRIVATE	High Biodiversity	Awareness	of health benefits		
		Awareness	of environmental benefits		
		Participation	by interacting		
		Participation	in maintaining the landscape		
		Participation	in advocating for others to maintain the landscape		
		Preference	in feelings of safety		
		Preference	of aesthetic		
		Preference	of the landscape		
	Low Biodiversity	Awareness	of health benefits		
		Awareness	of environmental benefits		
		Participation	by interacting		
		Participation	in maintaining the landscape		
		Participation	in advocating for others to maintain the landscape		
		Preference	in feelings of safety		
		Preference	of the landscape		
PUBLIC	High Biodiversity	Awareness	of health benefits		
		Awareness	of environmental benefits		
		Participation	by interacting		
		Participation	in maintaining the landscape		
		Participation	in advocating for others to maintain the landscape		
		Participation	in the public process to create the landscape		.413*
		Preference	in feelings of safety		
		Preference	of aesthetic		
		Preference	of the landscape		
	Low Biodiversity	Awareness	of health benefits		
		Awareness	of environmental benefits		
		Participation	by interacting		
		Participation	in maintaining the landscape	.563**	
		Participation	in advocating for others to maintain the landscape		
		Participation	in the public process to create the landscape		
		Preference	of the landscape		



Community Involvement and Knowledge Variable							
Awareness	Awareness	Participation	Participation	Participation	Participation	Participation	Participation
of government officials & local organizations	of landscape ordinances and public policies	in environmental education events	on a community board	in restoration activities	in voicing community concerns to councils, etc.	in community meetings or events	in regular neighbor communication
				.377*			
					.418*		
					.391*		
	.425*						
							.445*
	.511**					.540**	.442*
							.405*
		.550**					
		.387*					
		.427*					
		.571**					
		.394*			.453*		
.467**							

Non-White Community Involvement and Knowledge &
 /DQVFD86FHQULR&RUUHODWLRQDWUL[
 YLJQEDQYDULDEOHFRUUHODWLRQ@

			Awareness	Awareness
Land Use	Category	Variable	of active social & environmental programs	of where to get native plants
PRIVATE	Awareness	of health benefits	x	x
	Awareness	of environmental benefits		x
	Participation	by interacting		x
	Participation	in maintaining the landscape	x	x
	Participation	in advocating for others to maintain the landscape		x
	Preference	in feelings of safety	x	x
	Preference	of aesthetic		x
	Preference	of the landscape		x
PUBLIC	Awareness	of health benefits		
	Awareness	of environmental benefits		
	Participation	by interacting		x
	Participation	in maintaining the landscape	x	x
	Participation	in advocating for others to maintain the landscape		
	Participation	in the public process to create the landscape		x
	Preference	in feelings of safety		x
	Preference	of aesthetic		x
	Preference	of the landscape		x

highest high
 VLJQEDQH
 of correlation

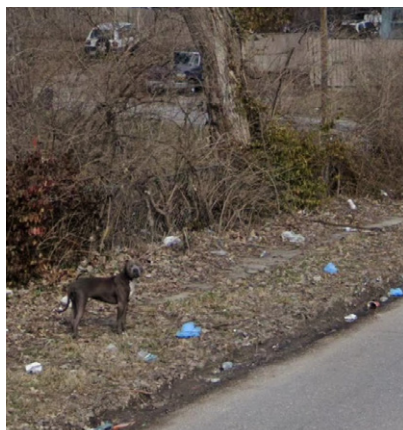
Community Involvement and Knowledge Variable

Awareness of government officials & local organizations	Awareness of landscape ordinances and public policies	Participation in environmental education events	Participation on a community board	Participation in restoration activities	Participation in voicing community concerns to councils, etc.	Participation in community meetings or events	Participation in regular neighbor communication
			x	x	x		
				x			
	x		x				
	x	x	x	x	x		x
x			x	x			x
x		x		x			x
x							
x		x	x	x	x		
				x			
				x			
	x						
		x	x				x
		x			x		x
x		x		x			
		x		x	x		
		x			x		
		x			x		
		x			x		x

Matrix highlighting possible community involvement strategies (based on survey correlations) for high-biodiversity landscapes WRH, HUVWDQWKHLUL, QHVEHWZHHQ, and private variables.

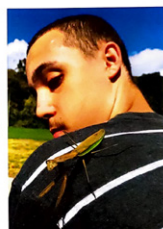
Appendix F

Site Character Imagery



ECOS Urban Outdoor Nature Discovery

Explore nature in the city, what makes a healthy neighborhood, and meet neighborhood leaders and career professionals creating healthy places for people and nature.



Free, COVID-safe Classes
Saturdays, beginning April 4th.

Anita B. Gorman Discovery Center - 4750 Troost
Lakeside Nature Center - 4701 E. Gregory Blvd.
Grades 4th-5th 10:00 - 12:00pm
Grades 6th-8th 1:00 - 3:00pm

Register at www.greenworkskc.org/programs

Call or text with question at (816)400-6434
*Parents / Guardians will receive updates.





Appendix G

List of Possible Partners

List of Possible Partners

<u>Ref. #</u>	<u>Type of Partner</u>	<u>Specific Group/User</u>
1	Social initiatives	<i>i.e.</i>
1.1		Justice and Dignity Center Coalition
1.2		Beyond the Conviction
1.3		KC Shepard's Center
1.4		Urban Neighborhood Initiative
2	Environmental initiatives	<i>i.e.</i>
2.1		National Wildlife Federation
2.2		Heartland Conservation Alliance
2.3		Grow Native!
2.4		Missouri Prairie Foundation
2.5		Missouri Department of Conservation
2.6		Master Gardeners of Greater KC (U of MO)
2.7		Habitat Conservation Assistance Network
2.8		Deep Roots KC
2.9		Bridging the Gap / Kansas City Wildlands / Heartland Tree Alliance
2.10		Kansas City Community Gardens
2.11		Cultivate KC
2.12		GreenWorks
2.13		Manheim Park + Gardens
2.14		Ivanhoe Demonstration Gardens
2.15		Pilgrim Center Labyrinth & Butterfly Garden
2.16		Global One Urban Farming
2.17		Dirt Beast Farm (Ivanhoe)
2.18		Adopt-A-Lot
2.19		Missouri Native Plant Society
2.20		Missouri Master Naturalist - Osage Trail Chapter
2.21		Westport Garden Club (founders of Deep Roots KC)
2.22		Gardeners Connect
2.23		The Greensman
2.24		Sow Wild Natives
3.00	Community Groups and Initiatives	<i>i.e., HOA, councils, neighborhood associations</i>
3.1		Ivanhoe Neighborhood Council
3.2		Vineyard Neighborhood Association
3.3		Oak Park Neighborhood Association
3.4		Plaza Hill Apartments
3.5		Plaza East Luxury Apartments
3.6		Manheim Land Trust
3.7		Historic Manheim Park Association
4.00	Vacant lot programs	<i>i.e.</i>
4.10		Vacant to Vibrant (Urban Neighborhood Initiative)
4.20		Land Bank
5.00	Discovery centers	<i>i.e., centers for discovery of the natural world</i>
5.10		Anita B Gorman Discovery Center
5.20		Lakeside Nature Center
6.00	Civic groups, centers, and representa	<i>i.e.</i>
6.1		Libraries
6.2		KC Fire Department #35
6.3		KC Fire Department #17
6.4		Yolanda Young (Representative of MO House)
6.5		Civic 'City' landscape caretakers

List of Possible Partners

Ref. #	Type of Partner	Specific Group/User
6.6		Vineyard Park
6.7		Oak Park
6.8		Cleveland Park
6.9		Brush Creek Park Area
6.10		Ivanhoe Park
6.11		Brush Creek Community Center and Pool (Part of KC-Parks)
6.12		Southeast Community Center
7	School or youth-based groups	<i>i.e, teachers, professors, administration at schools and learning centers and other youth-based groups</i>
7.1		Boys and Girls Club of Greater KC (Vineyard)
7.2		George Melcher Elementary
7.3		George Washington Carver Elementary
7.4		Mt Vernon Library (by Mt Vernon Church)
7.5		Kids in Christ Academy LLC
8	Local Businesses	<i>i.e.</i>
8.1	Landscape nurseries/businesses	City Roots Nursery
8.2		Green Thumb Gardens (Down to Earth Services)
8.3		Henderson Tree Care
8.4		Soil Service Garden Center
8.5	Restaurants	Sankofa Cafe and Bar
8.6		Church's Chicken
8.7		Johnny's Donuts -Some green space
8.8		Brotha's Grill
8.9		Gates BBQ HQ
8.10	Grocery stores	Murdock Quality Seafood Market
8.11		Blue Valley Market
8.12		Aldi grocery
8.13		Woodland City Market
8.14		Kanbe's Markets
8.15	Local Pop-up markets	<i>i.e. pop-up farmers markets (weekly, monthly, seasonal)</i>
8.16		Young Family Farm (Rep Yolanda Young and Family's garden initiative)
8.17		Ivanhoe farmers market
8.18		Longfellow Farm
8.19	Coffee shops	Anchor Island Coffee
8.20		Bulletin board, community advocate
8.21		Equal Minded Cafe
8.22	Other professional offices	Landscape architecture/design groups
8.23		Insurance, Loans, Tax, Services (Boost Mobile, Liberty Tax Service...)
8.24		Dentists
8.25		Furniture Home
8.26		Harris Park Midtown Sports
8.27	Gas Stations	BP Gas
8.28		Shortstop
8.29	Funeral Homes	Watkins Heritage Chapel (Vineyard)
9	Religious organizations	<i>i.e. churches</i>
9.1		Community Fellowship Church (Vineyard)
9.2		Community Praise Worship Center
9.3		Deliverance Temple Church
9.4		Ebenezer AME Church
9.5		Flipper/Flower Faith AME Church

List of Possible Partners

<u>Ref. #</u>	<u>Type of Partner</u>	<u>Specific Group/User</u>
9.6	Religious organizations (cont.)	House of Prayer
9.7		Allen Chapel AME Church (Oak Park)
9.8		Greater Mt Zion church
9.9		Mt. Ararat Baptist Church
9.10		Mt Tabor Missionary Church
9.11		Mt Vernon Missionary Baptist
9.12		New Hope Baptist Church
9.13		New Day Apostolic Church
9.14		Oak Grove Missionary Baptist
9.15		Rising Star Missionary Baptist
9.16		St Andrew UM Church + food distribution center
9.17		Ambassador for Christ in Christ Church (Ivanhoe)
9.18		Berean Bible church
9.19		Christ Tabernacle Church
9.20		Christian Fellowship Church
9.21		New Birth Christian Outreach Center
9.22		Prince of Peace Missionary Church
9.23		St James UMC
9.24		Emanuel Cleaver III's church - Eager for neighborhood initiatives
9.25		Sunlight Missionary Baptist Church + food distribution center

