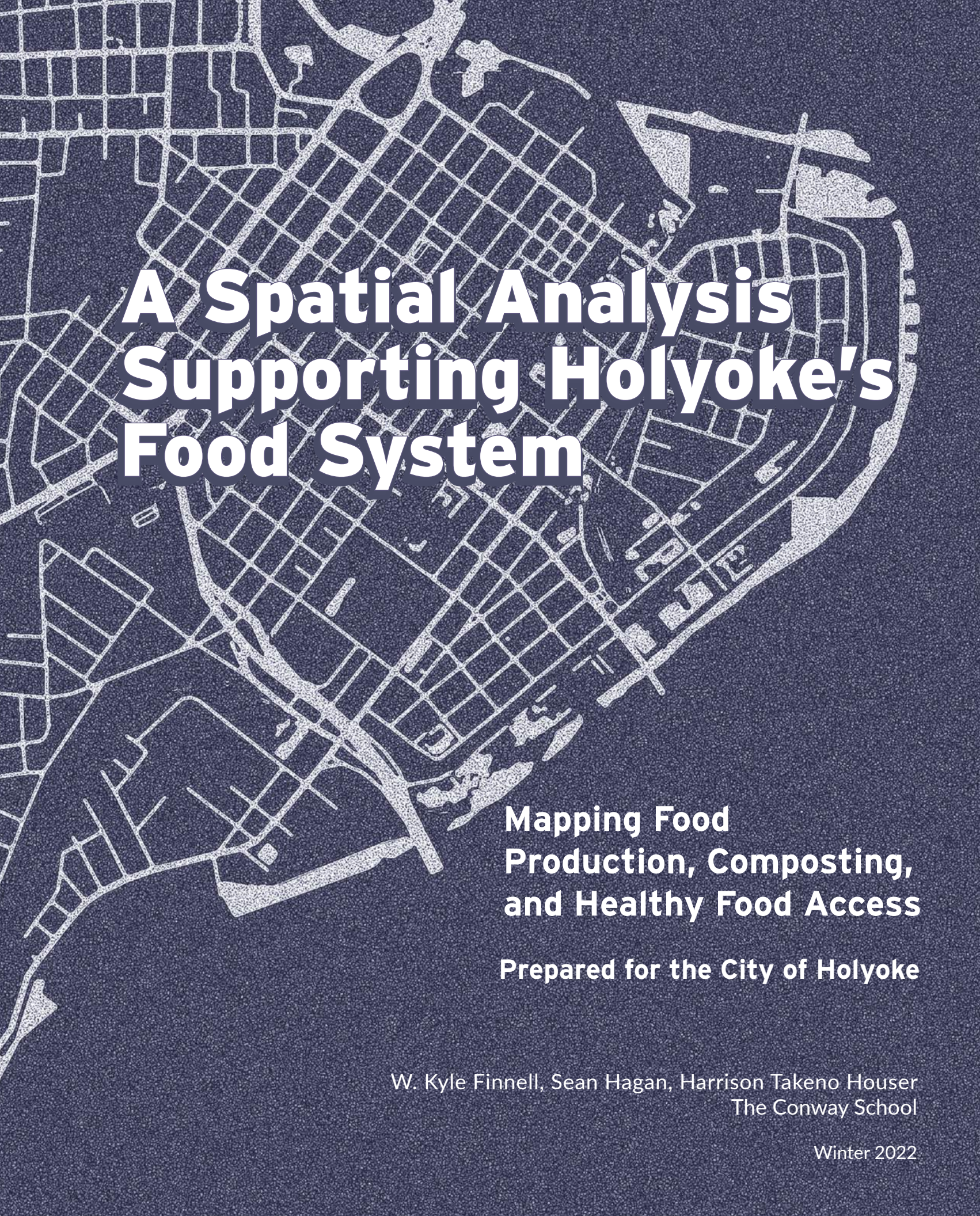

A Spatial Analysis Supporting Holyoke's Food System

Mapping Food Production, Composting, and Healthy Food Access

Prepared for the City of Holyoke

W. Kyle Finnell, Sean Hagan, Harrison Takeno Houser
The Conway School

Winter 2022

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Acknowledgements

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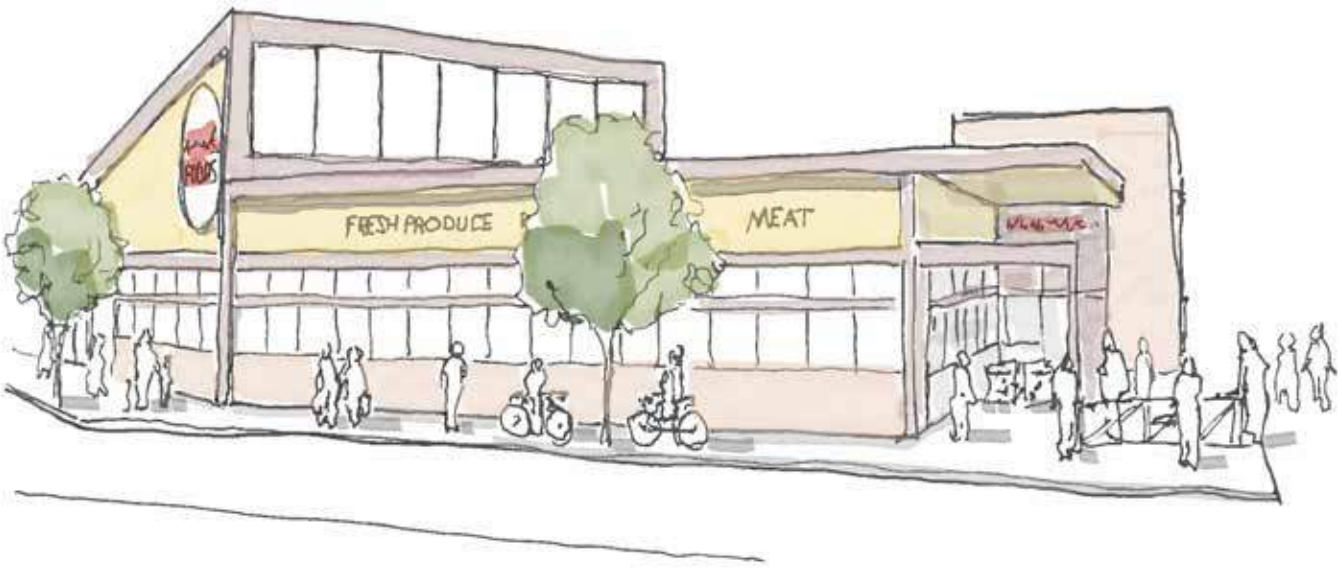
We would also like to extend our deepest appreciation for the faculty, staff, and students at the Conway school for their guidance, curiosity, and encouragement.



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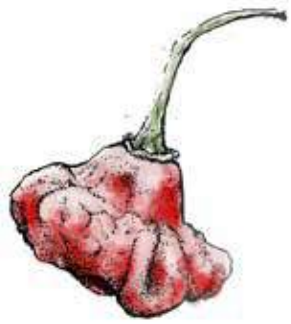
Executive Summary

The Covid-19 pandemic has brought food resiliency to the forefront of discussions pertaining to food systems. To make the local food system better able to adapt to disruptions, community leaders and policy makers need to understand where the food system needs strengthening and where resources should be focused. This report is a resource to support the Holyoke Food & Equity Coalition's efforts to increase the Holyoke food system's resilience, improve healthy food access for residents, and increase opportunities for food-related jobs in the community. This document integrates relevant past research and puts forth additional recommendations based on analyses of food access, the potential for food production, and possible models for city-wide composting. Geographic information systems (GIS) spatial analysis and other tools were used.



Healthy Food Access

The residents of Holyoke face many barriers to accessing healthy, affordable food. High rates of poverty, low rates of vehicle ownership, and a high proportion of renter-occupied housing limit residents' ability to, respectively, purchase healthy foods, conveniently reach grocery stores, and produce their own food at home. Analysis of the physical barriers to healthy food access reveals that transportation and mobility are key obstacles. This chapter provides a spatial picture of the number, type, and location of stores, along with physical barriers to reaching these stores, and recommendations for improving food access.

Food Production Potential

Holyoke has a living legacy of community gardens throughout its downtown neighborhoods. While current zoning ordinances limit small-scale production and sales of agricultural products for many residents, there is ample space available for community organizations and residents to expand outdoor production, both in-ground and on impervious surfaces. Additionally, there are nearly 140 acres suitable for large-scale indoor agriculture in the industrial buildings downtown. These sections present criteria for outdoor and indoor production areas and include maps depicting sites that meet these criteria.

Initiating a Composting Program

Holyoke has been trying to find a site suitable for a community composting operation but has had difficulty finding a site. A community-scale composting system would suit the size limitations present in Holyoke. Aerated static piles and bioreactor systems have promise, given the city's urban conditions. This chapter develops initial physical criteria for composting models appropriate to Holyoke, in particular aerated static piles and bioreactor systems, and includes maps depicting sites in the city that meet these criteria.

Resumen Ejecutivo

La pandemia de Covid-19 ha llevado la resiliencia alimentaria a la vanguardia de los debates acerca de los sistemas alimentarios. Para que el sistema alimentario local pueda adaptarse mejor a las perturbaciones, los líderes de la comunidad y los responsables de la elaboración de políticas deben comprender en qué aspectos debe fortalecerse el sistema alimentario y dónde deben concentrarse los recursos. Este informe es un recurso para apoyar los esfuerzos de la Coalición de Alimentos y Equidad de Holyoke (Holyoke Food & Equity Coalition en inglés) para aumentar la resiliencia del sistema alimentario de Holyoke, mejorar el acceso a alimentos saludables para los residentes y aumentar las oportunidades de empleos relacionados con la alimentación en la comunidad. Este documento integra las investigaciones anteriores pertinentes y formula recomendaciones adicionales basadas en el análisis del acceso a los alimentos, el potencial de producción de alimentos y los posibles modelos de compostaje a escala comunitaria para la ciudad. Se ha utilizado el análisis espacial de los sistemas de información geográfica (SIG) y otras herramientas.

Acceso a Alimentos Saludables

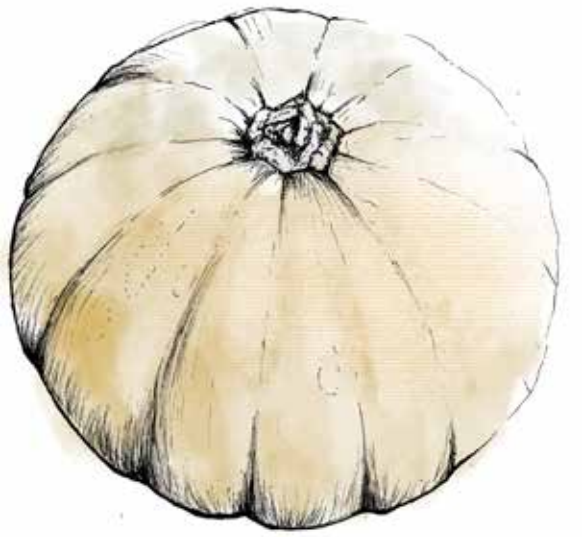
Los residentes de Holyoke se enfrentan a muchas barreras para acceder a alimentos saludables y asequibles. Las altas tasas de pobreza, la baja proporción de quienes poseen vehículos y la alta proporción de viviendas ocupadas por inquilinos limitan la capacidad de los residentes para, respectivamente, comprar alimentos saludables, llegar de forma conveniente a las tiendas de comestibles y producir sus propios alimentos en casa. El análisis de las barreras físicas al acceso a los alimentos saludables revela que el transporte y la movilidad son obstáculos principales. Este capítulo proporciona una imagen espacial del número, tipo y ubicación de las tiendas, junto con las barreras físicas para llegar a estas, y recomendaciones para mejorar el acceso a los alimentos.

Potencial de Producción de Alimentos

Holyoke has a living legacy of community gardens tHolyoke tiene un legado vivo de huertos comunitarios en sus barrios del centro. Mientras que las ordenanzas de zonificación actuales limitan la producción a pequeña escala y la venta de productos agrícolas para muchos residentes, existe un amplio espacio disponible en la que las organizaciones comunitarias y los residentes podrían ampliar la producción al aire libre, tanto en la tierra como en las superficies impermeables. Además, hay casi 140 acres adecuados para la agricultura bajo techo a gran escala en los edificios industriales del centro. Estas secciones presentan los criterios para las áreas de producción al aire libre y bajo techo, e incluyen mapas que muestran los sitios que cumplen con estos criterios.

Inicio de un Programa de Compostaje

Holyoke ha tratado de encontrar un sitio adecuado para una operación de compostaje comunitario, pero ha tenido dificultades en encontrar un sitio. Un sistema de compostaje a escala comunitaria se adaptaría a las limitaciones de tamaño presentes en Holyoke. Las pilas estáticas aireadas y los sistemas de biorreactores son prometedores, dadas las condiciones urbanas de la ciudad. Este capítulo desarrolla los criterios físicos iniciales para los modelos de compostaje que serían apropiados para Holyoke, en particular las pilas estáticas aireadas y los sistemas de biorreactores, e incluye mapas que muestran los lugares de la ciudad que cumplen con estos criterios.



Recommendations

This report proposes the following recommendations:

- **Include walkability in the discussion of healthy food availability and aim to make healthy food available within a half-mile distance of residents' homes.**
- **If a Healthy Bodega Program is initiated, focus it in areas with the highest concentration of households without a vehicle, with people with income below poverty level, and outside the half-mile walking distance of supermarkets.**
- **Start or expand food production at schools with available land, including Holyoke Community College.**
- **When installing container gardens in areas with the highest amount of impervious surface, explore opportunities to remove asphalt or other impervious surfaces; this would have the additional impact of reducing runoff.**
- **Coordinate with the Parks Department to create community gardens in parks with prime farmland soils.**
- **Partner with institutions (places of worship and hospitals) to start community gardens.**
- **Create and adopt a comprehensive urban agriculture chapter for the zoning code that expands opportunities for food-related enterprises and increases food security.**
- **Investigate the feasibility of a city-wide composting plan including an analysis of the environmental, economic and social impacts.**
- **Amend zoning regulations to explicitly allow for certain types and scales of composting in residential zones of Holyoke in order to support urban agriculture.**

Recomendaciones

Este informe propone las siguientes recomendaciones:

- **Incluir la transitabilidad peatonal en la discusión sobre la disponibilidad de alimentos saludables y tener como meta que los alimentos saludables estén disponibles a media milla de distancia de los hogares de los residentes.**
- **Si se inicia un Programa de Bodegas Saludables, centrarlo en las zonas con mayor concentración de hogares sin vehículo, con personas con ingresos por debajo del nivel de pobreza y fuera de la distancia de media milla a pie de los supermercados.**
- **Iniciar o ampliar la producción de alimentos en las escuelas con terrenos disponibles, incluyendo en Holyoke Community College.**
- **Cuando se instalen huertos en contenedores en zonas con la mayor cantidad de superficie impermeable, explorar las oportunidades para eliminar el asfalto u otras superficies impermeables; esto tendría el impacto adicional de reducir la escorrentía.**
- **Coordinar con el Departamento de Parques la creación de jardines comunitarios en parques con tierras agrícolas de primera calidad.**
- **Asociarse con instituciones (lugares de culto y hospitales) para crear huertos comunitarios.**
- **Crear y adoptar un capítulo integral de agricultura urbana para el código de zonificación que amplíe las oportunidades para las empresas relacionadas con la alimentación y aumente la seguridad alimentaria.**
- **Investigar la viabilidad de un plan de compostaje para toda la ciudad que incluya un análisis de los impactos ambientales, económicos y sociales.**
- **Modificar la normativa de zonificación para permitir explícitamente ciertos tipos y escalas de compostaje en las zonas residenciales de Holyoke con el fin de apoyar la agricultura urbana.**

01 Introduction

Why Another Food Study?

A Spatial Analysis Supporting Holyoke's Food System presents possible locations for increasing food production within the city, shows the overlapping physical barriers to food for the most vulnerable residents, and identifies the potential for composting in the food waste sector in Holyoke. These are based on analyses of environmental and social conditions in the city.

Past Studies

Holyoke is a city familiar with food system studies. Its residents are active in their many attempts to solve issues around food access and security. Despite decades of exemplary and well documented efforts, the slow movement of change can leave community members disappointed when facing yet another food system study.

This document acknowledges the depth and thoroughness of past reports and the action items already created by community members and supplements that literature with spatial analysis that aims to add perspective and renewed focus on food system issues facing the city.

This document refers to many past studies conducted in Holyoke, but uses the 2017 *Community Action Plan* developed during a Local Foods, Local Places Technical Assistance Workshop as a framework. The *Community Action Plan*'s workshop examined the existing social infrastructure related to food. It engaged stakeholders, identified existing assets, and recommended tasks to improve the social fabric of the food system; however, physical components and spatial mapping assessment were not a focus of the plan.

This document begins with a number of action items identified as priorities by community partners in the *Community Action Plan* and provides additional analysis to support the plan's recommendations. Original analysis conducted for this project supports additional recommendations in summary of each chapter.

This document aims to answer the following questions:

What are the physical barriers for residents to access healthy food?

What properties are suitable for food production, in what capacity and with what type of production?

What policy changes would support residents to grow more food?

What criteria are relevant for considering a city-wide composting program?

What does an inventory of the city's food system component assets reveal about where to focus efforts towards building a stronger system?

Project Partners

The principle clients are the City of Holyoke Office of Planning and Economic Development and the Holyoke Food and Equity Coalition. Other community partners include the Holyoke Community College, Holyoke Farmer's Market, Nueva Esperanza, and Nuestras Raíces.

Core Team Members

Aaron Vega, Director of Planning and Economic Development

Cynthia Espinosa, Executive Director of Nueva Esperanza, Mass in Motion City Coordinator, and Co-Director of the Holyoke Food and Equity Collective

JR Rivera, Holyoke Farmers Market Coordinator

Warren Leigh, Professor and Chef at Holyoke Community College

The following are overarching goals of the partner organizations:

1. Increase Holyoke's food system's **resilience.**

2. Improve healthy food **access** for residents of Holyoke.

3. Increase opportunities for food-related **jobs** in the community.

Defining "Resilience"

In defining key terms, this report cites specific sources and experts. The Johns Hopkins Center for a Livable Future defines resilience as "the ability to prepare for, withstand, and recover from a crisis or disruption. A resilient food system is able to withstand and recover from disruptions in a way that ensures a sufficient supply of acceptable and accessible food for all" (CLF).

Defining "Access"

Healthy food access includes the following aspects: physical, economic, cultural appropriateness, and the knowledge, skills, and resources to prepare food. (EPA, 6)

Food System Components

Food systems involve complex interconnected components supported by a multitude of services. While isolating the system's components allows us to focus on specific aspects, such an analysis may overlook areas of connection and interdependence. When exploring methods to build up and support any particular component, care should be taken to acknowledge how that component relates to the system as a whole.

- **Production:** small farms, community gardens, backyard gardens, container gardens, Controlled Environment Agriculture (indoor), greenhouse growing
- **Commercial Processing, Storage and Distribution:** food processing businesses, food hubs, shared processing facilities, institutional facilities, community kitchens, wholesale distribution
- **Retail sales and Hunger Relief:** supermarkets, neighborhood food stores, food pantries, mobile markets, gift economy
- **Preparation and Consumption:** restaurants, home preparation, end-users of food
- **Waste, Reuse and Recovery:** surplus food use, emergency food donation, gleaning, composting, landfill

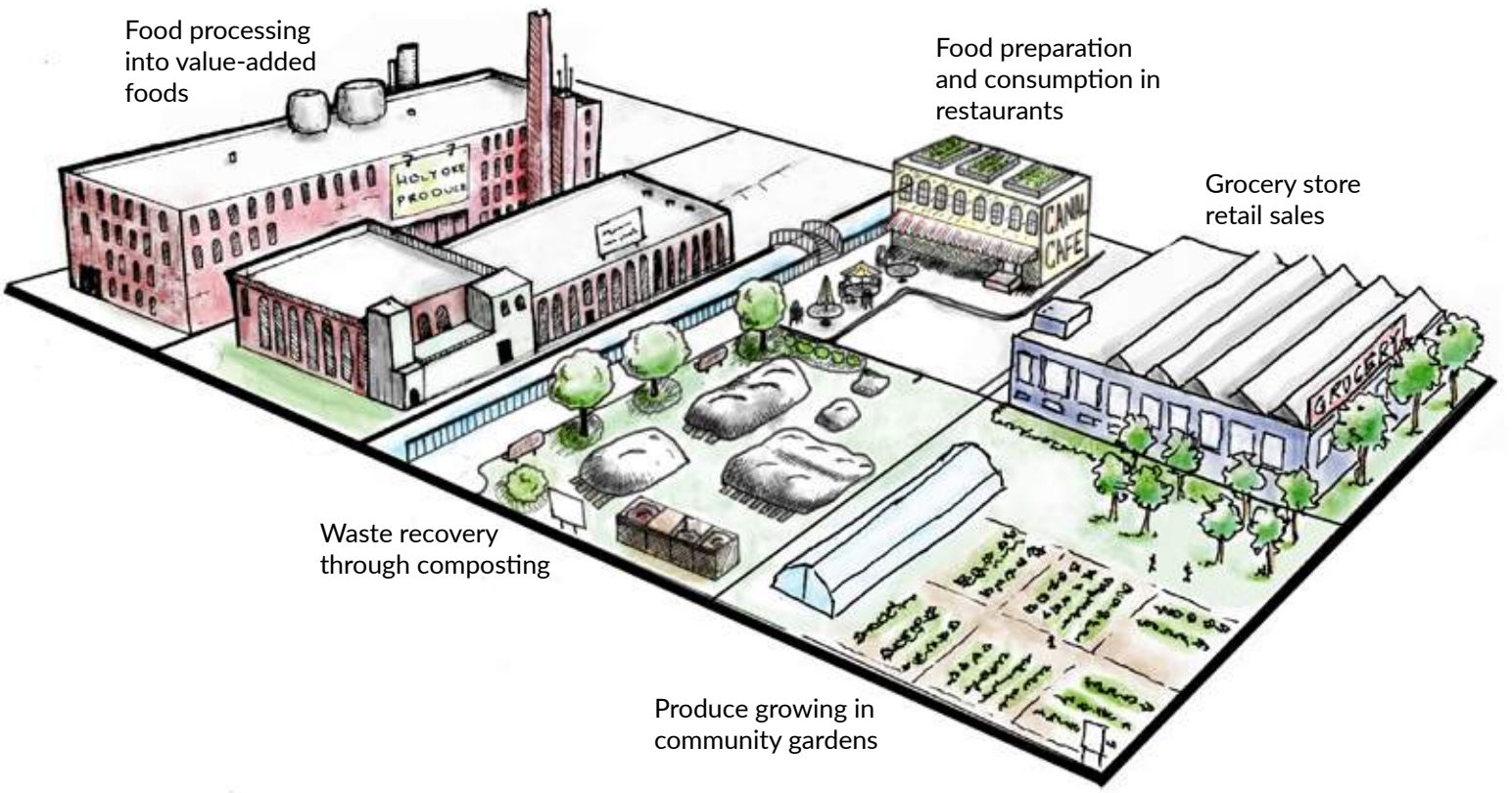
This study examines the following aspects of Holyoke's food system:

- **Analysis of physical barriers and their implications for healthy food access.**
- **Criteria for and identification of potential outdoor food production locations.**
- **Criteria for and identification of potential indoor food production locations.**
- **Initial investigation of opportunities for city-wide composting.**

Defining "Local"

This study applies aspects of Ruhf and Clancy's definition of "local food system" to Holyoke's food system (Ruhf and Clancy, 4). "Local" includes food grown for a resident's household within the city (backyard and community gardens); direct marketing (farmers markets, CSA, farm stands, farm-to-retail and farm-to-institution); small-scale aggregation for distribution to retail and institutions in Holyoke; predominantly small scale farms; and a loose geographic boundary of the Pioneer Valley when referring to sourcing food for the city.

CONCEPTUALIZING THE FOOD SYSTEM'S COMPONENTS



Previous Studies

This study builds on action plans and studies conducted by community leaders, outside organizations, and academics. These past reports cover state, regional, city, and neighborhood levels. This report uses and integrates relevant past research and puts forth additional recommendations based on new analysis.

At the **state** level, the 2015 ***Massachusetts Local Food Action Plan*** from the MA Food Policy Council identified areas for helping local food systems. The report identified the need to improve educational resources, update agricultural policy, and support farms and food business with technical support.

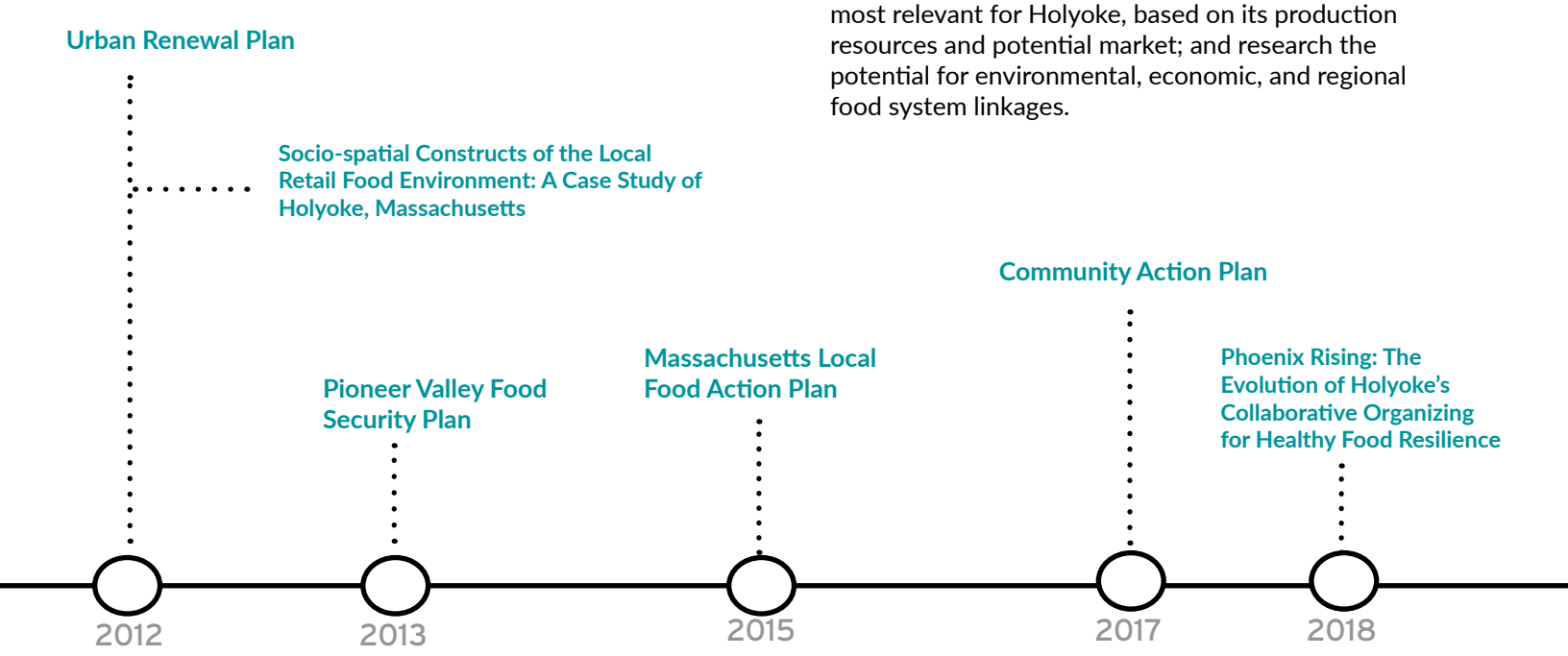
At the **regional** level, the ***Pioneer Valley Food Security Plan*** from the Pioneer Valley Planning Commission in 2013 discussed the widespread problem of hunger throughout the region and the need for wider use of nutritional assistance. The report recognized the economic development potential in more local food production and processing, the benefits for producer and consumer in farm-to-institution and farm-to-school distribution, and the potential for more food waste recycling through composting. The report made corresponding recommendations from these findings.

Reports at the **city** level span many areas of focus that directly or indirectly tie into the local food system.

The City's ***Urban Renewal, Plan, Connect, Construct, Create*** in 2010 looked at economic development potential particularly in the downtown area by capitalizing on a diverse stock of commercial, municipal, residential, and industrial buildings; connecting people and places; and constructing new public infrastructure.

The Community Action Plan for Holyoke is a product of the EPA's Local Food, Local Places Technical Assistance Workshop Program in 2017. Recommendations put forth in the plan stemmed from five main objectives: increase organizational capacity and collaboration around food-related activities; improve healthy food access; increase production of food within the city of Holyoke; increase marketing opportunities for farmers, growers, and food businesses; and grow downtown Holyoke as a destination.

The Controlled Environment Agriculture Study from Northbound Ventures in 2019 assessed the indoor agriculture industry and potential models for Holyoke. The study focused on three key objectives: provide a sketch of the market for Controlled Environment Agriculture (CEA) products and industry presence; determine the most successful types of CEA products and identify the top crops most relevant for Holyoke, based on its production resources and potential market; and research the potential for environmental, economic, and regional food system linkages.



The City's ***Urban Forest Equity Plan*** in 2021 conducted a public tree inventory and recommended action items for effectively increasing the tree canopy, engaging the community around tree care, where to plant more trees, and how to approach care for sidewalk trees in Holyoke.

Additional academic research has looked at specific issues related to Holyoke's food system relevant to this study:

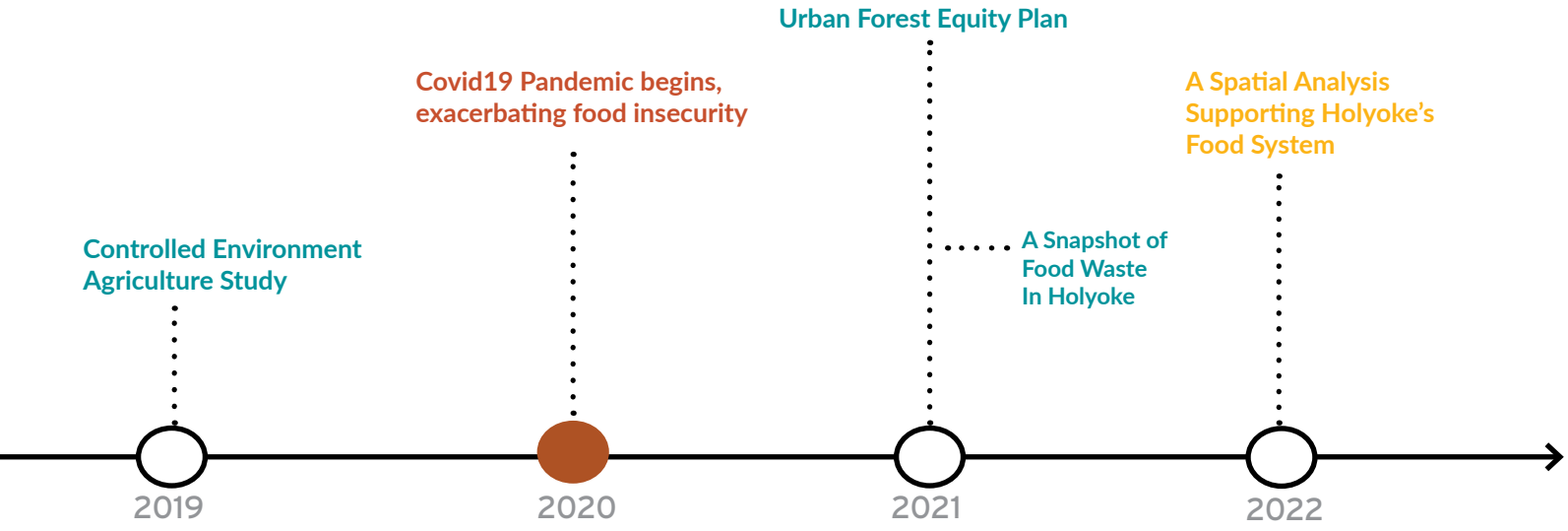
Socio-spatial Constructs of the Local Retail Food Environment: A Case Study of Holyoke, Massachusetts by Walter F. Ramsey in 2010 found a lack of healthy food availability in local food stores, particularly in smaller stores, and identified social and physical infrastructure barriers preventing stores from carrying more healthy food.

"A Snapshot of Food Waste In Holyoke" by Melissa Sandor and Emmy Whistler in 2021 identified ways Holyoke grocery store food waste is diverted towards food waste recovery (feeding the hungry, animal feed, industrial use) and barriers to food waste recovery.

"Phoenix Rising: The Evolution of Holyoke's Collaborative Organizing for Healthy Food Resilience" by Catherine Sands et al. in 2018 examined the now disbanded Holyoke Food & Fitness Policy Council as a case study for how leadership structure and lack of community involvement in decision making can disrupt community work and how to refocus efforts.

Impact of the Covid-19 Pandemic

The Covid-19 pandemic has brought food resiliency to the forefront of food systems discussion in a more urgent way. Supply chain disruptions in 2020 left shelves temporarily empty for basic food items. As the economy came to a halt, food banks sought additional donations to serve more people needing food assistance. The Food Bank of Western Massachusetts saw a 17 percent jump in people using its services from April 2020 to April 2021, straining its distribution system (WBUR). Additionally, community organizations faced challenges to performing their work in order to protect the health of staff and the community. In moving into a post-pandemic reality, efforts to make the local food system better able to cope with and adapt to such strains on society require an understanding of where the food system needs strengthening and where resources should be focused.



02 Engaging Stakeholders

Introduction

Recognizing the extent of past engagement with community members in studies and reports such as the *Community Action Plan* and acknowledging the limits to in-person gatherings in the midst of the Covid-19 pandemic, the planning team engaged with community members in a variety of remote and small-group events. Four strategies were employed to engage with community members:

- Remote community group meetings
- Online surveys
- Individual interviews
- Small focus groups

Remote Meetings

In January and February 2022, the planning team was invited to attend remote meetings hosted by elected officials and city departments that support different aspects of the Holyoke food system. During these meetings, planning team members shared a brief introduction to the project, and community members spoke to the current state of food access in the city. These meetings helped inform additional community engagement activities.

GUIDING QUESTIONS

Following initial client meetings and an early review of past Holyoke studies, key questions regarding the food system in Holyoke emerged to guide community engagement activities:

What are the biggest barriers to healthy food access for residents?

What would a resilient food system in Holyoke look like?

What are Holyoke's food-related assets?

What information or data would be helpful for improving the local food system?

On January 18 and 31, 2022, the team attended two meetings hosted by State Representative Pat Duffy and attended by representatives from over ten community organizations. The regularly occurring meetings are an opportunity for public service providers and representatives from community non-profits to speak with their state representative and fellow community leaders to coordinate services and resources. The planning team created a list of potential interviewees and focus group participants based on meeting attendees.

On February 10, 2022, the team attended an industry roundtable hosted by the Holyoke Office of Planning and Economic Development for restaurant owners and operators. This meeting was the first in a series of regularly scheduled roundtable discussions with business owners and industry representatives within the community. Five business owners/operators participated in the meeting, along with staff from Holyoke Community College's Culinary Arts program. The planning team shared details regarding the project and shared an online survey for restaurant owners/operators to complete.

Limited Responses from Surveys

An online survey was crafted using the guiding questions and included a map of the city with its wards. In an attempt to gather a variety of perspectives from people working in food production, processing, and distribution, the planning team shared the general survey with vendors from the Winter Holyoke Farmers Market and a link to the survey was sent to the HCC Culinary Arts department.

The original survey was adapted for restauranteurs and shared during the industry roundtable hosted by the Holyoke Office of Planning and Economic Development. The planning team sought input from restaurant owners and operators to gain a clearer understanding of perspectives on food processing, distribution, and consumption.

Responses to the surveys identified two wards, Ward 1 at 40 percent and Ward 2 at percent, as facing the largest barriers to accessing healthy food. The most commonly noted barriers to accessing healthy food were affordability or cost of food, the transportation needs of getting to the market, and the small number of supermarkets throughout the city. When asked for Holyoke's strengths as related to physical parts of the city, 60 percent of respondents noted the buildings, those that could be refurbished and vacant warehouses specifically. Respondents also recognized the number of community organizations working to solve food insecurity, the generally lower energy costs, and the easy access to highways as strengths within the city.

Of the over 100 invitees to participate in the online surveys, only five completed the survey. Four responses came from vendors at the Winter Farmers Market, with one coming from an independent restaurant owner. The planning team talked directly with vendors at the farmers market on multiple occasions prior to sending the survey, and this engagement likely contributed to a higher percentage of responses coming back from this group. The low proportion of participants from other sectors suggests ineffectiveness in the survey format or outreach.

Given the busy schedule of producers, restaurant owners, and culinary arts students, additional time and attention for feedback may have been too much to request. There was also little incentive to engage with the survey beyond individual interest. And the survey was shared only once during the project, with no reminders sent to garner additional feedback.

Insights from Interviews

In February and March 2022, interviews were conducted with core team participants and city residents with personal experience with various parts of the food system. Interviews were also conducted with industry professionals and experts for research on specific topics. Ten interviews were conducted in all.

Interviewees from Holyoke agreed that residents in Wards 1 and 2 face the most significant barriers to accessing healthy food. Interviewees identified transportation, zoning restrictions on agriculture, and overall cost-of-living as the barriers that have the greatest impact on residents accessing healthy food. Community members interviewed noted the Holyoke Farmers Market, Nuestras Raíces, and the quantity of independent corner stores and bodegas as assets of the city.

Community Perspective from Focus Groups

The planning team hosted two focus groups, on February 8 and March 2, 2022, each with four participants from local non-profits, agencies, and city departments. Both sessions were held at Nueva Esperanza, a community development corporation focusing on supporting the Puerto Rican and Afro-caribbean communities within Holyoke.

The focus groups opened with a grounding exercise to share participants' perspectives and relevant work experience and to acknowledge where gaps in expertise/knowledge might be within the group. Mapping activities designed to jump start discussion had participants mark areas of the city with the hardest time accessing healthy food and areas they would like to see receive more resources.

In addition to the topics of community assets and barriers to food access, the topic of "resilience" was given attention in order to better understand how community members define the term in relation to the food system. The first group explored this topic in conversation and together articulated a vision that values expanding access to community gardens, encouraging backyard production, bringing a grocery store to the Flats in Ward 1, making commercial kitchen space more accessible for residents, and incorporating composting as a resource for the community.

Based on the first group's definition, the planning team crafted a vision of a resilient Holyoke for the second focus group. These community members were able to see a graphic representation of these

February 8 focus group participants and planning team members discuss barriers to healthy food access.

> **"Systematically the people affected aren't at the table. There is a civic engagement crisis in our city. People don't understand the value of their presence to make change."**
>
> *– Focus group participant, in speaking about how Holyoke residents engage with planning processes*

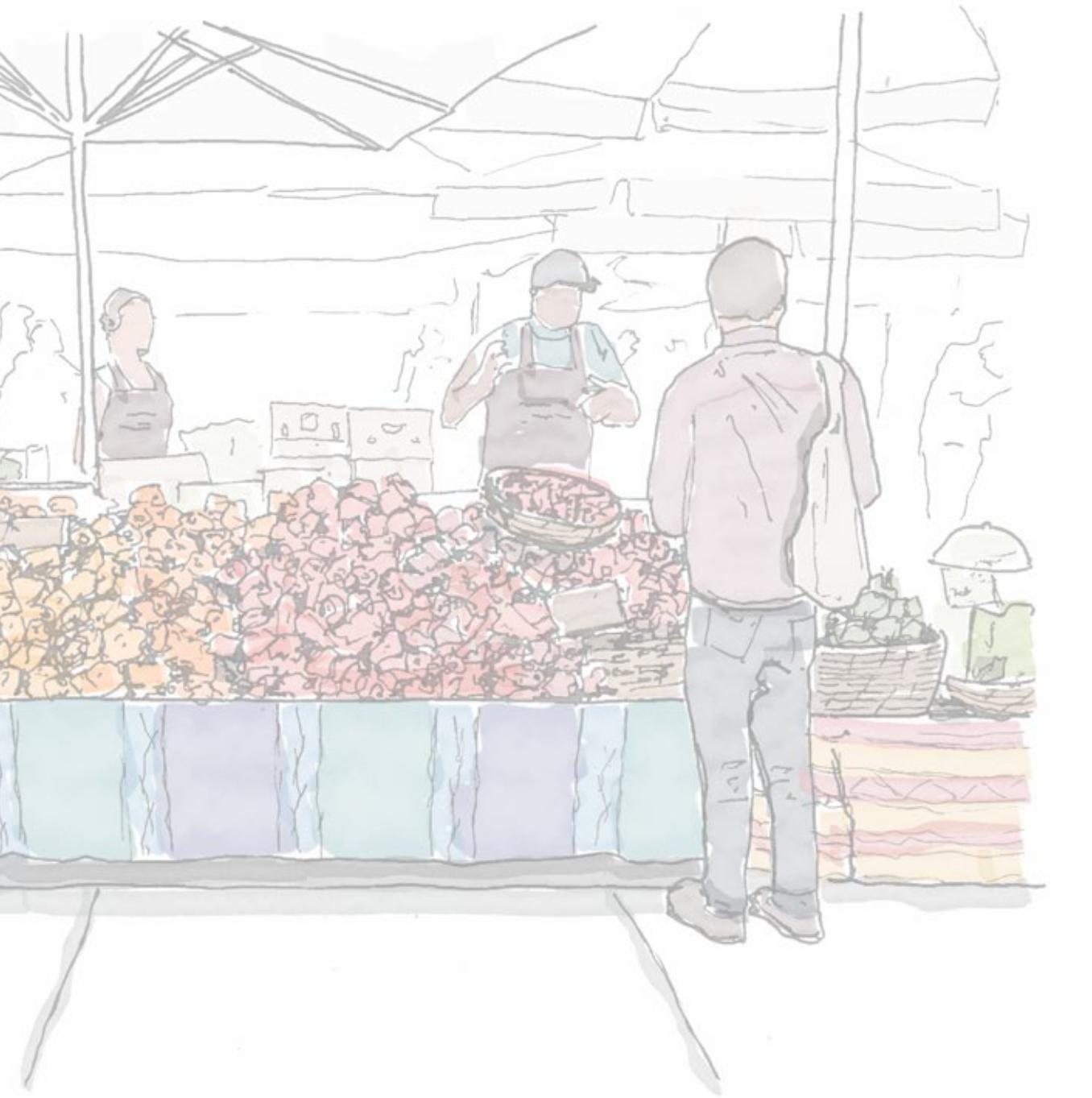
various aspects and offer feedback on the synthesized definition from the first group. While sharing a desire for aspects of the resiliency vision, participants also expressed frustration with their feasibility when they lack community buy-in and engagement and adaquate resources.

Out of interviews and focus group discussions, recurring topics emerged:

- A desire for expanded entrepreneurial support for new food businesses.
- Recognition of the importance of education for all community members, particularly around healthy eating and proper food storage.
- Acknowledgement that residents downtown could use additional transportation options, such as a downtown shuttle route.
- The importance of coordination between organizations doing emergency food distribution to maximize reaching those in need.
- A desire for schools to build educational gardens on school grounds.
- The importance of engaging with individual wards to identify shared goals and priorities for improving the food system.
- An acknowledgement that air and drinking water quality are not prioritized in food system analysis.
- Desire to see a food hub develop in the city to support food businesses.
- Acknowledgment that bodegas and corner markets have potential for improving healthy food access but doing so comes with economic, logistical and educational challenges.

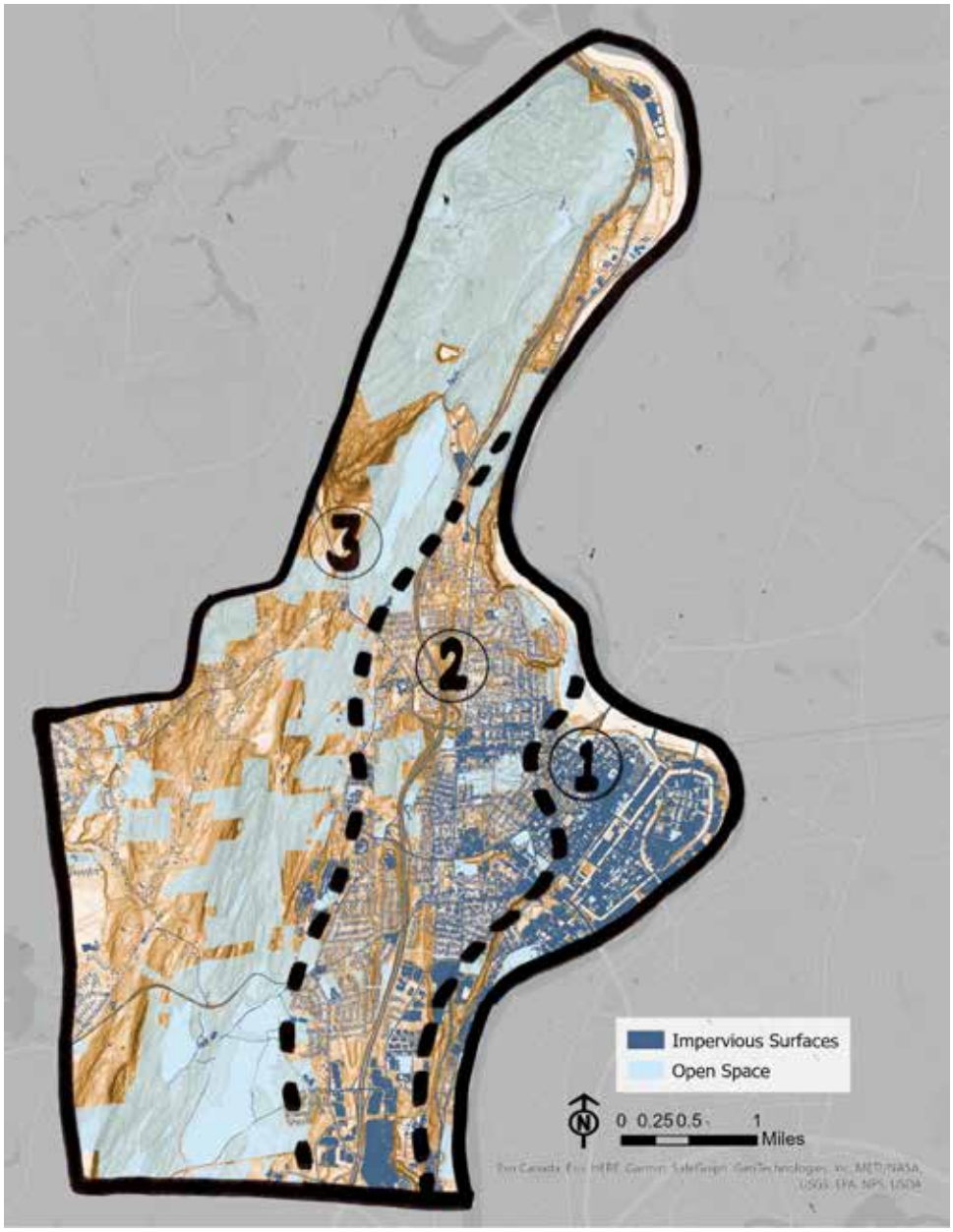
03

Existing Conditions



Physical Zones

Three Distinct Character Zones Of Holyoke



Holyoke has developed three distinct zones characterized by open land and the density of physical infrastructure.

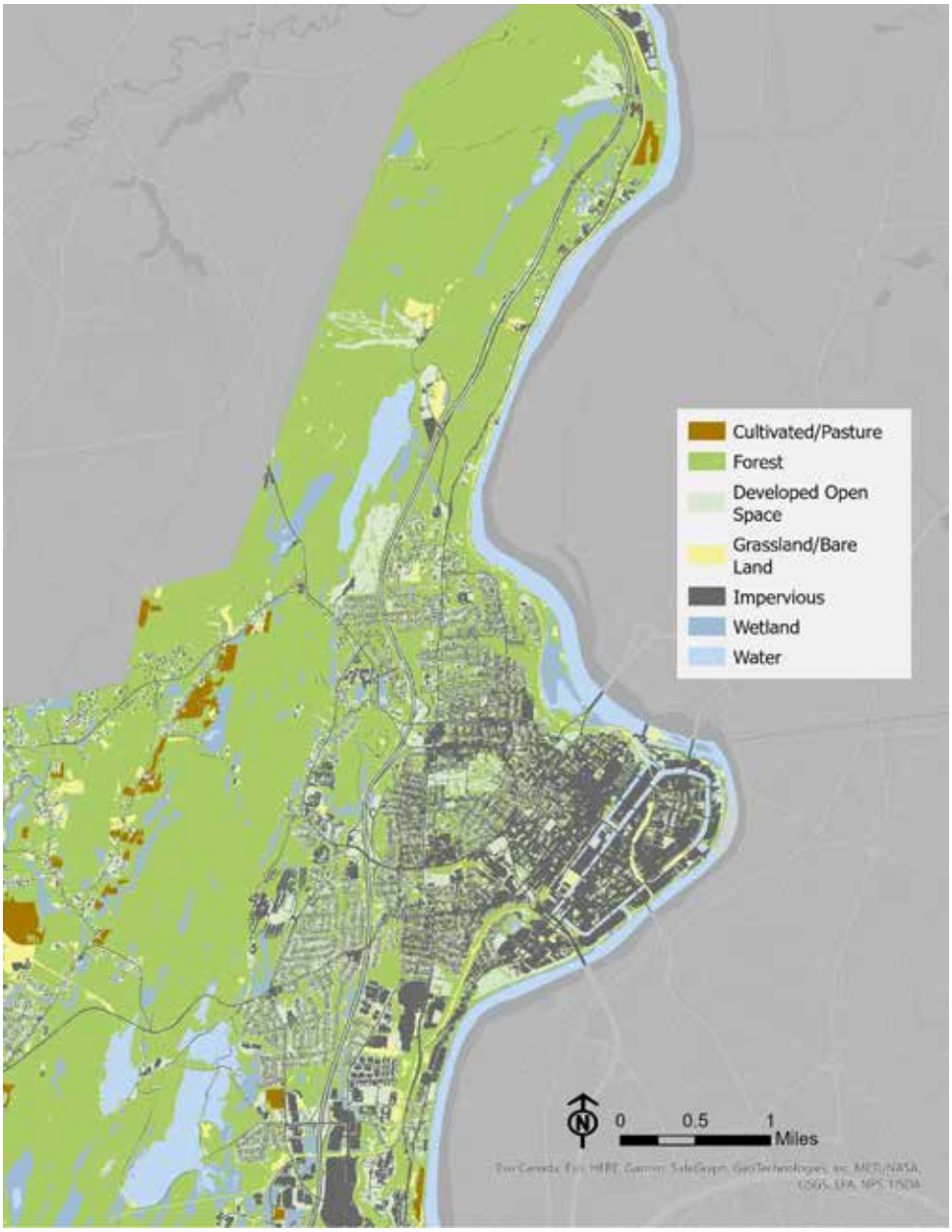
Zone One is the industrial center, where nineteenth-century mills and dense workforce housing intermix. The Connecticut River borders this heavily developed area.

Zone Two is the commercial center, where transportation routes cross through neighborhoods and shopping plazas. This area includes residential neighborhoods and the I-91 corridor.

Zone Three is the rural edge, where a large portion of natural resources are conserved, and housing is dispersed. This area includes the Mount Tom Range.

Land Cover

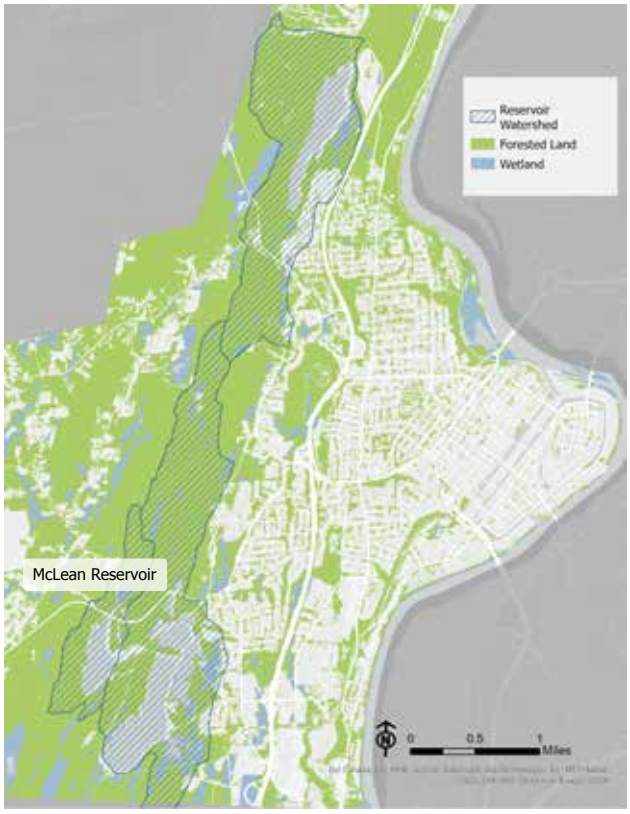
Surface Cover Types Across the City



Land cover shows the city divided similarly to the physical characteristics with much of the forested area of the city to the northwest on and around Mount Tom, and much of the impervious surfaces in the more densely populated areas to the east. There are 7,842 acres of forested land, 1,749 acres of developed open space and 2,603 acres of impervious surfaces. Cultivated land and pasture land make up less than 200 acres combined.

Water Quality

Public Water Supply Watersheds



Water is connected to all parts of the food system. Holyoke's public water supply comes from a network of reservoirs owned by Holyoke Water Works (HWW). The primary reservoir watersheds (catchment basins which directly feed the reservoirs) are legally protected according to state guidelines and outlined in the HWW's Watershed Resource Protection Plan, which is reviewed annually to ensure legal adherence and continued water quality. These reservoirs are also protected by large expanses of forested land cover, which act as vegetative filters for the public water supply.

The HWW's Annual Water Systems Report 2018 showed contaminants below the maximum contaminant level allowed by the EPA (Holyoke Water Works, 2). Lead levels in Holyoke were 4.4 ppb, below the action level of 15 ppb; however, even moderate to low levels of lead exposure can have detrimental health effects (Mulvihill). Lead contamination is most often due to corroded service pipes, an issue in the water delivery system through the city.

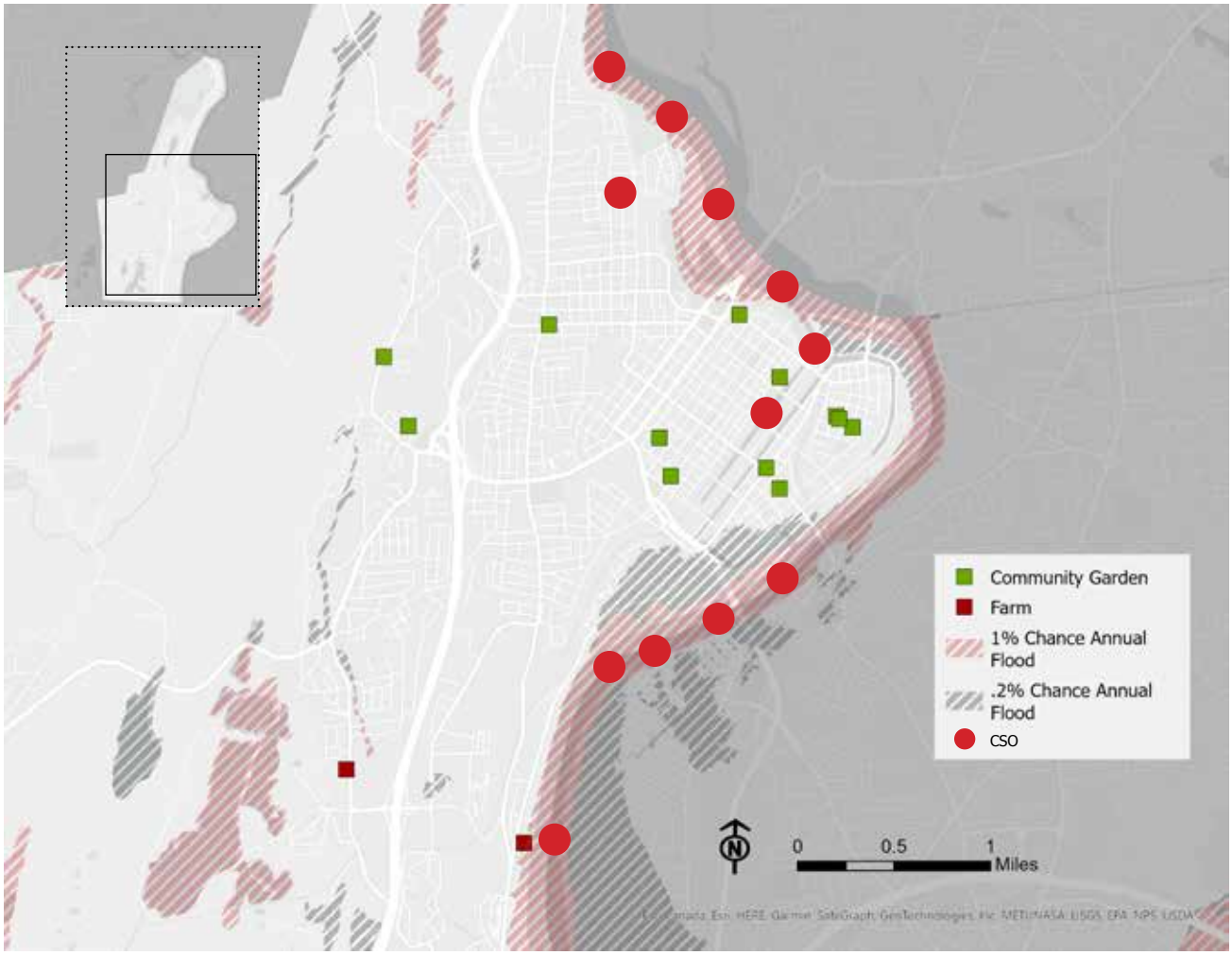
Organic Waste Recovery

Yard-waste Disposal Site

Holyoke does not have a municipal compost program for residents; however, the City does divert residential yard waste from going to landfills and incinerators as required by state regulations. Yard waste can be dropped off adjacent to the water treatment facility on Berkshire Street. According to a city official, this waste is contracted out to be disposed of at a designated diversion site outside the city.

Combined Sewer Overflows (CSO)

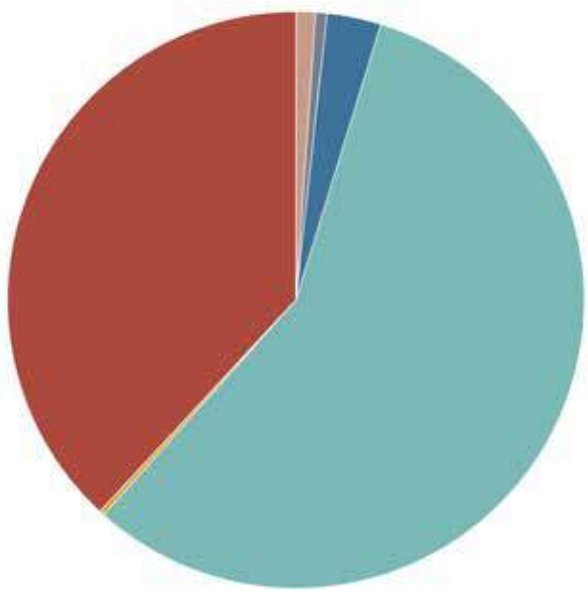
Potential Sources of Contamination



Combined Sewer Overflows (CSO) can release hazardous waste onto adjacent land during major storm events. CSO contamination was an issue following 2011's Hurricane Irene, which caused flooding in southern Holyoke. None of Holyoke's remaining CSOs are adjacent to open land identified as potential garden sites in the following chapters; however, sites in flood zones face contamination risk from any CSO emptying into adjacent water bodies.

City Demographics

Holyoke Population by Race (2020)



Source: U.S. Census Bureau's American Community Survey (ACS) 2016-2020 5-year estimates
10% margin of error

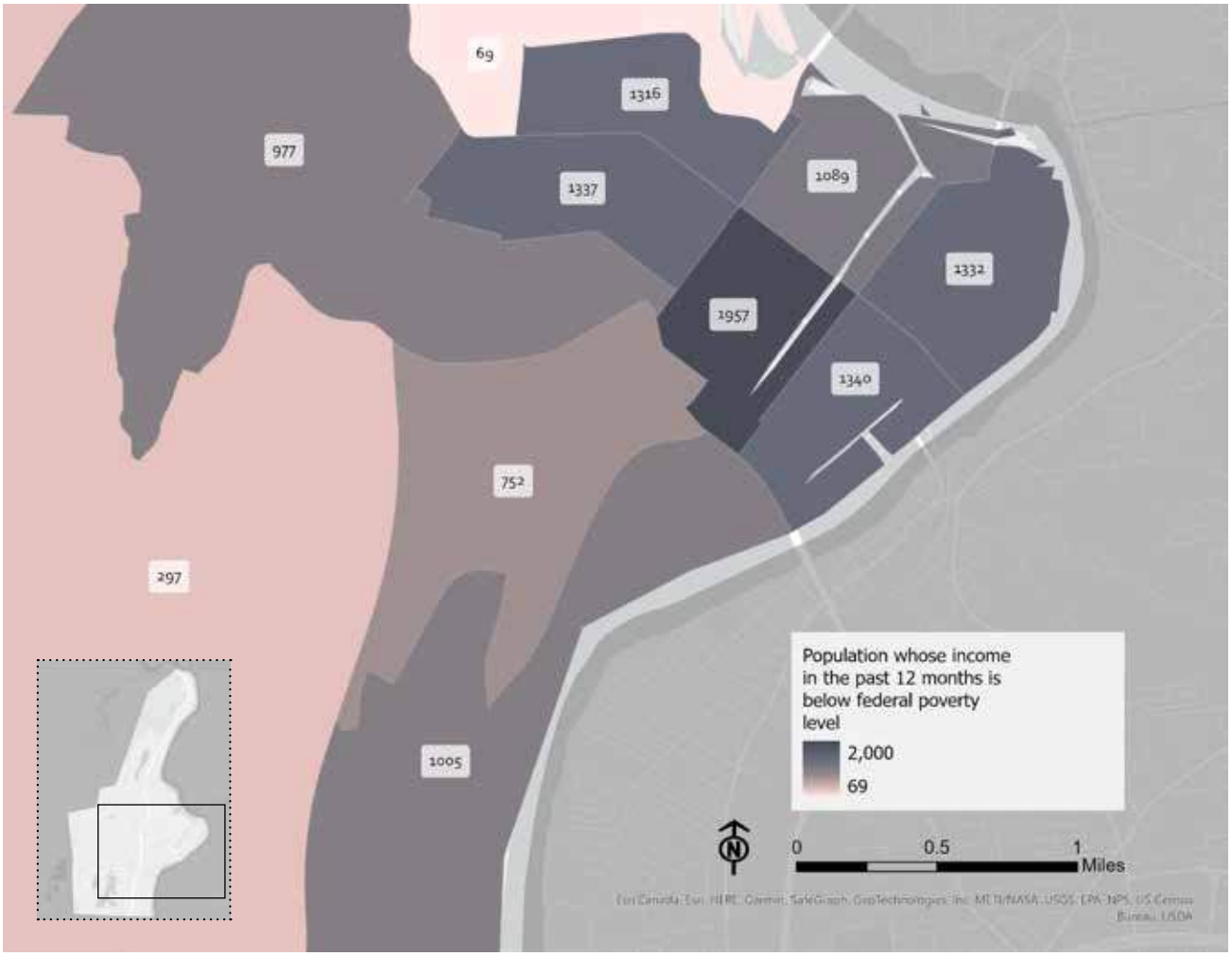
Holyoke has a significant number of residents with Puerto Rican heritage, making up over half of the city's population. Meeting the food access needs of Holyoke residents equitably requires an availability of culturally specific foods. Similarly, community services must have the cultural understanding and speak the languages of the residents those services aim to help.

Mural at Nueva Esperanza


PUERTO RICO
HOLYOKE
Isla Del Encanto

Poverty Rates

Population whose Income is Below Poverty Level

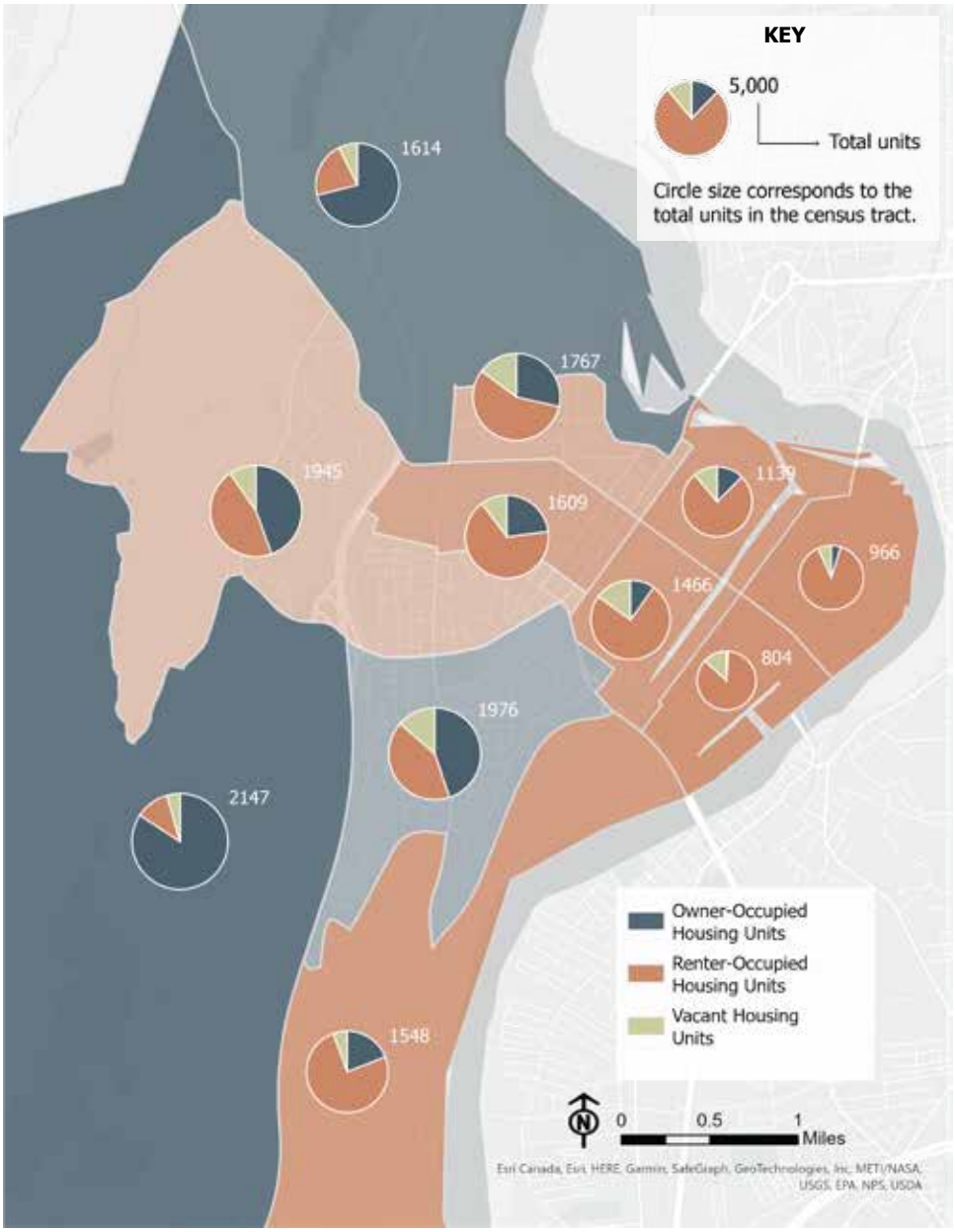


Source: U.S. Census Bureau's American Community Survey (ACS) 2016-2020 5-year estimates
10% margin of error

2015-2019 ACS data shows that over 5,700 residents live below the poverty line (29 percent). Most of these residents live in the downtown area. This population is most likely to need additional help with hunger relief services such as SNAP and grocery distributions from food pantries. Additionally, these residents have financial limitations when shopping for groceries where price becomes a primary factor in determining what food to buy.

Housing by Occupancy

Owner-Occupied, Renter-Occupied and Vacant Housing



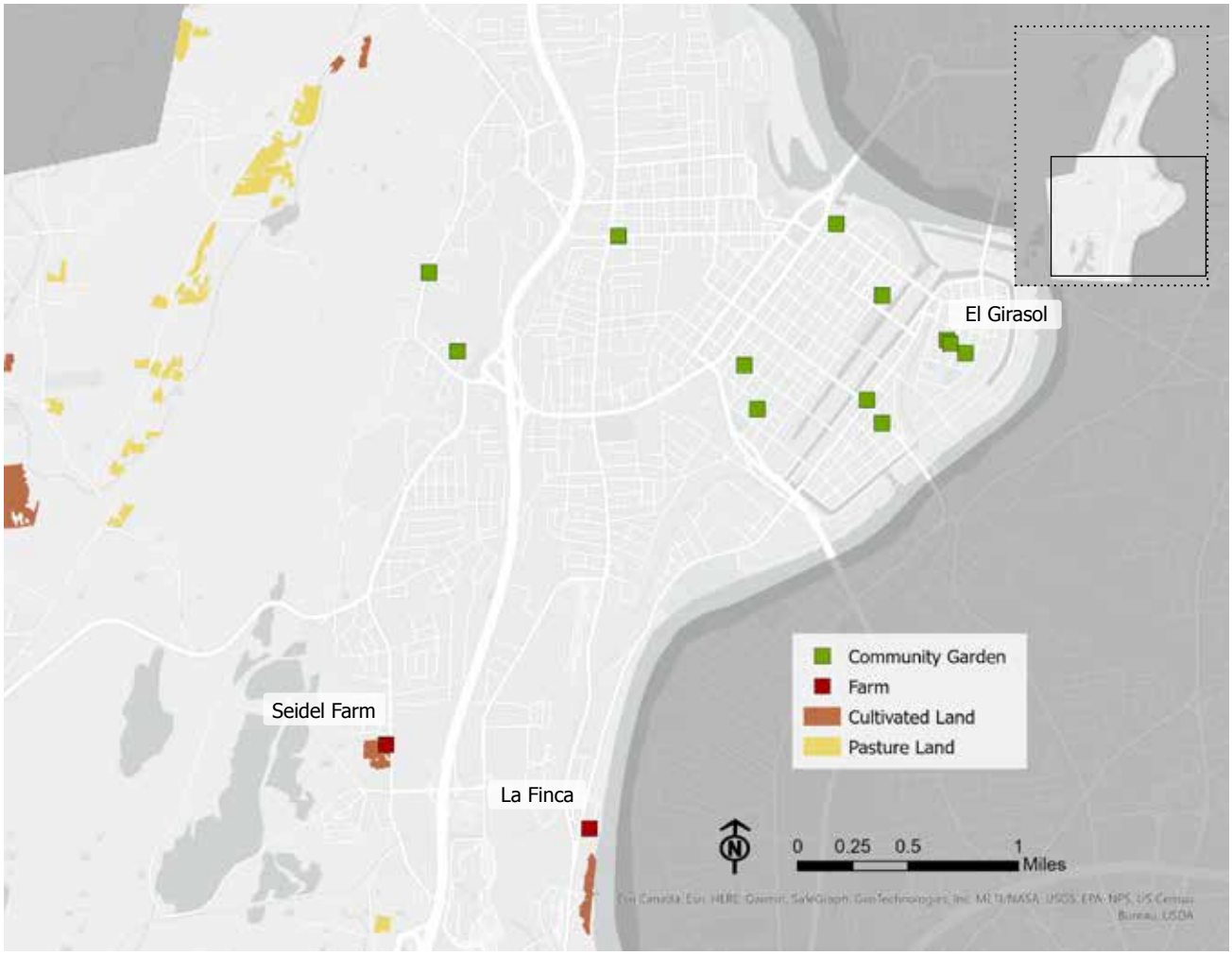
Source: U.S. Census Bureau's American Community Survey (ACS) 2016-2020 5-year estimates
10% margin of error

The majority of housing is renter-occupied in the lower income areas of the city. Large areas of renter-occupied housing overlap with areas where there are large numbers of people living below the poverty line. Much of this housing is apartment buildings. There is a mix of renter-occupied and owner-occupied housing in areas where there are single family and multi-family houses. Owner-occupied housing dominates the less densely populated areas of the City.

The Holyoke Farmers Market dates back to July 24, 1917, when Holyoke became the first city in western Massachusetts to open a modern farmers market.

Community Gardens and Farms

Cultivated Land in the City



Farm-scale food production in Holyoke is limited to two farms. Nuestras Raíces' La Finca is a six-acre farm on a larger thirty-acre site in southern Holyoke along the Connecticut River, where farmers rent small plots of land from a quarter acre to a half acre. The Holyoke Farmers Market provides an outlet for some of these farmers as well as some Nuestras Raíces' community garden growers. The majority of crops grown at La Finca are vegetables. Nuestras Raíces also holds a farmer training program and events at the site (Nuestras Raíces).

Seidel Farm is an eight acre mixed-fruit orchard that has been in operation for over a hundred years. The farm operates a seasonal farmstand at the property on Homestead Avenue.

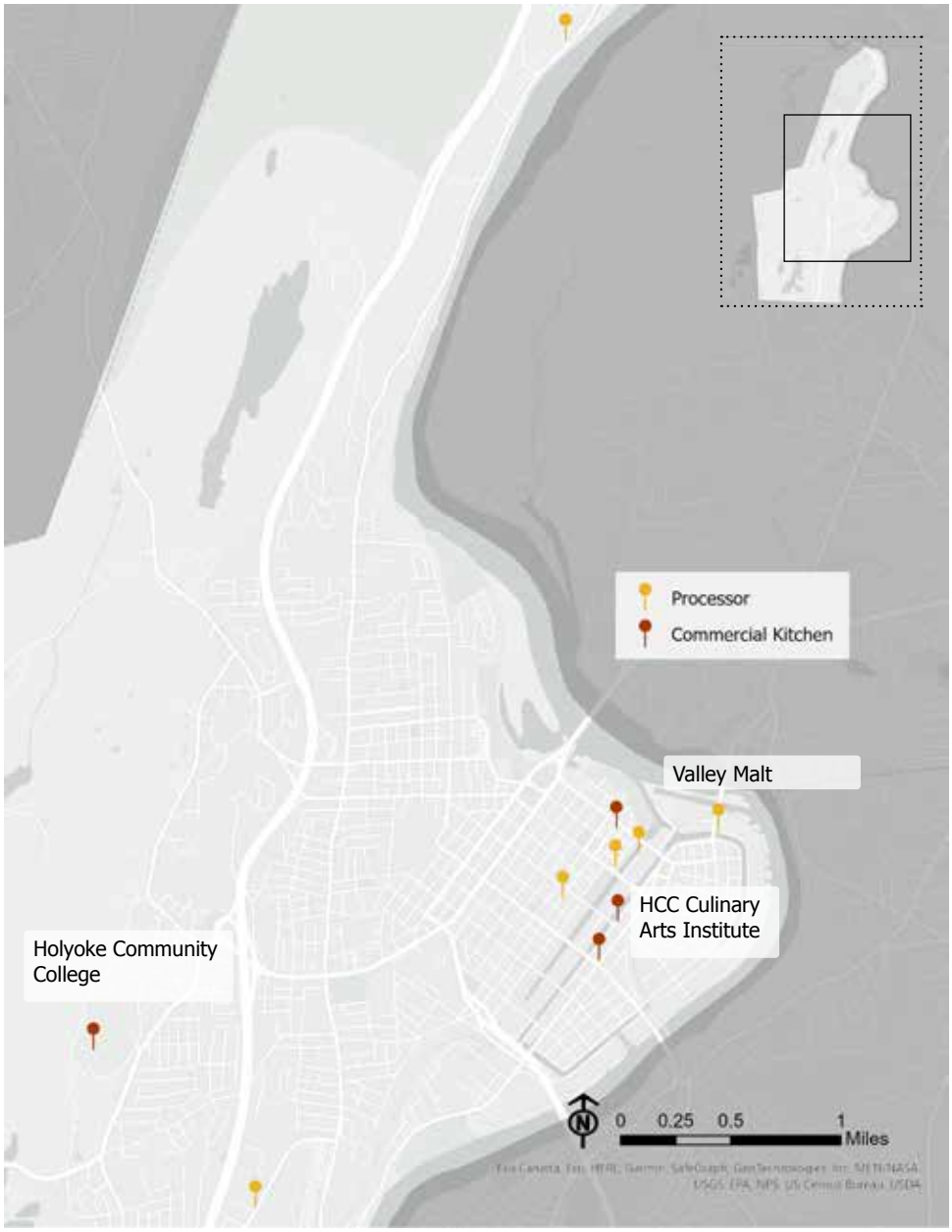
Holyoke has a significant network of twelve community gardens, run by two organizations – Nuestras Raíces and Neighbor to Neighbor. The gardens are concentrated in the downtown areas of the City. Nuestras Raíces' gardens range from 1,000 square feet (the Youth Garden near El Girasol) to 6,000 square feet (Jardín Comunitarios El Girasol). According to Nuestras Raíces, there is a waiting list for a plot at the more long-standing gardens, while some of their other locations are less used.

The additional cultivated and pasture land noted on the map do not appear to grow vegetables or raise livestock.

Backyard and container gardens are not mapped, though they do exist in the city.

Commercial Food Processing

Commercial Kitchens and Processing Businesses



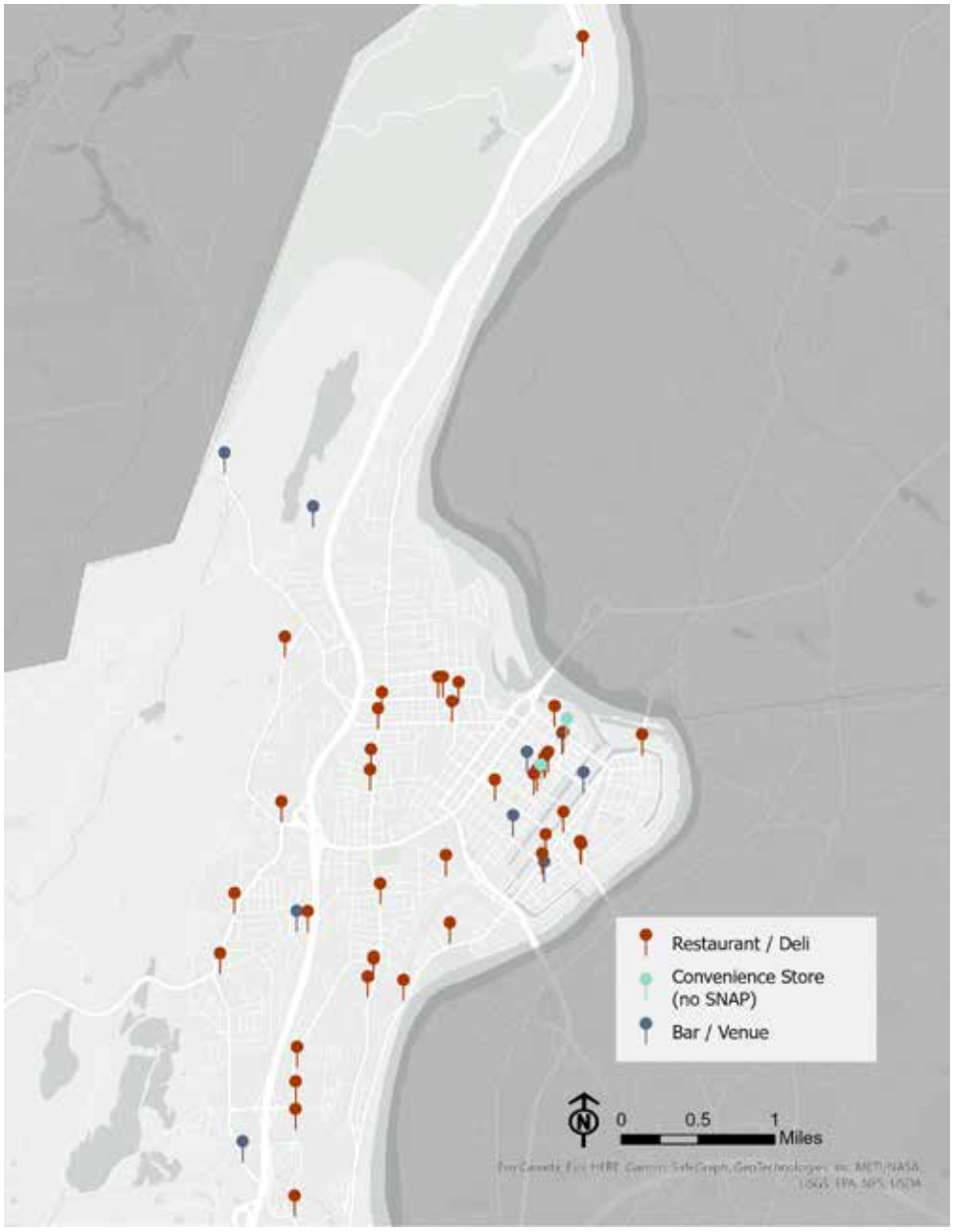
Commercial processing includes cooking, baking, fermenting, preserving, and other preparation that allows fruits, vegetables, meats, or grains to be transformed into value-added products to be sold.

While not a definitive list of businesses and organizations involved in food processing, the map shows commercial processors in the city turning raw food ingredients into food products. The map also shows the location of commercial kitchens owned by private companies, non-profit organizations, and institutions. Holyoke Community College's two locations have limited availability for community members while others are available to the public on a rental basis with the goal of helping small and start-up food businesses in the city.

According to Pioneer Valley Planning Commission's *Pioneer Valley Food Security Plan* from 2013, "in general, Western Massachusetts...lacks sufficient food processing facilities to meet demand for local consumption and exports, and sufficient refrigerated storage for fruits and vegetables is currently lacking in the region" (PVPC, 23). More research is needed to properly assess whether regional processing infrastructure has increased sufficiently in the nine years since the study.

Valley Malt Grain Silos

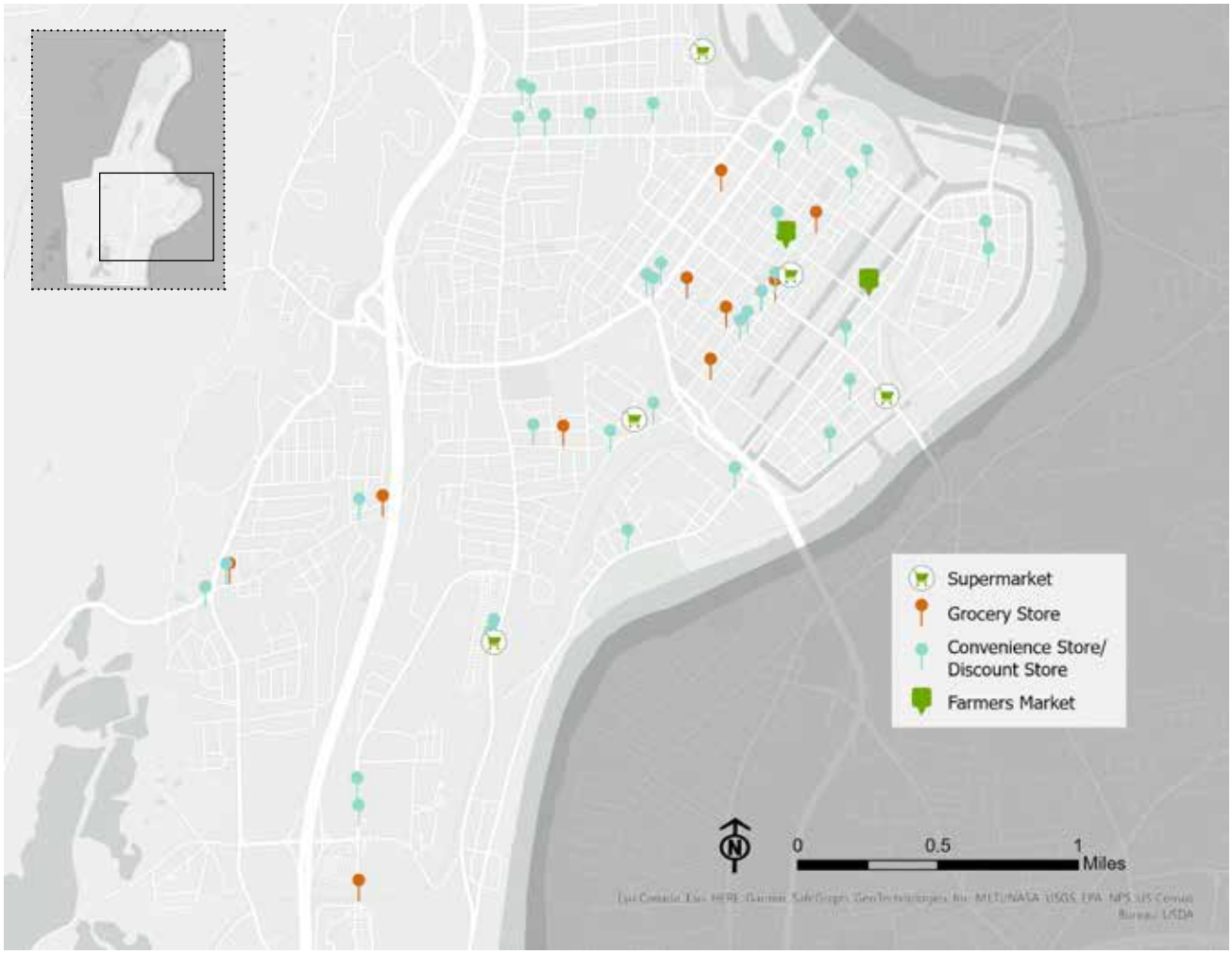
Restaurants and Venues



The map shows Holyoke restaurants identified as food economy business partners by the City which excluded fast food establishments. Most are clustered downtown with some distribution in other residential areas. Though not examined in this document, the number of restaurants (over 40) raises the questions of how many source local ingredients, whether increased local food purchasing is viable for the restaurants, and whether local food purchasing would help local food producers.

Food Stores

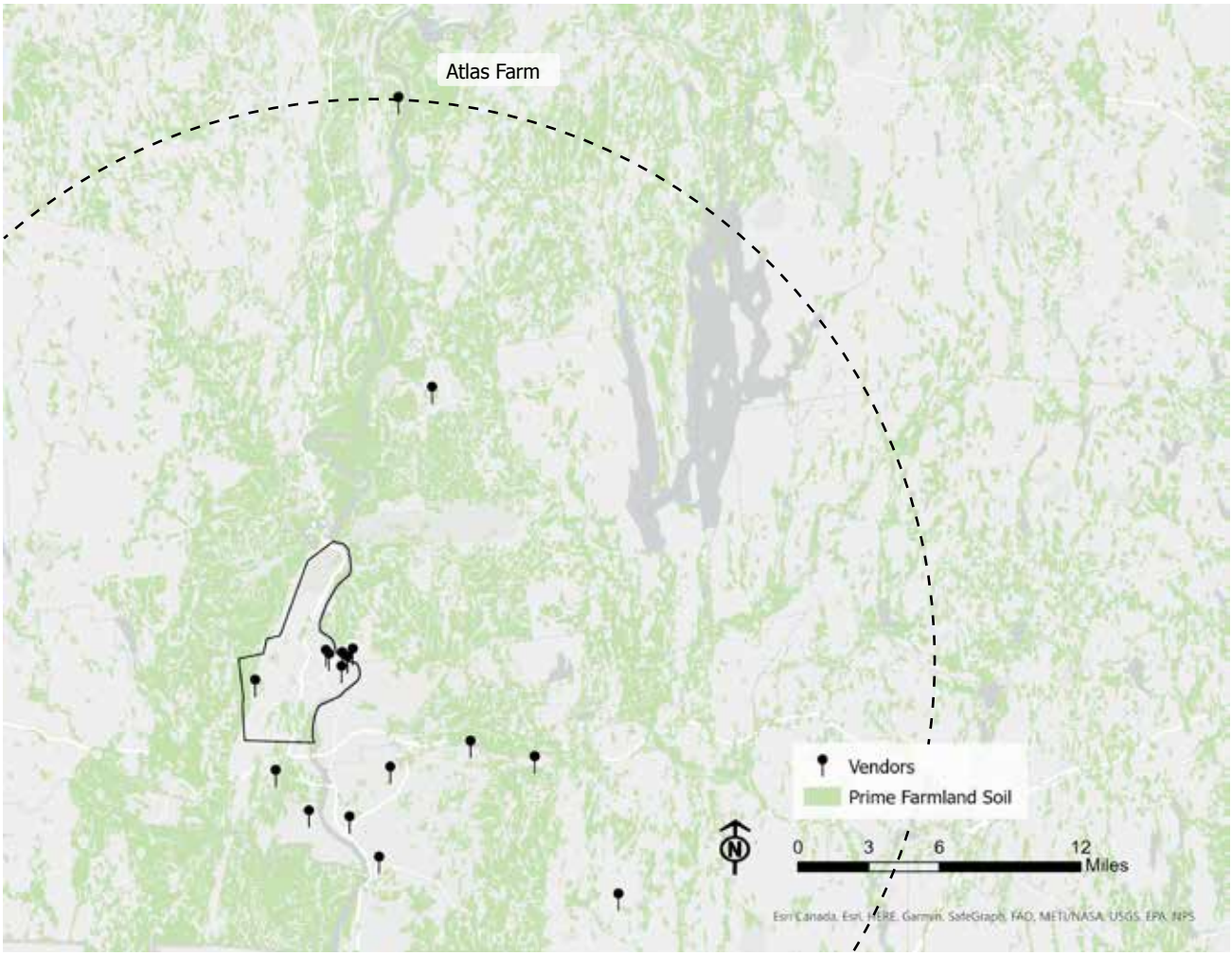
Supplemental Nutrition Assistance Program (SNAP) Locations



There are more than forty locations that accept Supplemental Nutrition Assistance Program (SNAP) benefits, ranging from supermarkets to convenience stores. These can further be categorized by scale and type: supermarkets, full service markets, and discount grocery stores on the larger end and neighborhood food stores, bodegas, retail drug stores, and gas station convenience stores on the smaller end (Ramsey, 46). There are four larger chain supermarkets, plus an independent supermarket that stakeholders noted should be included in the category because, while a smaller store, the selection is on the tier of larger chain supermarkets.

Farmers Market Vendors

And Regional Prime Farmland Soils

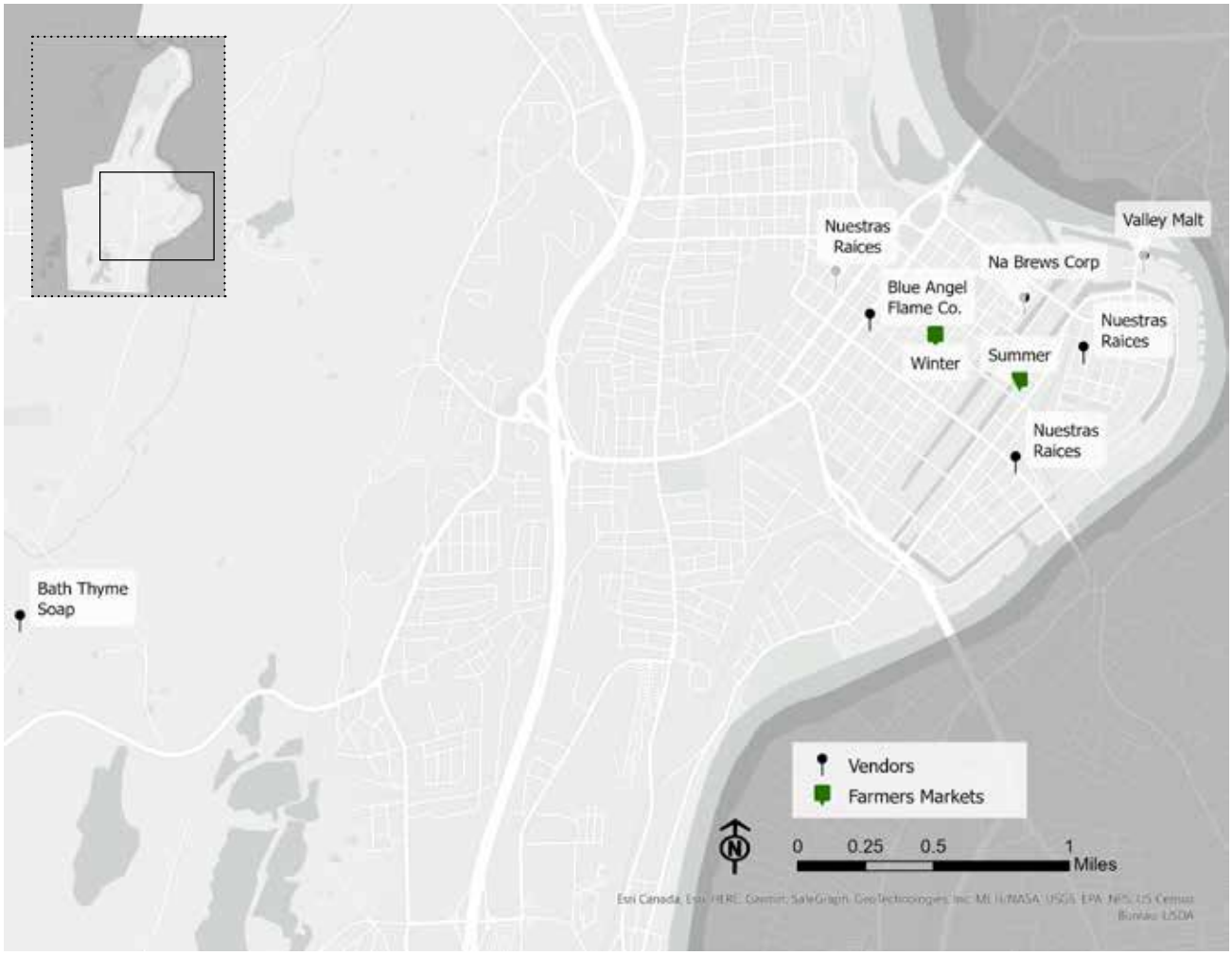


The vendor who travels the farthest to come to the Holyoke farmers market is Atlas Farm twenty-four miles to the north. Using Atlas Farm as a rough guide to the theoretical local food shed for the market, many Pioneer Valley farms sit within reasonable distance to directly supply Holyoke with local food.

Prime farmland, as defined by the USDA, "have an adequate and dependable water supply from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, acceptable salt and sodium content, and few or no rocks" (NRCS). There is significantly less prime farmland within the boundaries of the city when compared to the fertile soils along the Connecticut River to the north. Prime farmland is a likely factor in the distribution of farms in the area.

Farmers Market Vendors

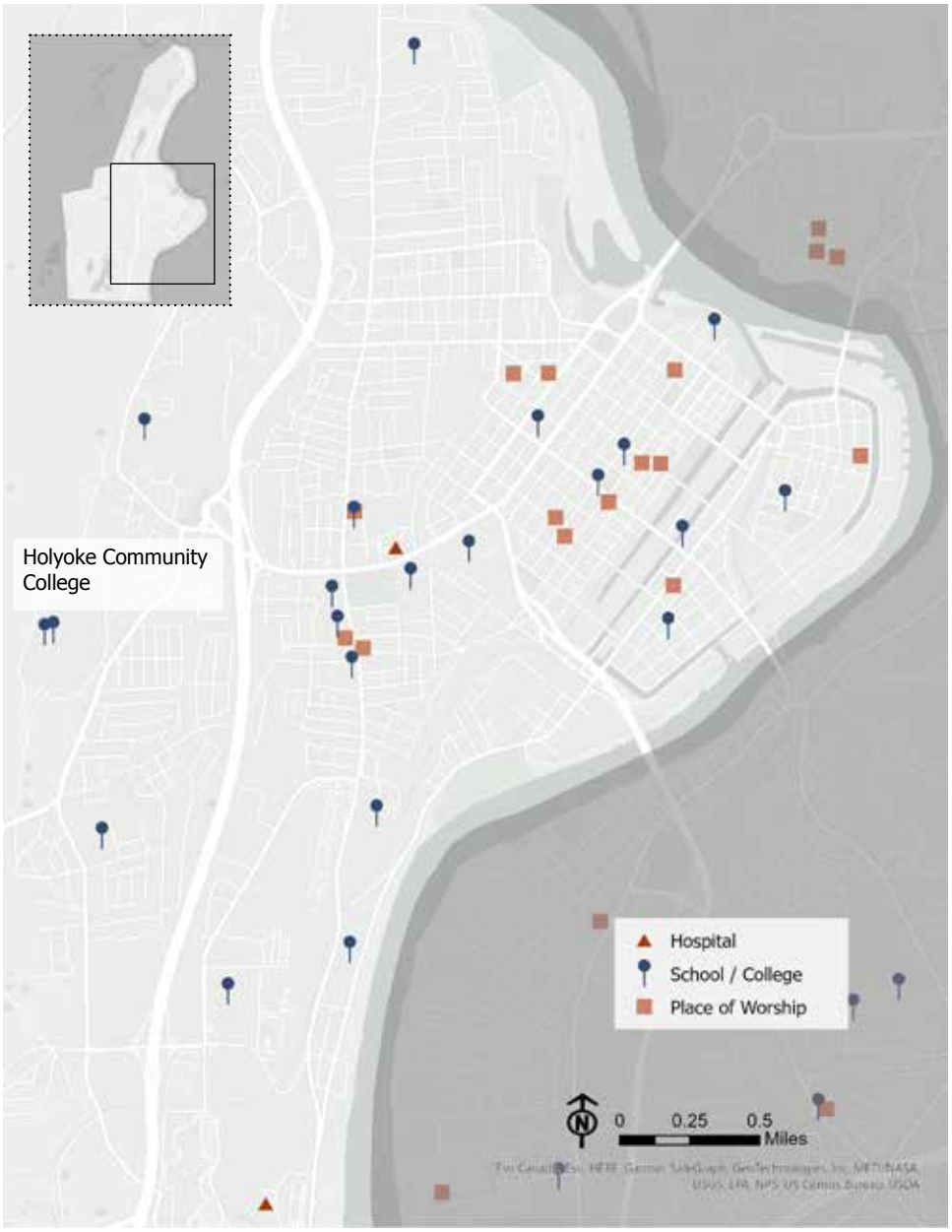
City-Based Vendors



There is one outdoor farmers market held weekly in the summer months with twenty four vendors (including both food producers and non-food producers) and one indoor market held twice monthly in the winter with two to four vendors. Two thirds of vendors come from outside of Holyoke.

Community Institutions

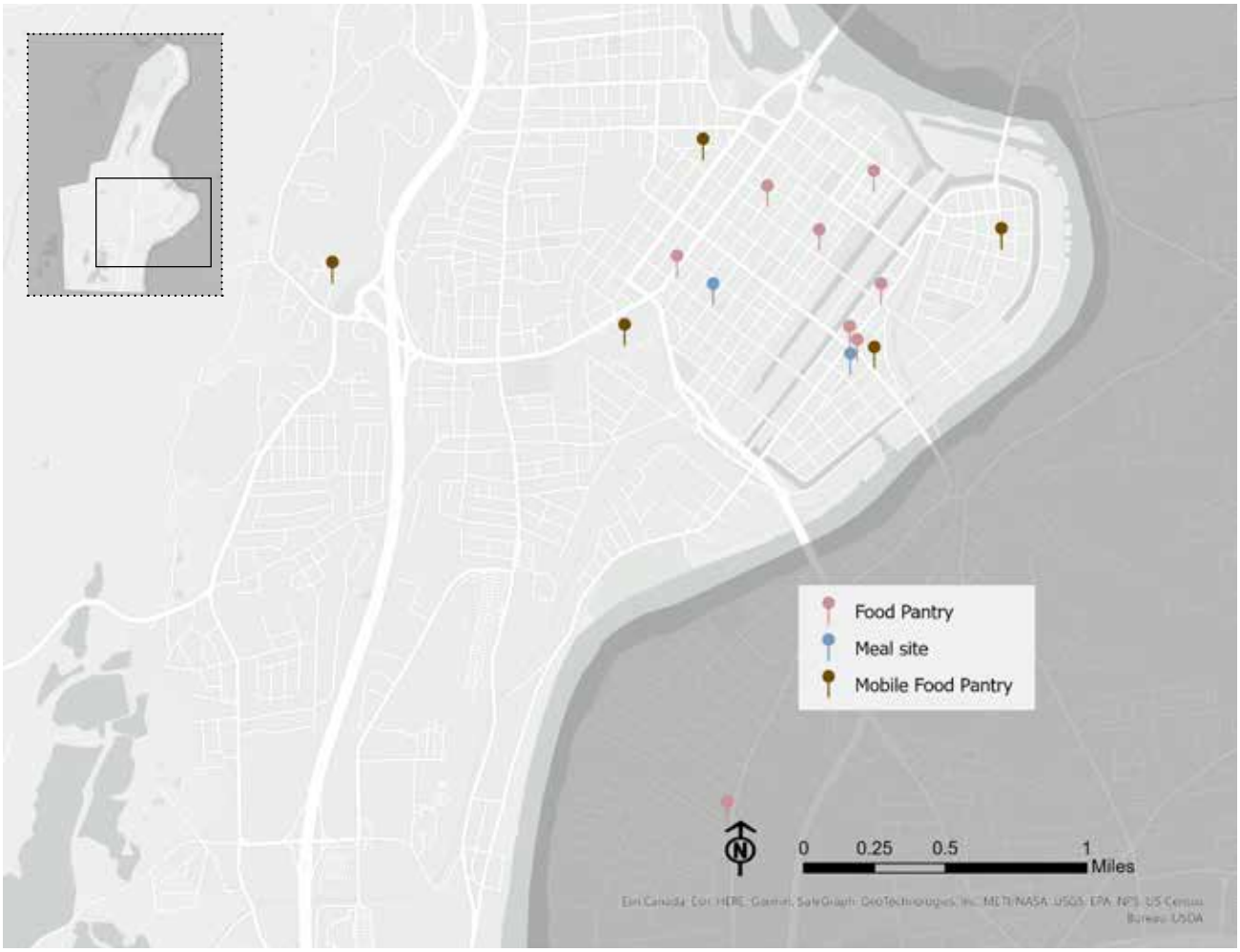
Schools, Places of Worship, and Hospitals



Schools, places of worship, and hospitals are concentrated in the more densely populated areas of the city. Food production and food distribution take place at some of these locations.

Emergency Food Distribution

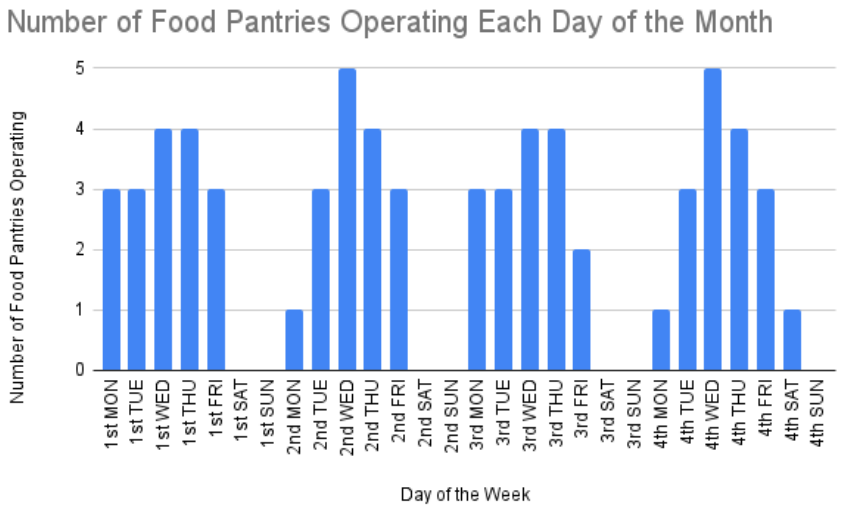
Food Pantries, Mobile Food Banks, and Meal Sites

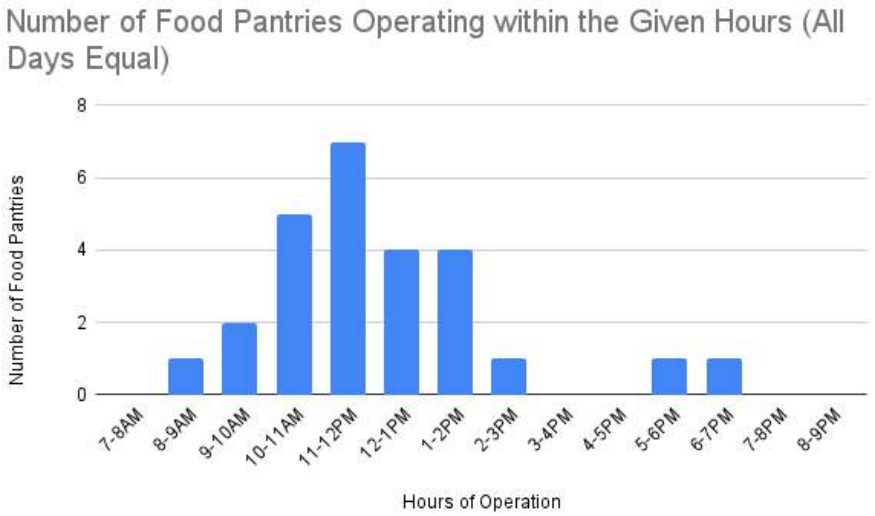


Emergency food relief is provided by seven food pantries, five mobile food banks, and two meal sites (not including those restricted to children and the elderly). Fresh produce included in these distributions is variable, though interviewees shared that farms do donate produce to these pantries. Sites are concentrated downtown in areas with more people whose income is below the poverty line.

Free Food Distribution Access

Operation Days and Times for Food Pantries and Mobile Food Banks





Source: Food Bank of Western MA

The graphs show that the majority of food distribution sites concentrate their hours between 10-2pm on weekdays. Half of the sites mapped do not operate the same hours each week of the month, with some times only available one or two weeks per month.

The variety of schedules may make it more confusing for residents trying to access different locations week to week. Midday and midweek hours may make accessing food more difficult for those with job or child-care obligations.

GROWING MORE LOCAL FOOD TO INCREASE RESILIENCY

Case Study: The Food Bank of Western Massachusetts, Hatfield, MA

The Food Bank of Western Massachusetts is a regional organization providing food donated from retailers and commodities from the government to member food pantries in Berkshire, Franklin, Hampden and Hampshire counties for distribution to people at risk of hunger. The organization also distributes directly to individuals through their Mobile Food Bank and Brown Bag: Food for Elders programs.

The Mobile Food Bank program delivers groceries directly to western Massachusetts community sites with populations that do not have equitable access to healthy foods. This program serves multiple sites in Holyoke and aims to fill in locational gaps between brick-and-mortar pantry operations. The Food Bank has historically operated two to four sites in Holyoke, but seasonal changes and the Covid-19 pandemic have affected locations and schedules. The Food Bank maintains a searchable database online for food relief programs by location (foodbankwma.org).

The Food Bank also runs Food Bank Farms with two farm sites in Hadley, Massachusetts, a 60-acre and 142-acre farm, to provide fresh produce to people. The Food Bank contracts with local farmers to grow organic vegetables on portions of the land for distribution to the community, including households at risk of hunger. In 2022, farmers on the newer 142-acre site will sell a portion of their crops to schools in high-poverty school districts including Springfield public schools. The farm project is a collaboration between the Food Bank, farmers, foundations, land trusts, and the school district. Owning farmland is rare among the 200 food banks that operate throughout the country, and serves to increase resiliency in the effort to supply healthy food to people at risk of hunger in western Massachusetts (Food Bank of Western MA).

INCREASING HEALTHY FOOD AVAILABILITY WITH MOBILE MARKETS

Local Leader: Atlas Farms, South Deerfield, MA

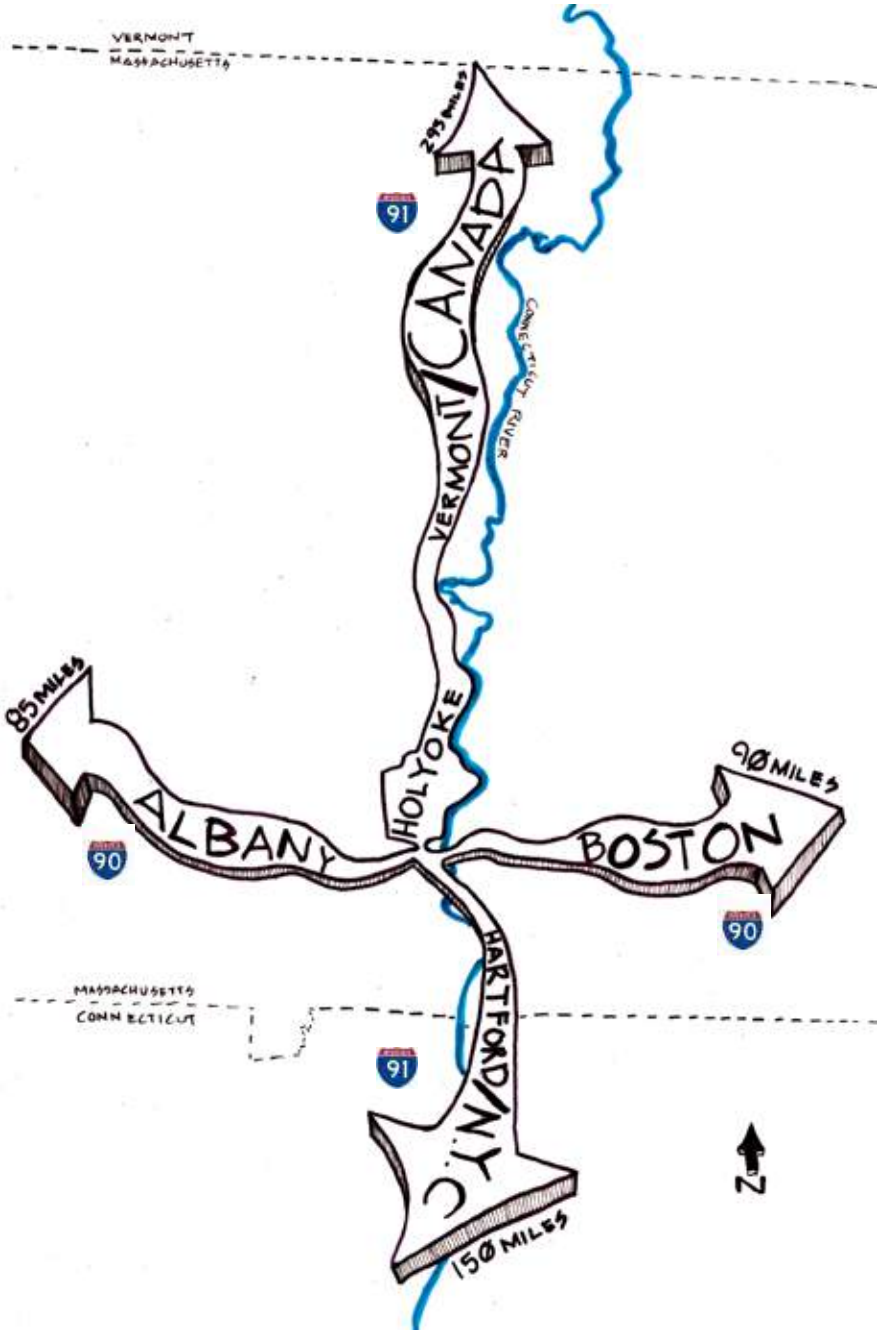
With the intention of making fresh produce accessible to a wider community of customers, Atlas Farm will be running a mobile market in 2022. The South Deerfield farm will use a retrofitted bus to visit seven public housing sites in Holyoke and one location in Greenfield each week. The mobile market will accept SNAP/HIP benefits and aims to keep prices low by selling surplus and seconds from the farm.

The farmers are collaborating with the Holyoke and Greenfield Housing Authorities to develop the route and schedule for the season (Allium).

Atlas Farm's new mobile market prior to renovations

Major Transportation Routes

Regional Market Access



Major transportation routes run through Holyoke. Interstate 91 connects Holyoke to New York City 150 miles to the south, while Interstate 90 connects to Boston 90 miles to the east. These connections can be an asset to food producers and processors in Holyoke, facilitating the sale of products regionally. This proximity to major transportation routes means that the city is easily accessible by trucks and other vehicles that bring food products into the City.

04 Mapping Barriers to Healthy Food Access


DELI GROCERY
VEGETABLES
COLD CUTS
MEAT
COFFEE
ATM

Introduction

The Scientific Group of the UN Food Systems Summit states that "A healthy diet is health-promoting and disease-preventing. It provides adequacy without excess of nutrients and health promoting substances from nutritious foods and avoids the consumption of health-harming substances" (Neufeld, 3).

For a person to have good access to healthy food through retail establishments, a number of conditions need to be met. A store needs to be in an accessible location and to be open when the person is able to shop. The store needs to have a variety of culturally acceptable food of good quality and at affordable prices. The person needs to have a degree of physical mobility or some means for the food to be delivered, and the financial resources and time to shop and prepare the food, or have it prepared for them.

GUIDING QUESTIONS

The partner organizations' shared goals prompted the following questions in analyzing healthy food access:

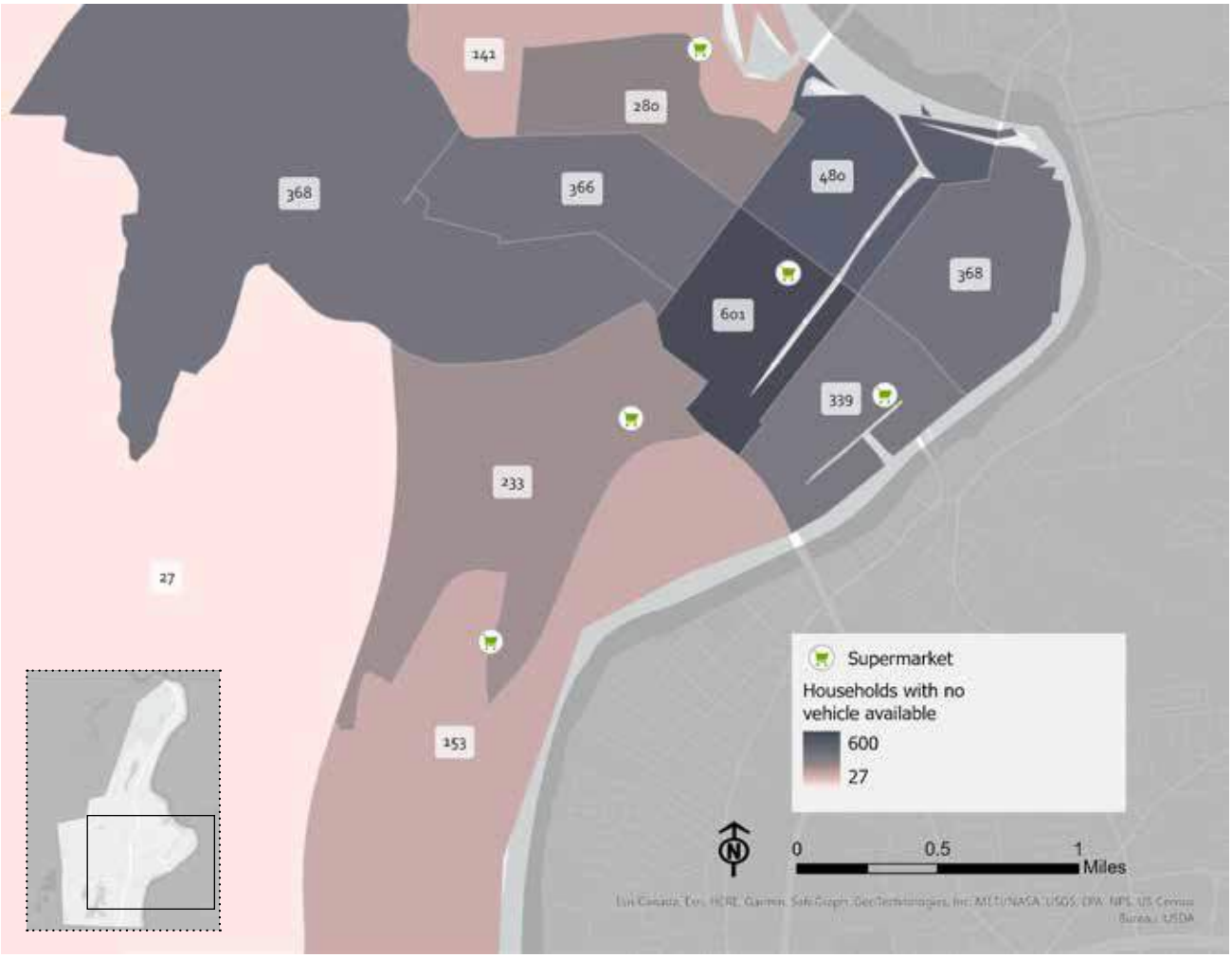
What are the physical barriers to equitable, healthy, local food availability?

What are the effects of these barriers on the local food system's resilience?

This chapter provides only a spatial picture of the number, type, and location of stores, and a snapshot of mobility and financial factors. Ramsey in *Socio-spatial Constructs of the Local Retail Food Environment: A Case Study of Holyoke, Massachusetts* shows that other factors, such as price, culture, and community networks, impact access to healthy food in Holyoke as well (Ramsey, 25). Replicating Ramsey's study in order to track the changes in the socio-economic conditions of food availability post pandemic would provide an updated picture of these other barriers to equitable food access in Holyoke.

Mobility and Transportation

Households Without Access to a Vehicle



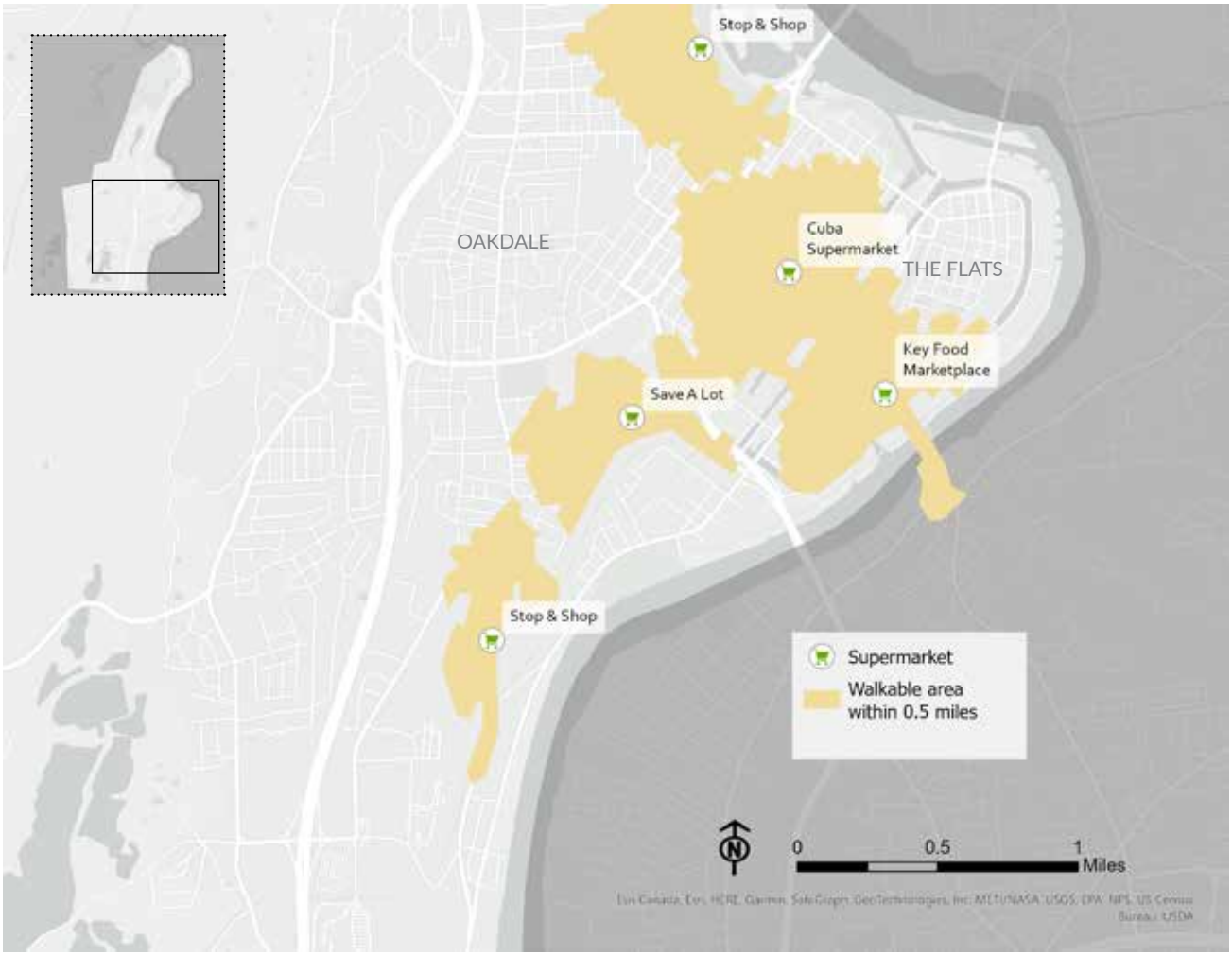
Source: U.S. Census Bureau's American Community Survey (ACS) 2016-2020 5-year estimates
10% margin of error

The USDA defines low access to healthy food as being far from a supermarket, supercenter, or large grocery store. Specifically, the USDA identifies a census tract as having low access "if at least 100 households are more than one-half mile from the nearest supermarket and have no access to a vehicle" (ERS).

2015-2019 ACS Census data shows that nearly 1,800 households lack access to a vehicle in the downtown area. Without access to a vehicle, alternative modes of transportation—whether walking, public transit, bikes, rideshare, or borrowing a vehicle—become important for accessing food.

Food Access Barrier: Distance

Half Mile Walking Distance to Supermarkets

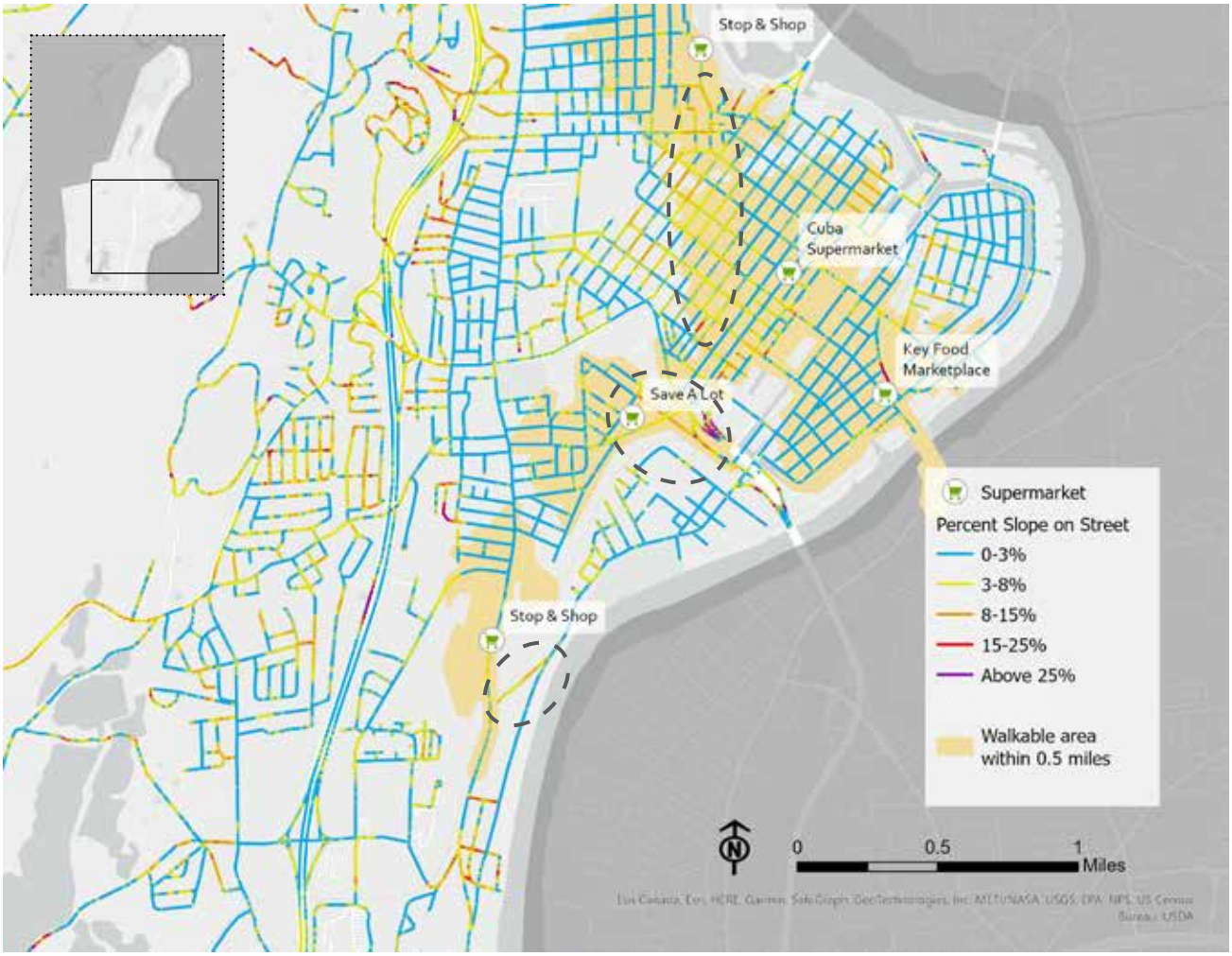


Alternatively, a census tract is considered low access if "a significant number (at least 500 people) or share (at least 33 percent) of the population is greater than one-half mile from the nearest supermarket, supercenter, or large grocery store" (ERS). There are large areas of neighborhoods outside of a half-mile walking distance to the supermarkets in Holyoke, particularly in the Flats near the river and Oakdale north of Save A Lot. These areas also include a large number of households without access to a vehicle.

Smaller grocery stores and bodegas can fill in these access gaps; however, constituents confirm that healthy food availability in smaller stores is still to a large extent limited, and only a small percentage of these carry a full selection of healthy food such as fresh produce.

Food Access Barrier: Hills

Supermarkets and Street Slopes

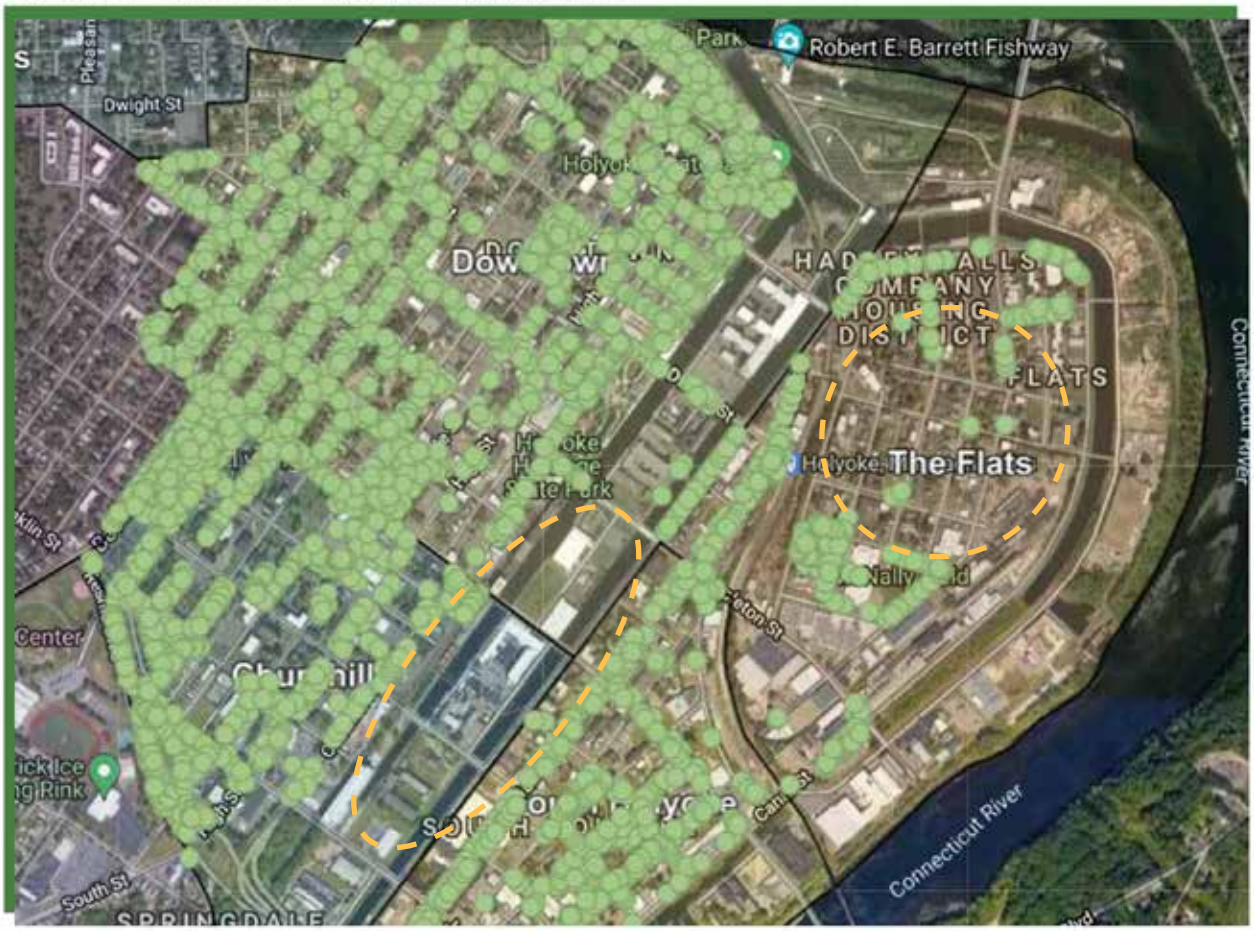


Additionally, overlaying the half-mile access radius of comfortable walking distance with the road slopes shows how a hill separates downtown from the upper wards, forming a barrier to accessing grocery stores by foot. Significant slopes separate Save A Lot from neighborhoods to the southeast, and Stop and Shop from neighborhoods to the south.

Food Access Barrier: Heat

Tree Cover and Lack of Shade

Map C. Aerial View of Public Trees Inventoried (TreeKeeper®)



Green dots are the inventoried public street and park trees in the four neighborhoods.

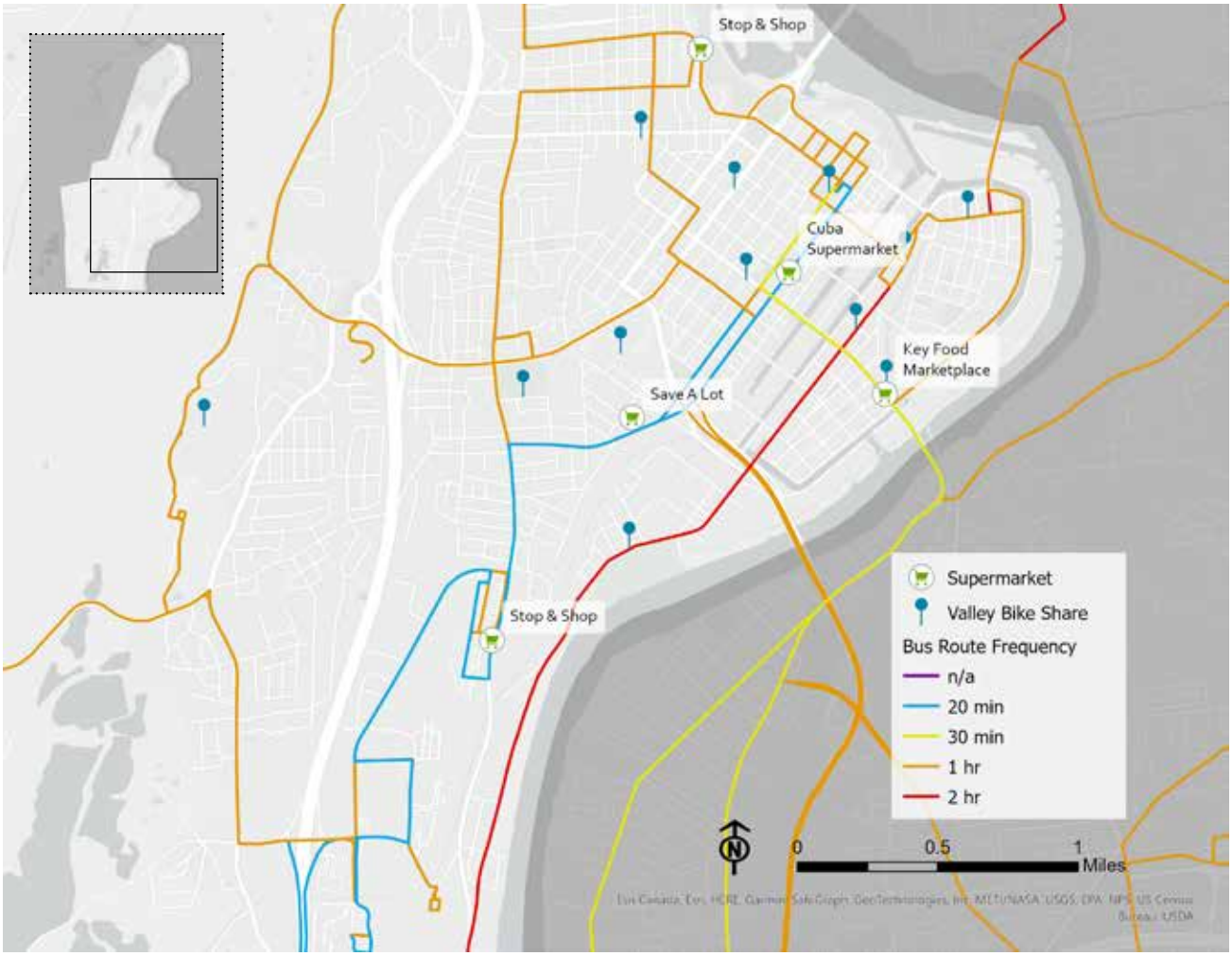
City department leaders and project consultants mapped the street trees in the downtown area in the City's *Urban Forest Equity Plan* in 2021. The mapping revealed the lack of shade trees present in the Flats. "Downtown areas that have more buildings, roads, and sidewalks and less tree canopy and greenspace are warmer than surrounding suburban and rural areas that have more tree canopy, greenspace and less impervious surfaces" (McManus et al., 17). The increased heat of the urban infrastructure with little shade provided by street trees is an additional hindrance to walking.

Broken sidewalks and lack of shade on High Street looking northeast towards downtown.

HIll on Maple Street and Parenteau Drive northeast of Save A Lot.

Public Transportation

Bus Routes and Bike Share Locations

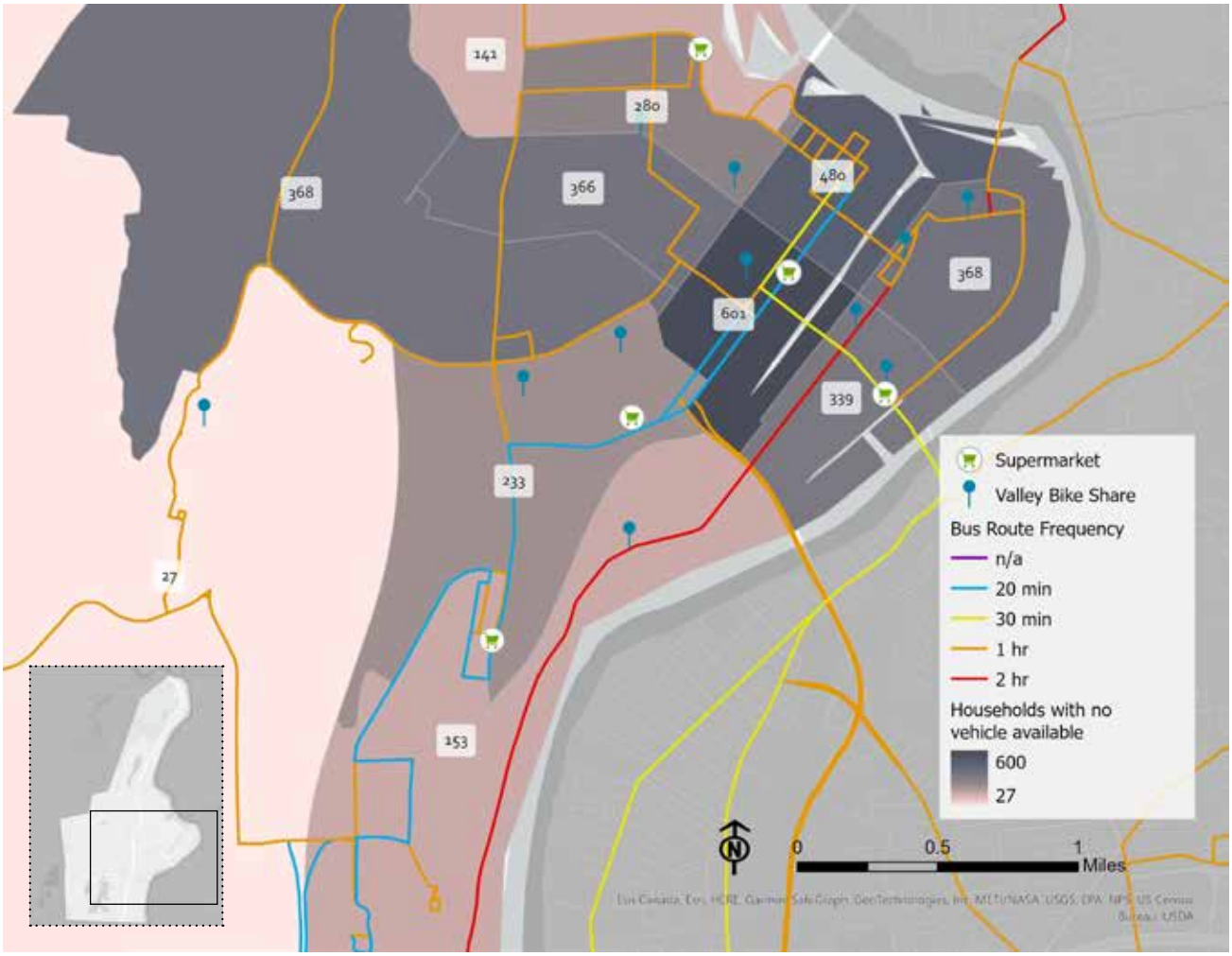


Public transportation provides an alternative to travel by car or foot. Bus routes connect much of the city; however, bus frequency varies from 20 minutes to up to 2 hours for certain bus lines (though some lines do overlap in areas).

Valley Bike began a bike share program in cities and towns in the Pioneer Valley in 2018. There are now twelve bike pickup/drop-off stations located in the city. In interviews, constituents reported that residents do use these bikes to get groceries, though limitations include the cost to use them ($2 per ride), the amount of groceries that can be carried comfortably, and the difficulty of bike use in the winter months due to cold and icy roads. There are no bikeshare stations at either Stop & Shop or Save A Lot.

Food Access Barrier: Transit

Bus Routes and Households Without Access to a Vehicle



Overlaying bus routes with the map of households without access to a vehicle shows the importance of certain lines to these neighborhoods. The three largest grocery stores are not within walking distance of the neighborhoods with the highest number of households without a car, and though they are on bus routes, carrying multiple weeks' worth of groceries on a bus can be very cumbersome. Additionally, if those buses are delayed or infrequent, refrigerated and frozen foods can thaw and produce can wilt.

The range of mobility barriers in physical difficulty, logistical planning, and time, show the difficulties that the residents face when getting food.

HELPING CORNER STORES BRING HEALTHY FOOD TO COMMUNITIES

Case Study: Saba Grocers Initiative, Oakland, California

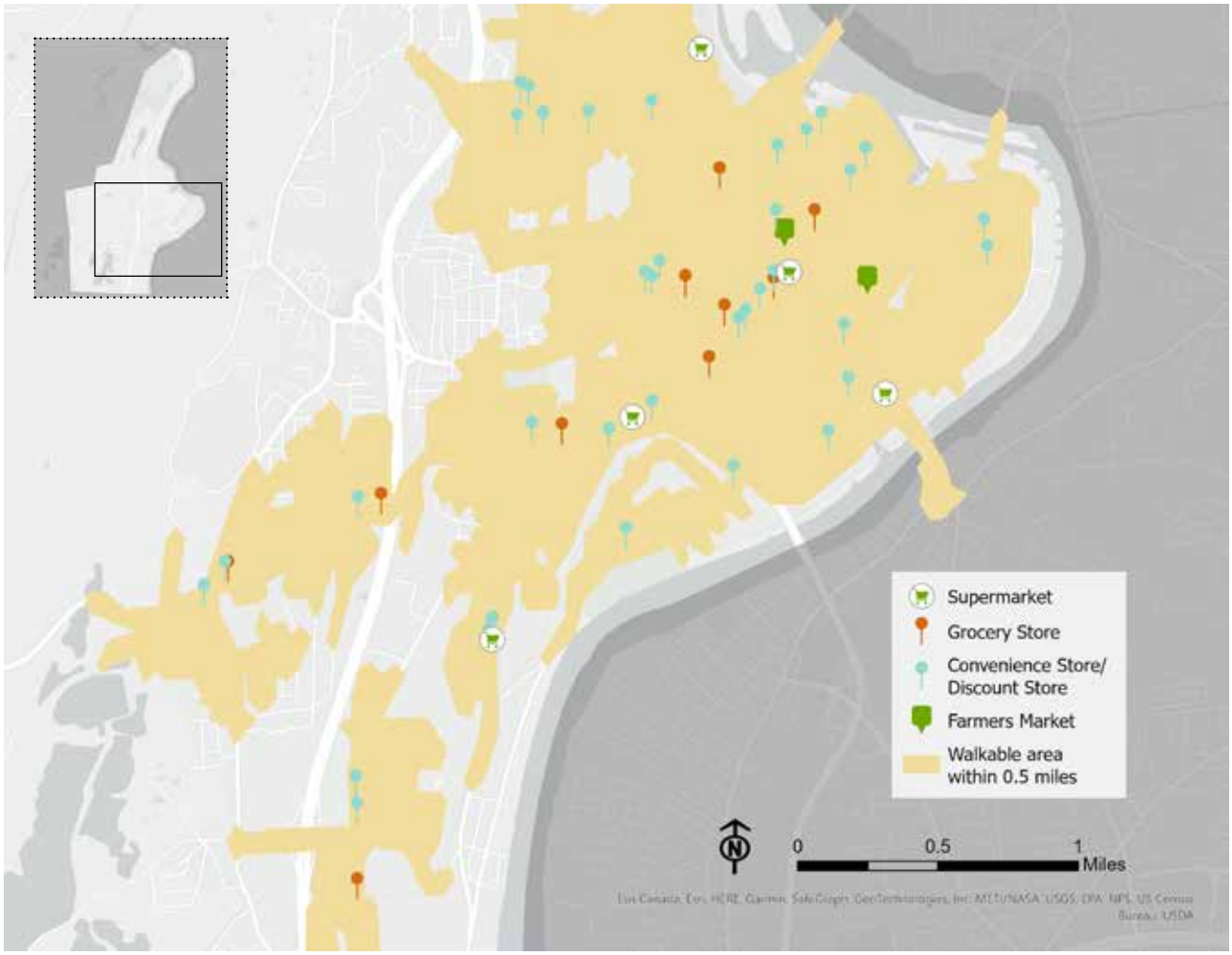
How do you support corner stores and bodegas' ability to stock healthy food for customers? What kind of organizational support do these businesses need to offer a new product like fresh produce? One organization in Oakland, California, Saba Grocers Initiative, tries to tackle these questions. They are a collective of Arab immigrant and Black corner store owners who came together to help support their local food system by trying to make sure produce is affordable and available for all. They believe "a healthy community where everyone has access to quality, nutritious, healthy food can be achieved through a synergistic relationship between stores and the communities they serve. Corner stores and community markets can serve as an important conduit for communities to get healthy products, provide information that promotes health and well-being, and for facilitating community empowerment" (Saba Grocers Initiative). With the help of foundation grants and government funding, the organization helps stores by purchasing refrigeration equipment and acting as a distributor. With limited space, small corner stores often cannot buy in bulk. Saba Grocers Initiative lets stores order what they need from an offering of ninety items and on a schedule that works for them.

Saba Grocers Initiative is reliant on grant funding and is supported by programs like California's Healthy Refrigeration Grant Program, which offers funding towards expanding fresh food at locations that experience food apartheid, defined by the Natural Resources Defense Council as areas and groups of people that have a lack of fresh produce.

The COVID-19 pandemic has slowed the organization's efforts, as supply chain disruptions have made the sourcing of refrigeration units more difficult. Data is not yet available to assess Saba's impact on the communities and stores in which it has helped establish fresh produce but it may be a model for overcoming the barriers that small stores face in carrying fresh produce (Smith).

The Potential for Food Access

Half-Mile Walking Distance to Food Stores



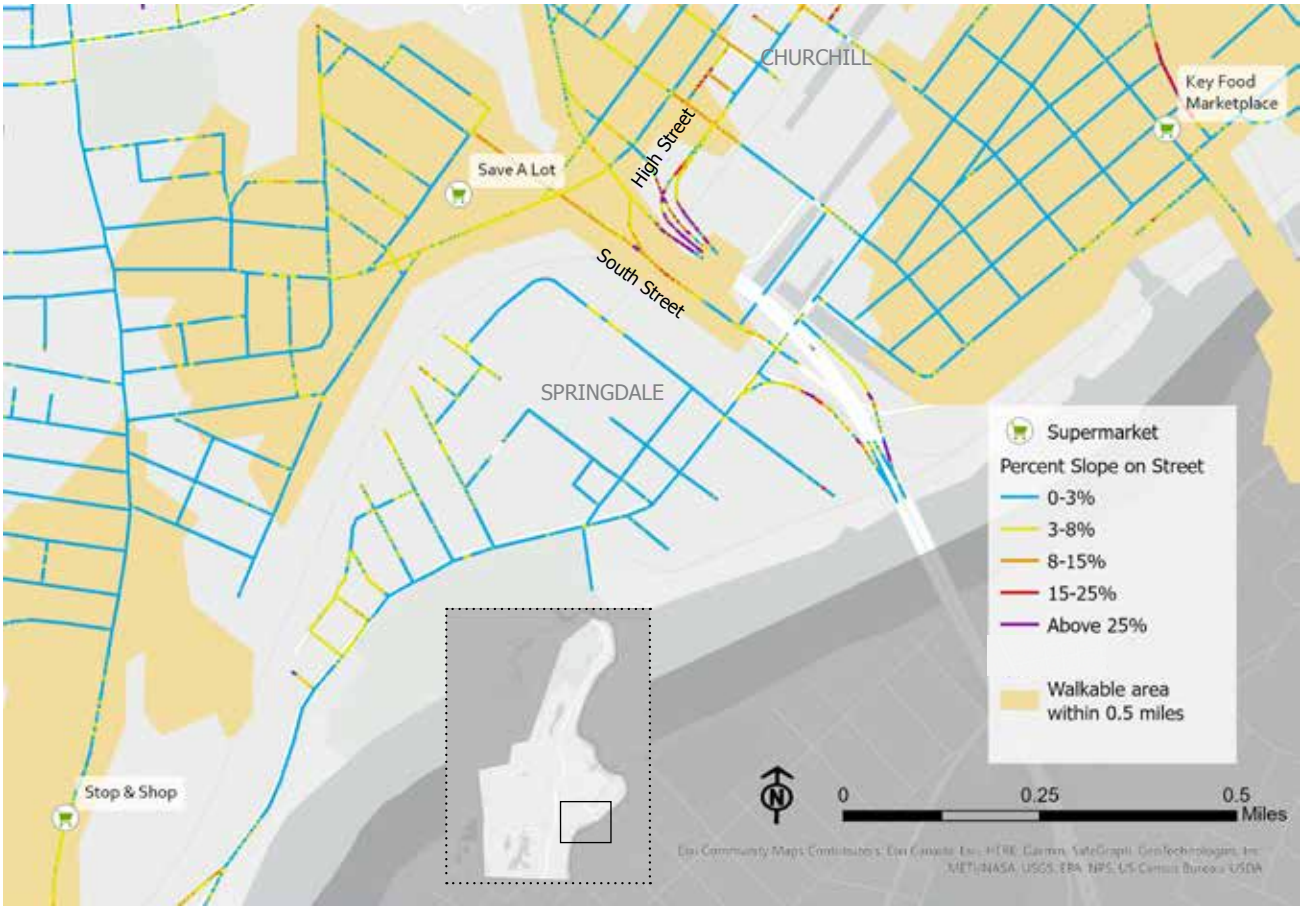
Increasing healthy food availability in existing smaller grocery stores and bodegas could help to alleviate low access in areas outside the half-mile walking distance of supermarkets in nearly all areas where vehicle access is of particular concern. Defining low access in terms of proximity to large supermarkets as the USDA does, does not take into account the role that smaller food stores play in urban areas. In dense urban areas such as downtown Holyoke, it may be a more equitable frame to include the smaller grocery stores and bodegas in the discussion of access as they are a part of the fabric of the city and residents have existing relationships with these stores. Increasing healthy food options in these existing stores may be a way of serving the greatest number of residents across the most areas.

Recommendations

4.1 Include walkability in the discussion of healthy food availability and aim to make healthy food available within a half-mile distance of residents' homes.

- **Address sidewalk quality:** assess and repair sidewalks in key areas where steep slopes and low vehicle ownership coincide, specifically along steep roads connecting these to supermarkets. This includes South Street connecting Save A Lot to the Springdale neighborhood to the southwest, and High Street connecting to the Churchill to the east.
- **Increase shade trees:** the lack of an urban tree canopy in some downtown Holyoke areas contributes to pedestrian discomfort and therefore may impact food access and people's health and wellbeing. If trees were planted in the Flats as recommended in the Urban Forest Equity Plan, it could have a positive impact on the highest number of residents without vehicle ownership, those most likely to walk to the store.
- **Utilize existing neighborhood food stores:** bringing healthy produce into small stores would make healthy food more accessible — even with additional tree canopy and improved sidewalks, it is still a long way to walk with groceries from supermarkets to some of these neighborhoods.

Supermarkets and Street Slopes Around Save A Lot



4.2 If a Healthy Bodega Program is initiated, focus it in areas with the highest concentration of households without a vehicle, with people with incomes below poverty level, and outside the half-mile walking distance of supermarkets.

Initiating a healthy bodega program was an action item included in the *Community Action Plan*:

> Action Item 2.1: Initiate a Healthy Bodega Program.
>
> Many cities across the country are addressing food access issues by working to provide fresh produce in local corner stores or bodegas. This action involves coordinating with the bodega owners in Holyoke to provide fresh, local, affordable produce. A healthy bodega program could include a collaborative buying club between bodega owners, and/or a city-wide policy requiring the sale of fresh food and staple dietary items at retail outlets accepting SNAP benefits. Other elements of the program could include healthy food demonstrations at the farmers market in collaboration with bodega owners, and customers using their Healthy Incentives Pilot (HIP) option to purchase produce. A healthy Bodega program could be revived and if successful, substantially increase access to, and consumption of fresh, healthy food in Holyoke (EPA,17).

With additional models of increasing healthy food availability now present across the country, revisiting a healthy bodega program with new data could contribute to its success. Utilizing pop-up farm stands and mobile markets in front of bodegas is one example to jump start demand while lessening the burden on the bodega owners. Another component to a successful program might be increasing HIP locations in Holyoke for qualifying participants.

05 Mapping Outdoor Production Possibilities

Introduction

Is it Possible to Grow More Food in Holyoke?

The *Community Action Plan* makes the recommendation to: "Better utilize land in Holyoke to produce more food for distribution to people and organizations across the city, with a focus on institutions and students." The report states that "many sites are underutilized when it comes to growing, including Holyoke Community College land" and suggest that more food should be produced for Holyoke schools (EPA, 22). Aiming to provide more detail to this recommendation, this chapter identifies which parcels may be most suitable for food production.

GUIDING QUESTIONS

This chapter explores these production-related questions:

How might Holyoke produce more of its own food?

What role might urban agriculture play in a healthy Holyoke?

Why community and backyard gardens in Holyoke?

Defining "Urban Agriculture"

"Urban agriculture is the practice of food cultivation within cities, often but not necessarily using spaces like empty, vacant lots. It encompasses community gardens and small farms, much like La Finca owned by Nuestras Raíces. Urban agriculture does not need to fit the mold of traditional farming. Backyard growing, rooftops, and indoor growing are all methods of urban agricultural production.

Raised garden beds

Greenhouse growing

Why Community Gardens in Holyoke?

The degradation and demolition of buildings following the decline of manufacturing in Holyoke has resulted in vacant lots scattered throughout the city. There is an opportunity to use these open spaces for community gardens and other forms of urban agriculture. These gardens may help increase Holyoke's food system resilience by making it better "able to withstand and recover from disruptions in a way that ensures a sufficient supply of acceptable and accessible food for all" (CLF). Increasing local food production can positively impact processors and restaurants by providing local ingredient sources and hunger relief programs by providing more sources of fresh foods that can go to food pantries and kitchens.

It takes approximately one acre to grow the amount of food a person needs to survive in a year (Donahue, et al., 10). With plots ranging in size from 100 to 500 square feet (NC State Extension), community gardens are not going to be able to grow all or even the majority of a person's food. They can however, provide fresh fruit and vegetables to supplement a grower's diet and help reduce grocery costs.

Repurposing an Industrial Past through Community Work

Like many mid-sized mill cities in New England, Holyoke struggled to transition to new economies after the decline of the mill industries in the early 1900s. As technologies transitioned and manufacturing work declined, so did the upkeep of some of the city's infrastructure. But new purposes are being found for the structural assets that made Holyoke an industrial center. Even the vacant lots left by now torn-down buildings provide opportunities for residents. Community organizations such as Nuestras Raíces have used vacant lots and land that deindustrialization left behind to bring agriculture into the urban center of the city with community gardens.

Gardens also do more than produce food, serving to build community, contribute to an active, healthy lifestyle, and provide a site where cultural values are expressed. Community gardens also provide a variety of services to the broader ecosystem. These include:

Air pollution filtration: Plants in gardens help to filter air particulates. Air pollution levels in many areas of the United States exceed national air quality standards (US EPA 2015).

Rainwater infiltration: Permeable ground with vetegation reduces flooding and stormwater runoff during heavy rainfall events, allowing water to soak into the ground.

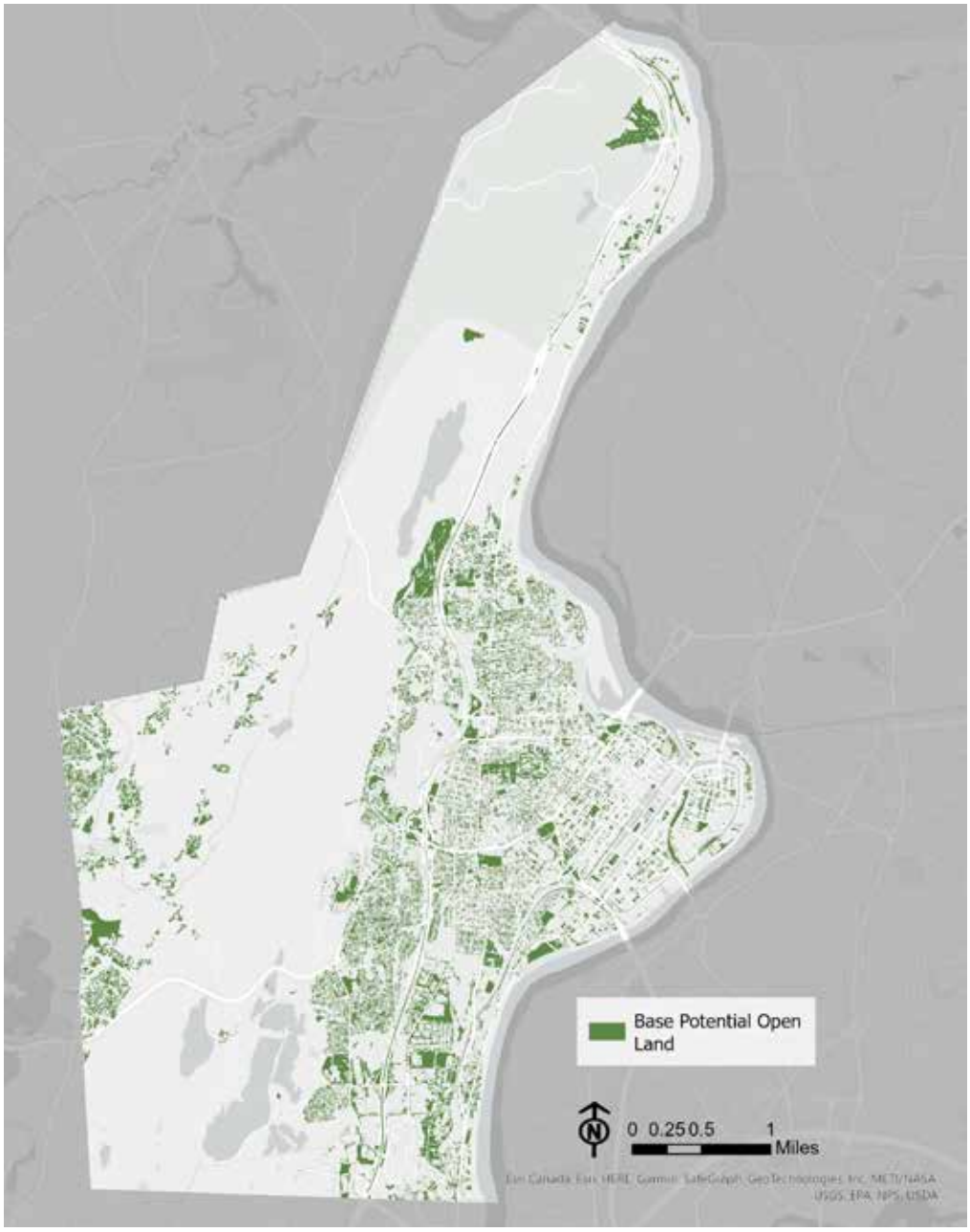
Regulate air temperature: By 2090, Massachusetts' average temperature is projected to increase more than 7.2°F (Wuebbles et al.). Plants are natural air conditioners; they do this through transpiration, which is when plants evaporate water through their leaves into the atmosphere (University of Melbourne).

Refuge for insects and other fauna: A well-managed garden provides food and shelter for beneficial insects. The rapid decline of "pollinators like bees, birds, butterflies, and bats is threatening biodiversity both globally and locally. The thousands of plant-pollinator interactions that sustain our food supply and natural environment are under threat by multiple, interacting factors including habitat loss, pesticide use, invasive species, disease, and climate change" (Mass Audubon).

Potential Outdoor Production Areas

Initial Areas of Open Land

This outdoor map analysis attempts to identify locations that would be suitable for establishing community, school, and church gardens by using open land, neighborhood proximity, ownership, and soil type as considerations for assessment. The series of analysis assumes that larger properties in residential areas offer the greatest opportunity for expanding outdoor production.



Initial Areas of Open Land Downtown

In the maps displayed, all available open land in Holyoke is shown in green, and totals 1,953 acres. The following criteria are used in defining base potential open land:

Non-forested land: The analysis focuses on land where trees would not have to be removed in order to grow good crops.

Land without structures: Roof space can be utilized for urban agriculture but this analysis looks at possibilities for growing in the ground which may allow for easier access by community members and more straightforward establishment.

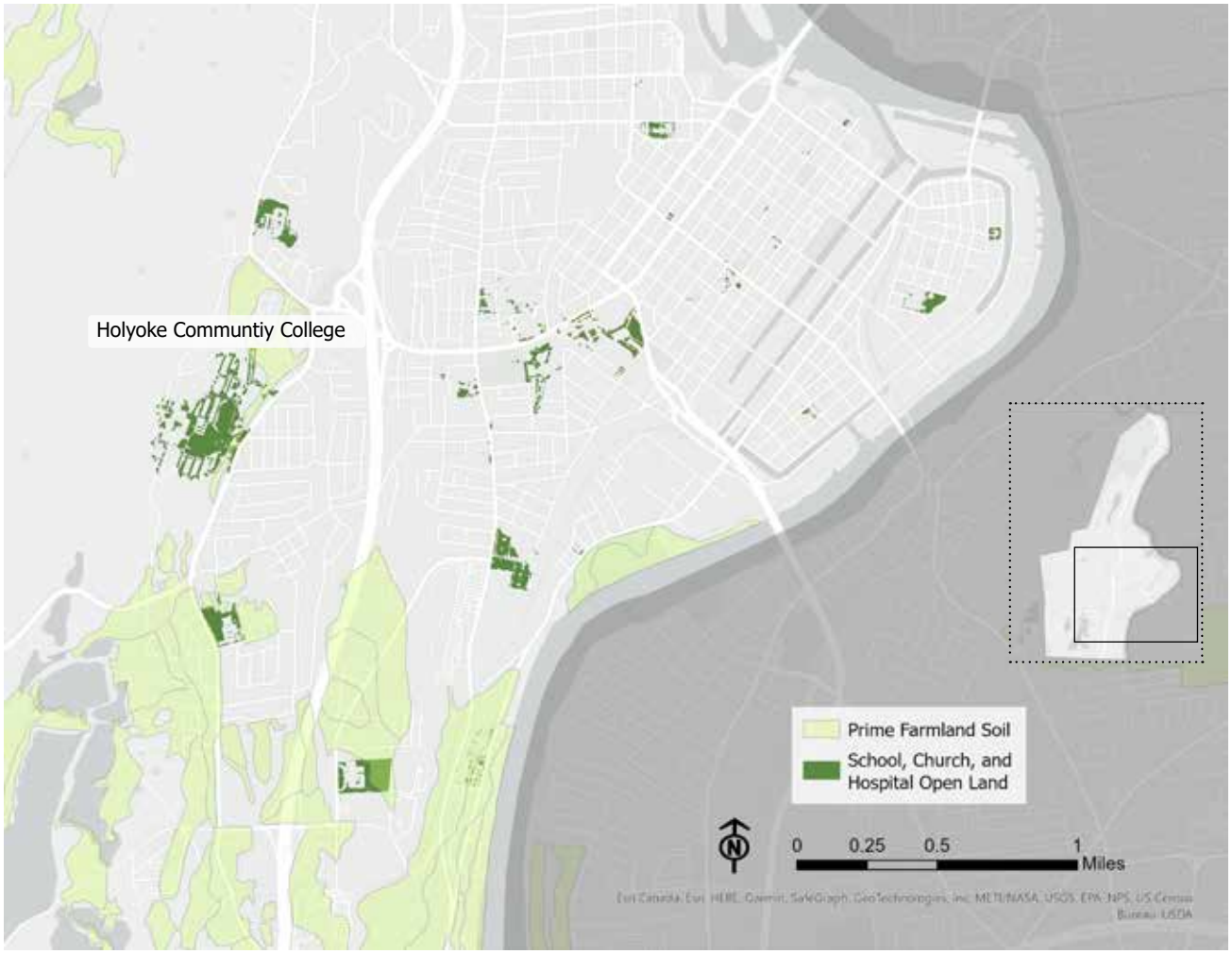
No impervious surfaces: This analysis only focuses on permeable land to allow for in-ground growing.

Land not designated as endangered habitat or wetlands: These land areas are removed due to restrictions on activities that can occur on protected land areas.

Land with slopes less than 10 Percent: While slopes above 10 percent can be terraced and grown on, this analysis focuses on flatter slopes most suitable for conventional in-ground production.

Potential Locations for School, Place of Worship, and Hospital Gardens

Open Land on Institution Parcels



There are seventy-two acres of open land suitable for food production on properties associated with schools, places of worship and hospitals. Of these, twelve and a half acres are on prime farmland soils, those most suitable for growing food.

Zoom-ins are provided in recommendation pages 74 and 79.

Potential Locations for Community Gardens

6,000-square-foot Parcels with Proximity, Soil and Ownership Considerations

The largest community garden in Holyoke (Nuestras Raíces' El Girasol) is 6,000 square feet. Using this as a baseline size to explore the potential for additional large gardens, there are over 2,000 sites of at least this size totalling 1,042 acres. This map does not account for land ownership or current use, both of which will rule out some sites.

Prime farmland soil layer overlay

494 acres of the identified open land lie on prime farmland soil. Much of Holyoke's prime farmland has been lost to development and 2,232 acres is conserved and not available for agriculture. Protecting the remaining prime farmland that is still usable for growing food would keep it available for agriculture in the future if residents deem that to be a priority.

There is no prime farmland downtown but this does not rule out growing food there. Agriculture in densely settled urban environments is feasible in raised beds with imported soil.

City-owned parcels overlay

The overlay of city-owned parcels and identified open land reveals additional considerations for locating community gardens. City-owned parcels may prove easier to establish a community garden on because additional land would not need to be purchased. Some of these areas include sites within city parks.

Existing community garden locations

Existing Holyoke community gardens are more concentrated in neighborhoods in the downtown area, where there is also less access to healthy food and where home rentership is higher. Applying a quarter-mile walking distance around the garden locations reveals the residents the gardens may most easily serve. The Springdale neighborhood and parts of Ward 6 are some of the areas that do not have immediate access to community garden spaces.

Jardin Comunitario Cuenta Conmigo nearby to El Girasol

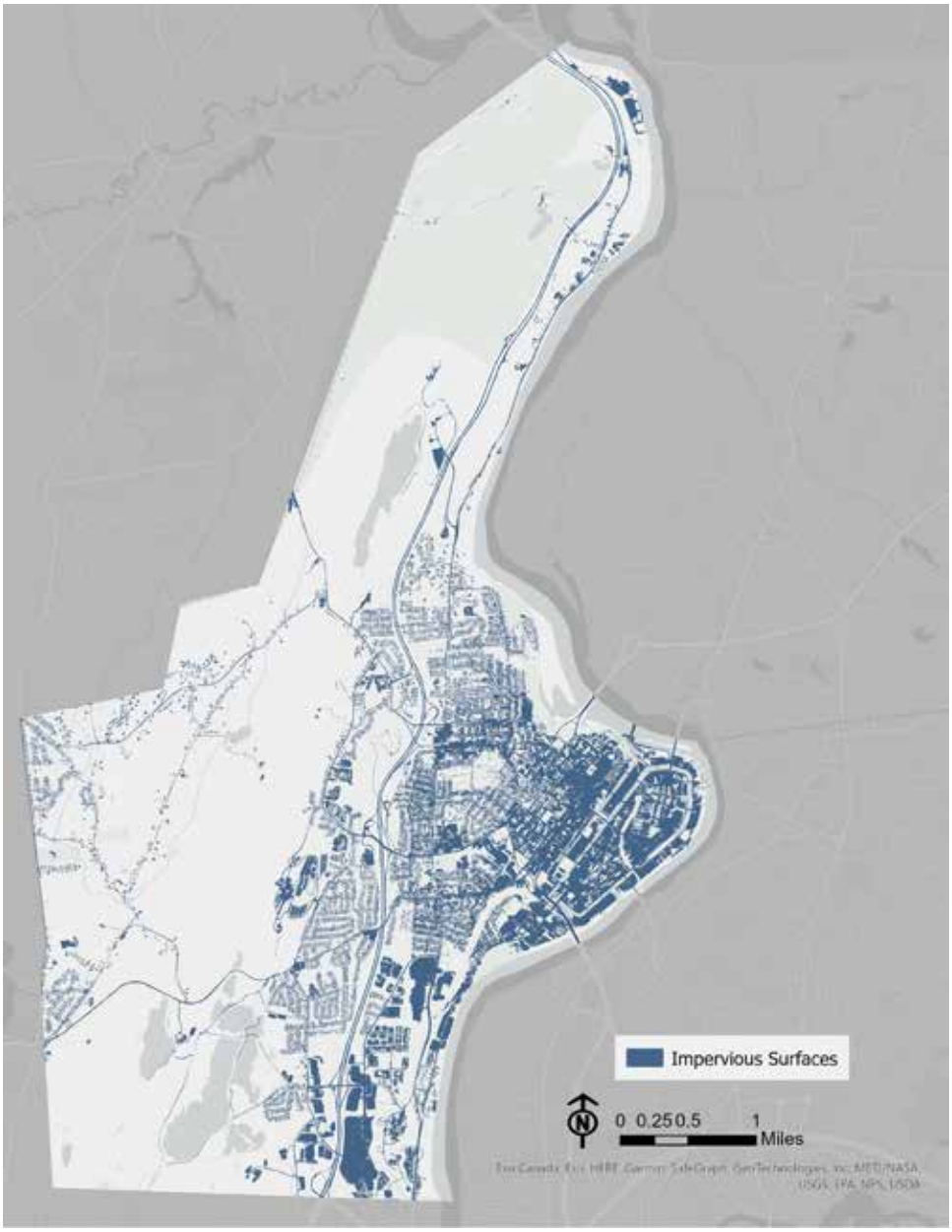
If agricultural production within the city is deemed essential to addressing resilience against future food system distruptions, protecting areas of the remaining approximately 500 acres of prime farmland in the city should be a priority.

Potential Locations for Container Gardens

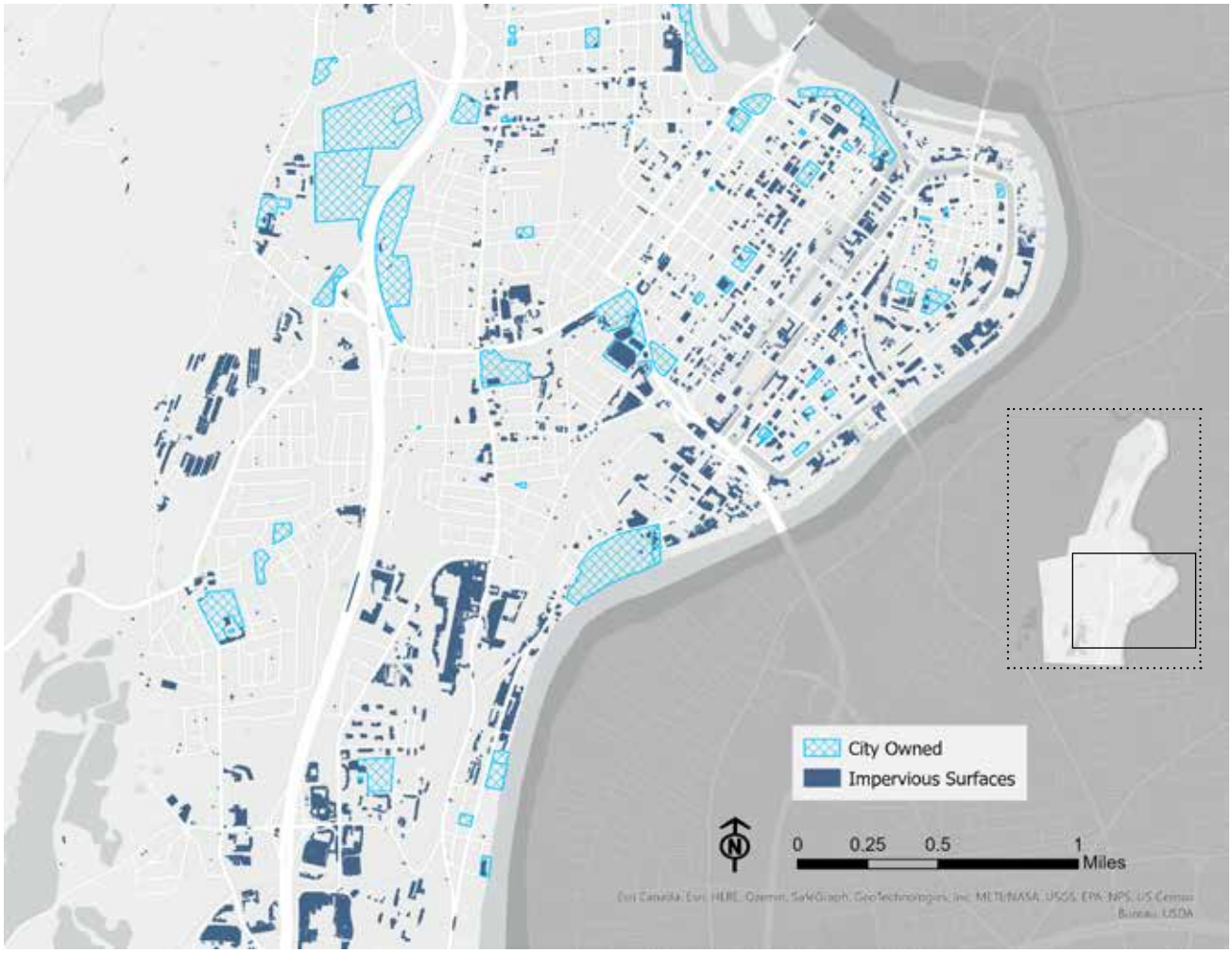
Initial Areas of Impervious Surfaces

The following maps look at impervious surfaces as potential locations for establishing raised-bed gardens or container farming operations. This map analysis also shows where sections of impervious surfaces could potentially be removed to establish more green spaces for Holyoke's residents.

There are over 2,600 acres (4 square miles) of impervious surface in Holyoke. Most of downtown in impervious.



Impervious Surfaces Downtown



There are 474 acres of impervious surfaces identified as suitable for container gardens using the following criteria:

Buildings, roads, sidewalks, and driveways are excluded: While rooftops can be used for urban agriculture, this particular map only includes land at the ground level and excludes impervious surfaces that people walk or regularly drive on.

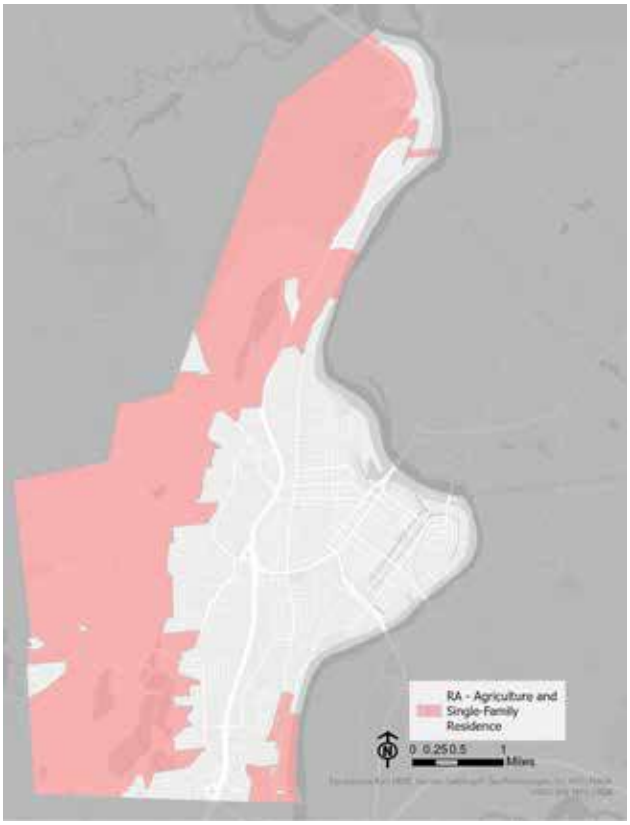
Land with slopes less than 5 percent: This map only includes impervious surfaces with slopes of less than five percent, with the assumption that these spaces are more accessible and better suited to host container gardens.

City-owned parcels overlay

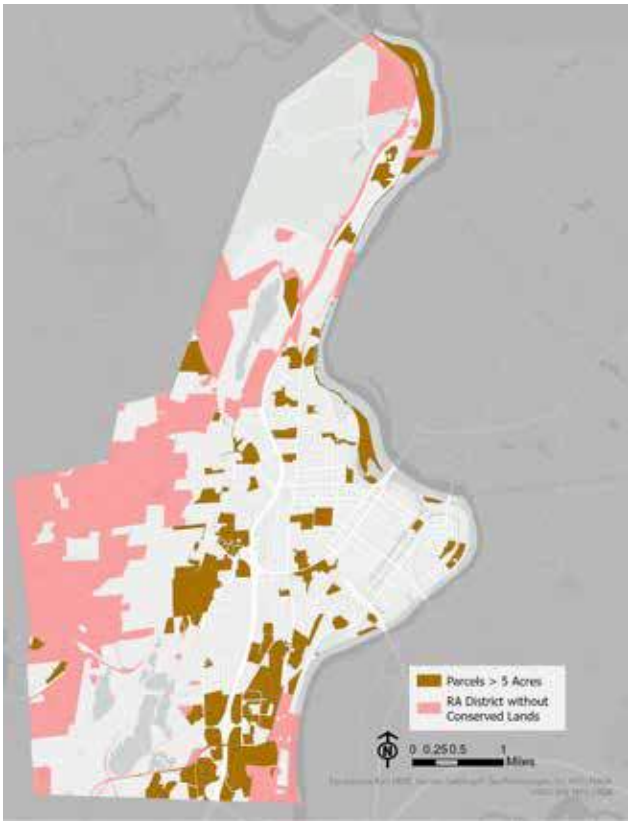
As city-owned parcels could prove easier to having their use changed, the overlay of city-owned parcels reveals potential sites the City could most readily encourage container gardens or potentially remove impervious surfaces.

Potential for Backyard Growing

Agriculture and Single-family Residence (RA) Zone



RA Zone with Parcels Greater Than 5 Acres



The City zoning ordinances restrict the agricultural production and sale of agricultural products to a single zoning district, Agriculture and Single-Family Residence (RA). A majority of this zoning district is in the western part of the city, where there are extensive tracts of conserved land (left map). While food production is allowed in other zones, types of production including raising livestock are limited and on-site sales are not allowed.

Excluding parcels that are protected in perpetuity, there are 3,344 acres available for agricultural use (right map). Residents in the RA district are free to grow and sell their produce on-site. New production and on-site sales in the RA district could result in expanded access to fresh food for nearby residents and additional income for producers. Residents outside the RA district are free to grow their own produce, but are restricted from selling products on-site.

Under the current zoning code, properties of five acres or greater outside of the RA zoning district are also exempt from agricultural use restrictions (right map). There are 167 such parcels. Equaling nearly 4,200 acres, these parcels could be used for agricultural production; however, they may not be suitable for in-ground food growing depending on the degree of development and history of use. Alternative forms of agriculture such as container farming would be needed. Large greenhouse production might also be suitable on these larger parcels.

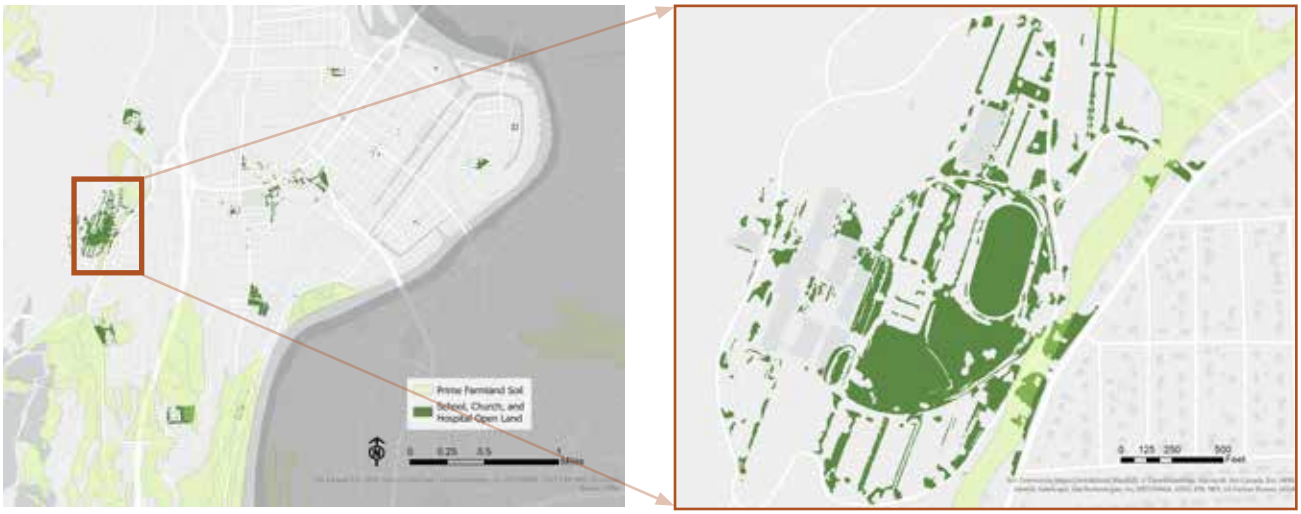
Residential Production Possibilities

Open Land in Single-and Two-Family Districts

Encouraging residential-scale production can greatly benefit residents by expanding access to fresh food, increasing availability of healthy food options, and reducing food insecurity. Examining non-agricultural single- and two-family districts reveals over 1,180 acres of available space for residential-scale production. Multi-family districts are excluded from this analysis based on the assumption that apartment buildings are less likely to have significant space for residents, many of whom are renters, to use as they wish. Non-residential districts are also excluded from this analysis. Some discrepancies exist in the final acreage, as highway medians, cemeteries, and public spaces appear in the final map.

Recommendations

5.1 Start or expand food production at schools with available land, including Holyoke Community College.



Holyoke Community College already has a small garden and greenhouse, growing common and uncommon edible fruits. The college has 19 acres of open land on site potentially available to grow food, though this includes playing fields. With increased food growing, the college could be a model for producing and distributing food to school meal programs. The College's Culinary Art Institute could be a potential collaborator to use produce grown on site.

Looking west over the HCC campus.

PILOTING ALTERNATIVE GROWING METHODS WITH FREIGHT FARMS

Local Leader: HCC, City of Holyoke, Nuestras Raíces, Holyoke, MA

Holyoke Freight Farms is a collaboration between Holyoke Community College and Holyoke residents to grow fresh produce in refurbished shipping containers using a soil-free hydroponics system. Each container has the capacity to hold 3,000 plants and can grow as much produce as an acre of farmland annually. A controlled environment allows students to grow produce year-round. In addition to food production, the goal of the project included training residents in hydroponic food production and donating a portion of harvested food to hunger relief (HCC).

The freight farms fell out of use during the Covid-19 pandemic and, according to a College official, the inner machinery of the structures has fallen into disrepair. In an effort to find good use for the structures, the College is considering shifting their use from solely food production to partnering with a seed company to use them for seed production.

EXPANDING FARM-TO-SCHOOL EFFORTS

Precedent: Detroit School Garden Collaborative, Detroit, MI

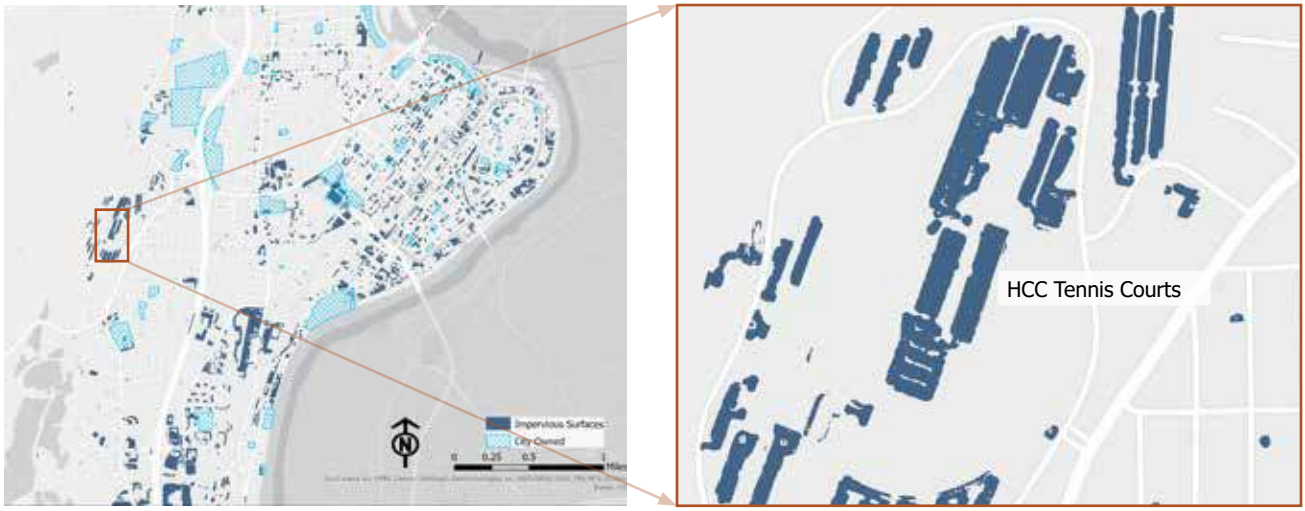
The Detroit School Garden Collaborative operates multiple farm-to-school initiatives through the Detroit Public Schools Community District's Office of School Nutrition with the goal of providing "high-quality food, nutrition, and wellness education while eliminating barriers to healthy food." Eighty-two district schools currently participate in the program, with plans for all DPSCD schools to receive a garden. Six raised garden beds fill each site, growing fruit, vegetables, and edible flowers for use in classroom tasting activities and school salad bars. Partnerships with other organizations and institutions provide seeds, transplants, raised-bed construction help, and educational support.

In addition to the Collaborative, Detroit Public Schools also operate a two-acre farm at Drew Transition Center, a school serving 18-26 year olds with cognitive and physical impairments. With one and a half acres of field production and six unheated greenhouses, the farm produces approximately 20,000 pounds of organic produce for school lunch programs. Crop choice and planting is aligned to school district menus and salad bar needs to ensure the food is used. The school garden program was designed as a replicable model to increase food production on school sites. Some sites also have greenhouses to extend growing into the colder months.

A summer internship program pays high school students to maintain school garden sites in the months when school is not in session, help with production on larger sites, and process harvests.

The Office of School Nutrition also uses Food Corps (an AmeriCorps program) service members at K-8 schools in nutrition and garden education (DPSCD).

5.2 If asphalt or other impervious surfaces were removed in the installation of container gardens, targeting areas of the city with the highest amount of impervious surface area would have the additional impact of reducing runoff.



When looking for impervious surfaces to remove, considering large underutilized spaces that would be costly to repair may be cost effective. As an example, the HCC tennis courts could be removed if no longer needed.

HCC tennis courts in disrepair.

TURNING A PARKING LOT INTO A COMMUNITY GARDEN

Case Study: Depave Puget Sound, Seattle, WA

Depave Puget Sound is an organization that helps communities transform areas of unneeded pavement into green spaces to improve community well-being through cleaner water, air, and healthier neighborhoods. The organization worked in partnership with World Relief Seattle, a refugee and immigrant support organization, to complete Paradise Parking Plots Community Garden in 2018. Seeing that immigrant families could benefit from a space to grow food used in traditional dishes, to build relationships with other immigrants, and to connect with the land in their new home, World Relief Seattle worked with Hillside Church to acquire an under-used portion of the church's parking lot and turn it into a community garden and gathering place. In total, the project removed 50,000 square feet of asphalt and in its place built fifty raised garden beds and five rain gardens to divert stormwater runoff (Depave Puget Sound).

5.3 Coordinate with the Parks Department for community garden creation in parks where prime farmland soils and parks overlap.

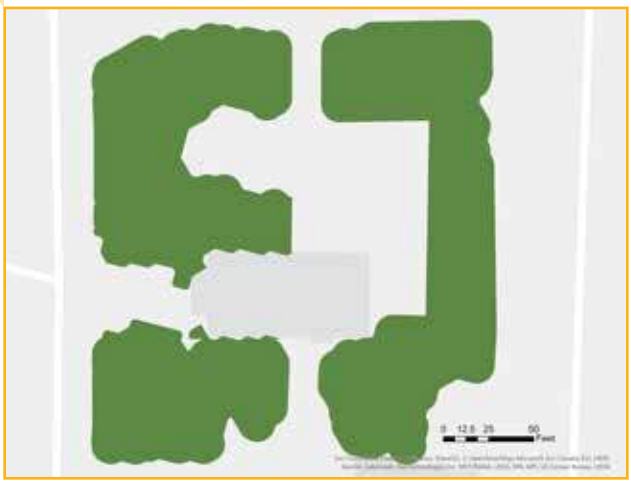
Explore Springdale Park for a community garden or community greenhouse. Springdale Park is located on prime farmland soils, is one of the larger parks in the City, and is located in a neighborhood where no community gardens presently exist. It is also located in a neighborhood where there are physical barriers to healthy food access.

Expansive play field at Springdale park, looking northeast.

5.4 Partner with institutions (places of worship and hospitals) to start community gardens.

Working with places of worship with significant open land and/or in areas outside of the walking radius of current community gardens to install new gardens could have the greatest impact on the community. A similar action item was recommended in the *Community Action Plan* (EPA, 22).

The spatial analyses show that some churches have more than enough open space and are located at good locations to establish community gardens. Since some places of worship are deeply rooted within the community, they also make ideal locations for distributing food.



Our Lady of the Cross Parish

Immaculate Conception

5.5 Consider engaging with community members to draft and adopt a comprehensive urban agriculture chapter for the zoning code that expands opportunities for food-related enterprises and increases food security.

The *Community Action Plan* recommended passing a growing ordinance that would similarly support small-scale growers. Action Item 3.1 reads: "Pass a Community Growing Ordinance (based on Springfield's ordinance)." Springfield, Massachusetts, a neighboring city of Holyoke, passed an ordinance that allows small-scale and backyard growers to sell their produce at farmers markets, farm stands, and restaurants. Replicating Springfield's ordinance in Holyoke could help increase opportunities for existing growers to generate revenue in the city through more formal production and distribution channels and encourage more residents to invest in food production as a source of income. This could also increase the overall supply of fresh, local produce available in the community and at the farmers market.

Considering not just a growing ordinance but looking at policy and the zoning code from a whole-systems approach would allow the city to avoid piecemeal solutions and to address barriers to expanded production across all City departments and through relevant regulations. The example of Springfield's ordinance does not address topics such as raising livestock, on-site slaughter, or rainwater harvesting for irrigation.

SUPPORTING BACKYARD GROWERS

Local Leader: Holyoke Food and Equity Collective, Holyoke MA

When the pandemic began in 2020, local community leaders recognized food insecurity as a looming issue for residents facing economic disruptions. They also recognized that backyards make up an abundance of open land that could be an asset for food security in the City. The group formed the Holyoke Food and Equity Collective as "an antiracist community organization working to create better access to healthy food in the city of Holyoke by building food sovereignty." The collective aims to generate health, racial, and economic equity by working towards policy change and on-the-ground projects. Since the start of the pandemic they have helped over thirty-five households install backyard gardens, sourcing local seedlings to grow culturally relevant food. The collective also supplies plans for backyard garden beds for residents able to do the work themselves (Holyoke Food and Equity Collective).

The collective also organized gleaning efforts during the pandemic and collected thousands of pounds of produce from farms during harvest season to get produce to Holyoke residents in need of food assistance (Christensen).

OPENING PATHS FOR URBAN AGRICULTURE

Precedent: Greater Cincinnati Regional Food Policy Council and City of Cincinnati, OH

Since 2019, residents and businesses in Cincinnati have referred to a single chapter of the City's zoning code regarding all things agriculture. A two-year-long process involving City Council, local stakeholders, and the City's Planning Department resulted in a ten page amendment to the zoning code. This single document clearly outlines how to establish community gardens and urban farms, compost food waste, and keep animals as livestock for farming purposes.

Following a 2017 stakeholder meeting hosted by the Greater Cincinnati Regional Food Policy Council, the City Council passed a motion tasking the Planning Department to revise the municipal code. The Planning Department gathered officials from a variety of city departments to collaborate in the redesign process and identify different barriers to urban agricultural practices. Community engagement was also integral in the redesign process, with multiple stakeholder meetings being held with the public. Throughout the process, the Planning Department made draft language available to the public on their website.

In addition to the clear guidelines related to establishing urban farms, composting food waste, and keeping livestock, there are provisions for indoor farming and aquaculture. Most importantly, the updated code clarifies enforcement standards for inspectors and establishes farming as a right for property owners. The key lessons learned from the redesign process were the importance of having a stakeholder-driven approach with political backing from City Council and ensuring inclusivity for all community members throughout the internal and external engagement processes (ERIT).

A MODEL OF COMMUNITY ACTIVISM

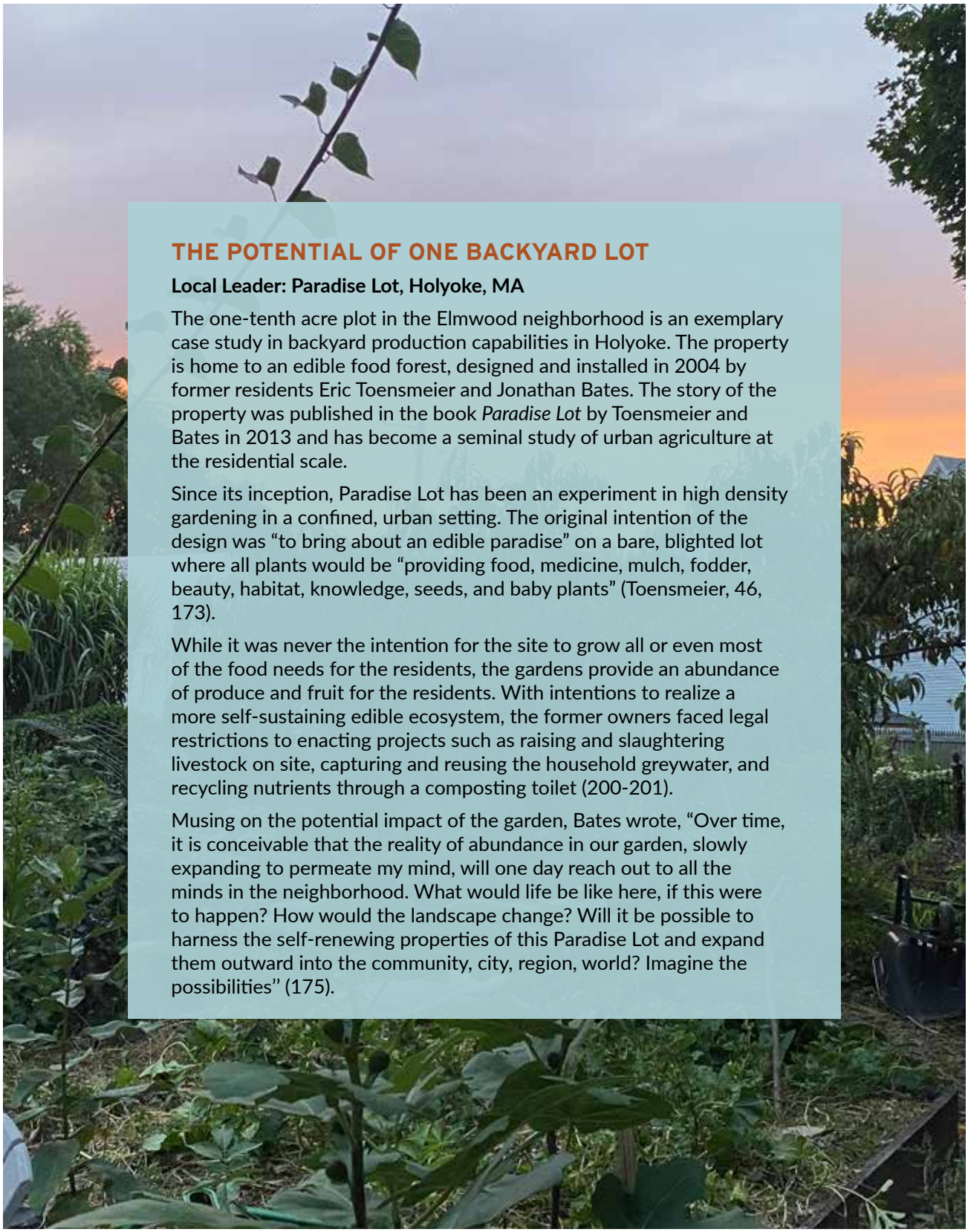
Local Leader: Nuestras Raíces, Holyoke, MA

Nuestras Raíces is a local grassroots urban agriculture organization whose "mission is to create healthy environments, celebrate 'Agri-culture,' harness collective energy, and to advance their vision of a just and sustainable future" (Nuestras Raices). Founded in 1992 by a group of migrant farmers from Puerto Rico with strong agricultural backgrounds, the organization has since grown to have huge impacts in the city by adding opportunities for local food production, community building, business creation, and education. In the 30 years since its inception, the organization has:

- created a network of community gardens by transforming vacant and polluted lots into flourishing and empowering community spaces. Today, Nuestras Raíces manages nine urban community gardens and has been involved with four educational gardens.
- created a 30-acre farm in southern Holyoke called La Finca, bordering the Connecticut River. The Farm creates land opportunities for Latino community farmers on one-quarter to one-half acre and grows culturally-specific foods such as calabaza pumpkin, sweet peppers, and eggplant.
- created free-to-pick planter boxes on the United Church of Christ grounds, where anyone is allowed to take some of the harvest.
- made available a commercial kitchen in downtown Holyoke for food entrepreneurs to lease.
- held a regular Puerto Rican Lechonera (pig roast) in partnership with a local entrepreneur.
- provided classes in financial literacy and assistance to Latino entrepreneurs.
- created mobile markets to bring fresh produce to Hampden County residents.
- launched a clean energy business in Holyoke called Energia, Llc, a company that now employs more than forty workers.
- conducted or participated in many planning workshops including forming a Local Foods, Local Places steering committee whose work led to the *Community Action Plan* for Holyoke.
- employed FoodCorps (an AmeriCorps service program) members to increase their capacity for community education and engagement around food and nutrition.
- spearheaded in plans for numerous other community actions including creating a cafe, a food hub for local food aggregation and distribution, and creating additional school gardens with the aim of getting healthy food into school cafeterias.

(Nuestras Raices)

Despite being a city-changing organization and community leader, Nuestras Raíces has faced many hurdles to accomplishing their mission. The reliance on grant funding, changing organizational leadership, and the difficulty in overcoming the marginalization of the Puerto Rican community in the city, often without government support, Nuestras Raíces has not always been able to sustain or complete the many projects they have envisioned. The impacts of the Covid-19 pandemic have added to these hurdles. Yet the organization's sustained efforts over 30 years has built a legacy of activism that will continue to promote their vision of a just and sustainable future.



THE POTENTIAL OF ONE BACKYARD LOT

Local Leader: Paradise Lot, Holyoke, MA

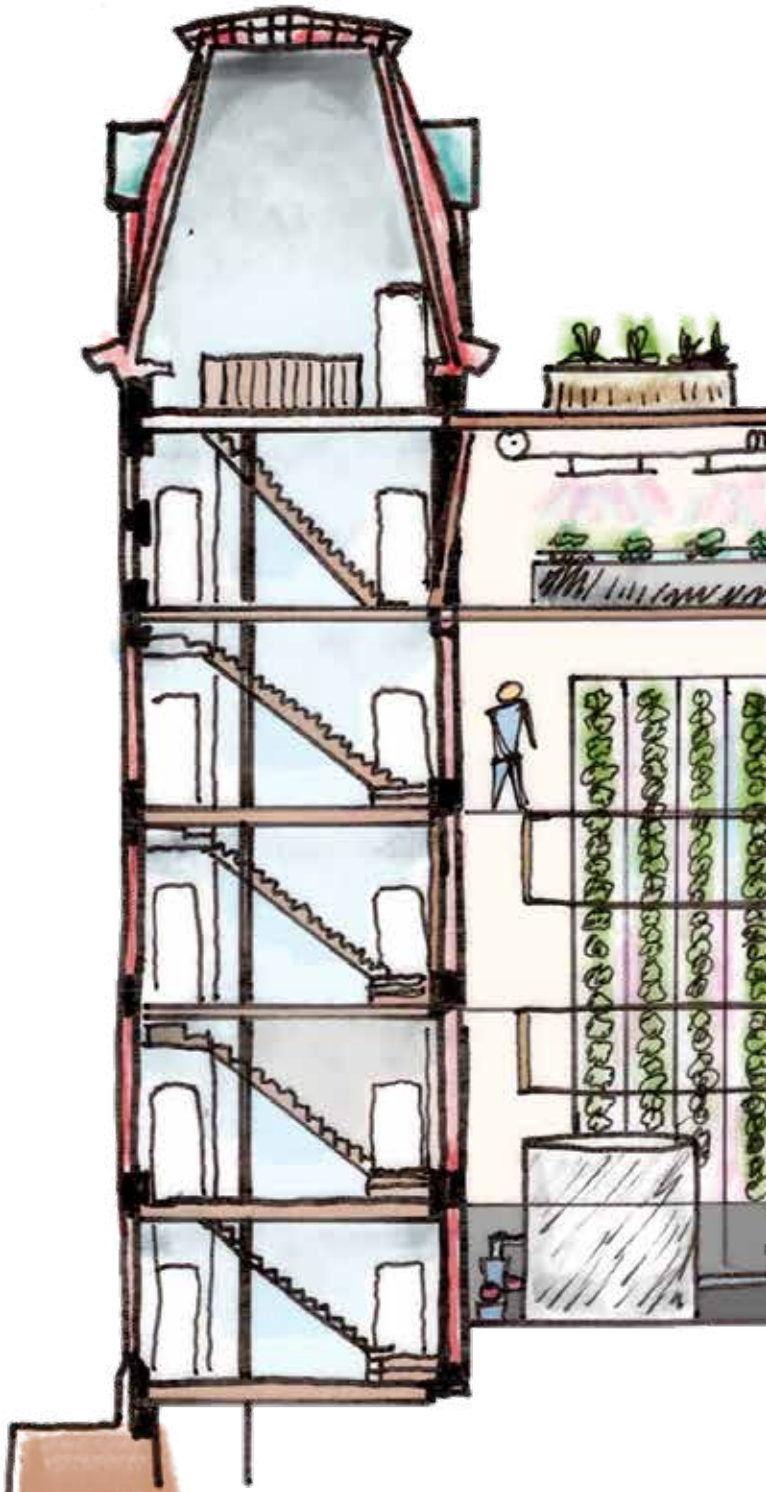
The one-tenth acre plot in the Elmwood neighborhood is an exemplary case study in backyard production capabilities in Holyoke. The property is home to an edible food forest, designed and installed in 2004 by former residents Eric Toensmeier and Jonathan Bates. The story of the property was published in the book *Paradise Lot* by Toensmeier and Bates in 2013 and has become a seminal study of urban agriculture at the residential scale.

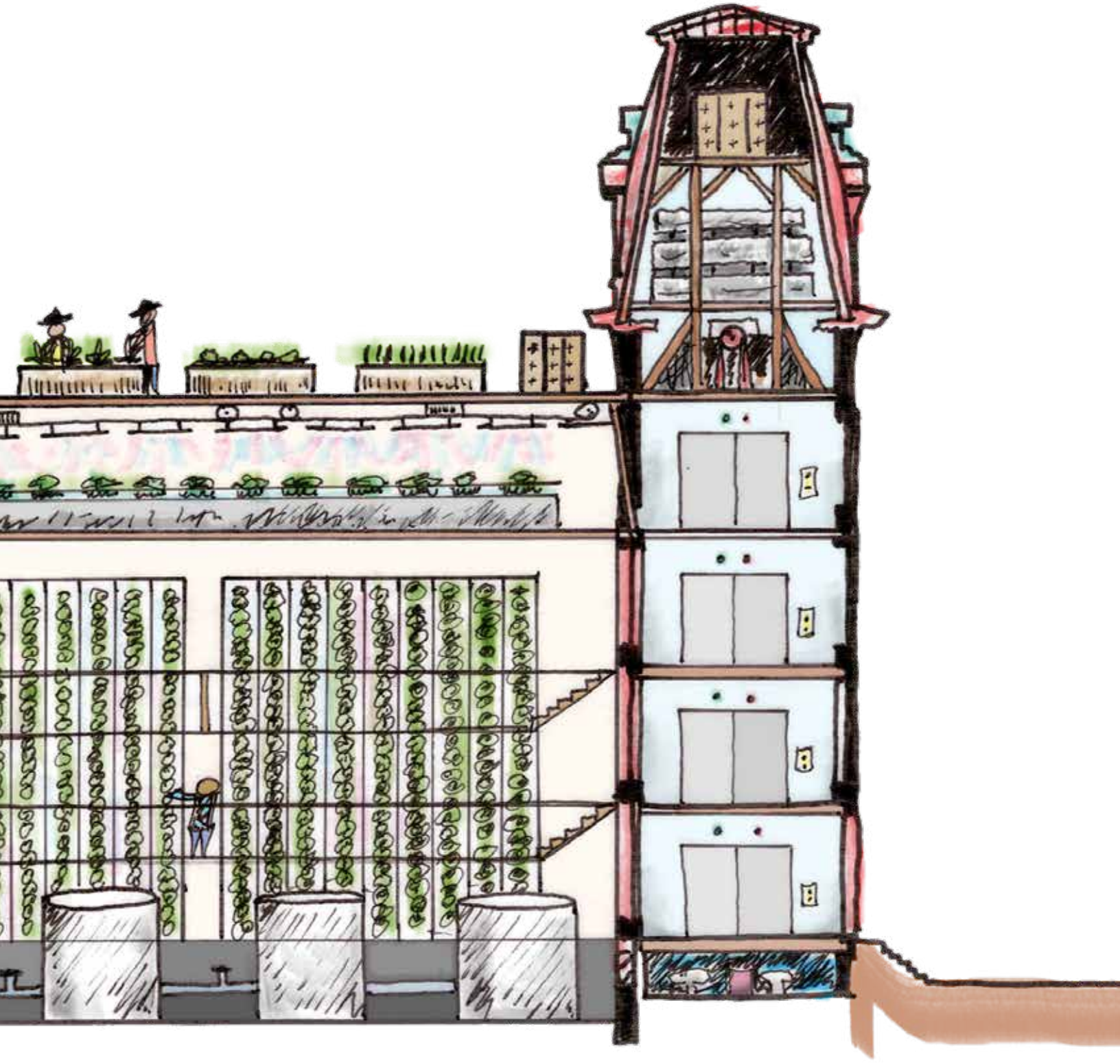
Since its inception, Paradise Lot has been an experiment in high density gardening in a confined, urban setting. The original intention of the design was "to bring about an edible paradise" on a bare, blighted lot where all plants would be "providing food, medicine, mulch, fodder, beauty, habitat, knowledge, seeds, and baby plants" (Toensmeier, 46, 173).

While it was never the intention for the site to grow all or even most of the food needs for the residents, the gardens provide an abundance of produce and fruit for the residents. With intentions to realize a more self-sustaining edible ecosystem, the former owners faced legal restrictions to enacting projects such as raising and slaughtering livestock on site, capturing and reusing the household greywater, and recycling nutrients through a composting toilet (200-201).

Musing on the potential impact of the garden, Bates wrote, "Over time, it is conceivable that the reality of abundance in our garden, slowly expanding to permeate my mind, will one day reach out to all the minds in the neighborhood. What would life be like here, if this were to happen? How would the landscape change? Will it be possible to harness the self-renewing properties of this Paradise Lot and expand them outward into the community, city, region, world? Imagine the possibilities" (175).

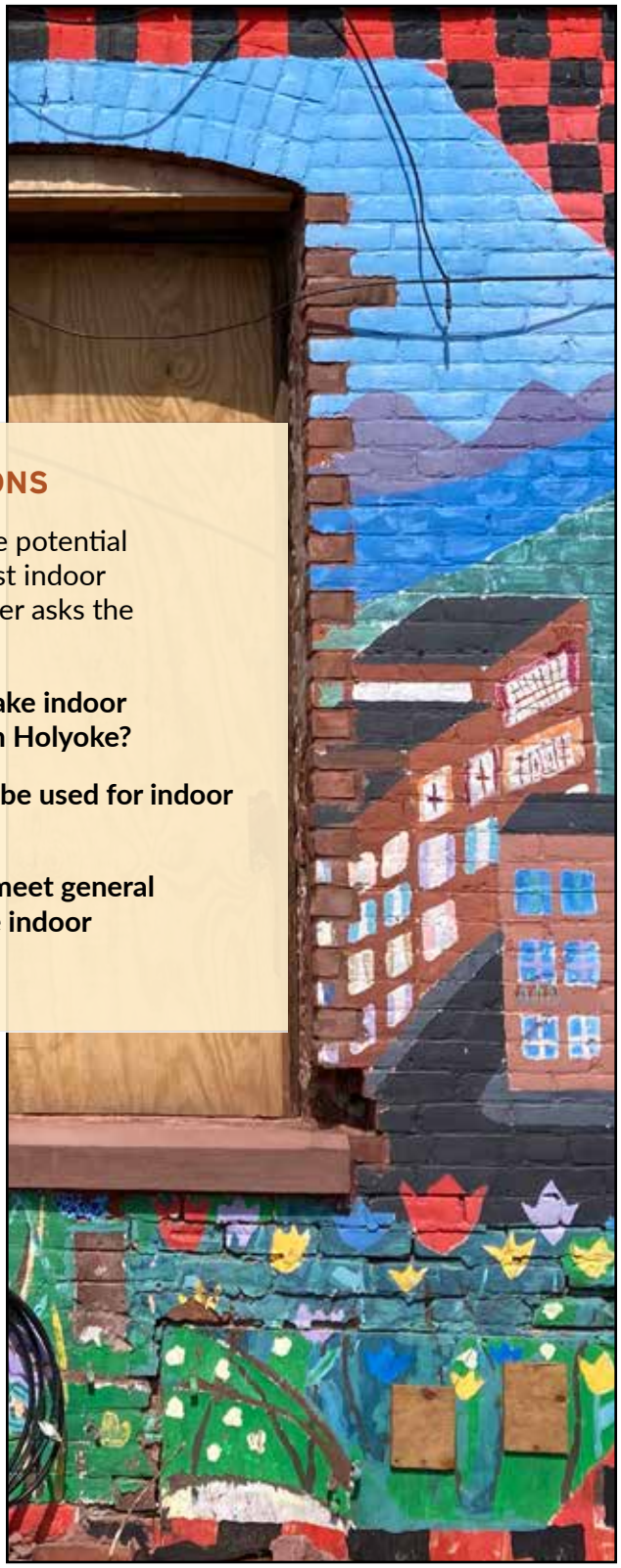
06 Mapping Indoor Production Possibilities





Introduction

Community Action Plan Action Item 3.2 recommends to "identify properties for indoor urban agriculture, specifically through the industrial re-use of old mill buildings" (EPA, 21). That report recognized the plentiful space available in vacant mill buildings and shared a desire from community members for repurposing these spaces for indoor production that would increase the overall supply of fresh produce for Holyoke residents. This document does not explore the policies or incentives needed to make such a distribution possible; however, this chapter does identify suitable structures for indoor production, which was a measure of success for this particular action item.



GUIDING QUESTIONS

In order to identify the potential buildings suited to host indoor production, this chapter asks the following questions:

What assets might make indoor production possible in Holyoke?

What buildings could be used for indoor production?

How many buildings meet general criteria for large-scale indoor production?

Assets of the Industrial Past

Beginning in 1847, taking advantage of the broad plain and the approximately sixty foot drop in the Connecticut River at South Hadley Falls, work began on a planned industrial city. Canals were all dug by pick and shovel, and dams were built to harness the power of the river by using water wheels and turbines that turned shafts and pulleys mechanisms that in turn drove the machinery in the paper mills (Bluestone). Holyoke converted the dam and canal system to electricity generation when hydro-electric technology developed in the late nineteenth century.

Existing Mill Buildings

Mill Buildings Downtown

This map shows the fifty-two mill buildings remaining in Holyoke (using City parcel data), with a total finished floor area of over 4,680,000 square feet (107 acres). Some have been repurposed for other uses while some sit vacant and in disrepair. Others have already been torn down to make way for new structures. Integral to the character of the city, the mill buildings that line the canals show the legacy of the city's industrial birth.

Why Indoor Agriculture in Holyoke?

In 2019, the City along with MassDevelopment commissioned a study to examine various modes of controlled environment agriculture. Industry leaders were interviewed and shared the many considerations they have in selecting host communities and particular properties. The study concluded that "Holyoke is well positioned to capitalize on market growth and investor interest in CEA and its related technologies" (Northbound Ventures, 26).

The report's conclusion was based on the city's competitive electricity rates, available building stock, and the growing network of professionals with industry expertise. This chapter explores the physical conditions related to the city's building stock and which properties may be suitable for indoor agriculture.

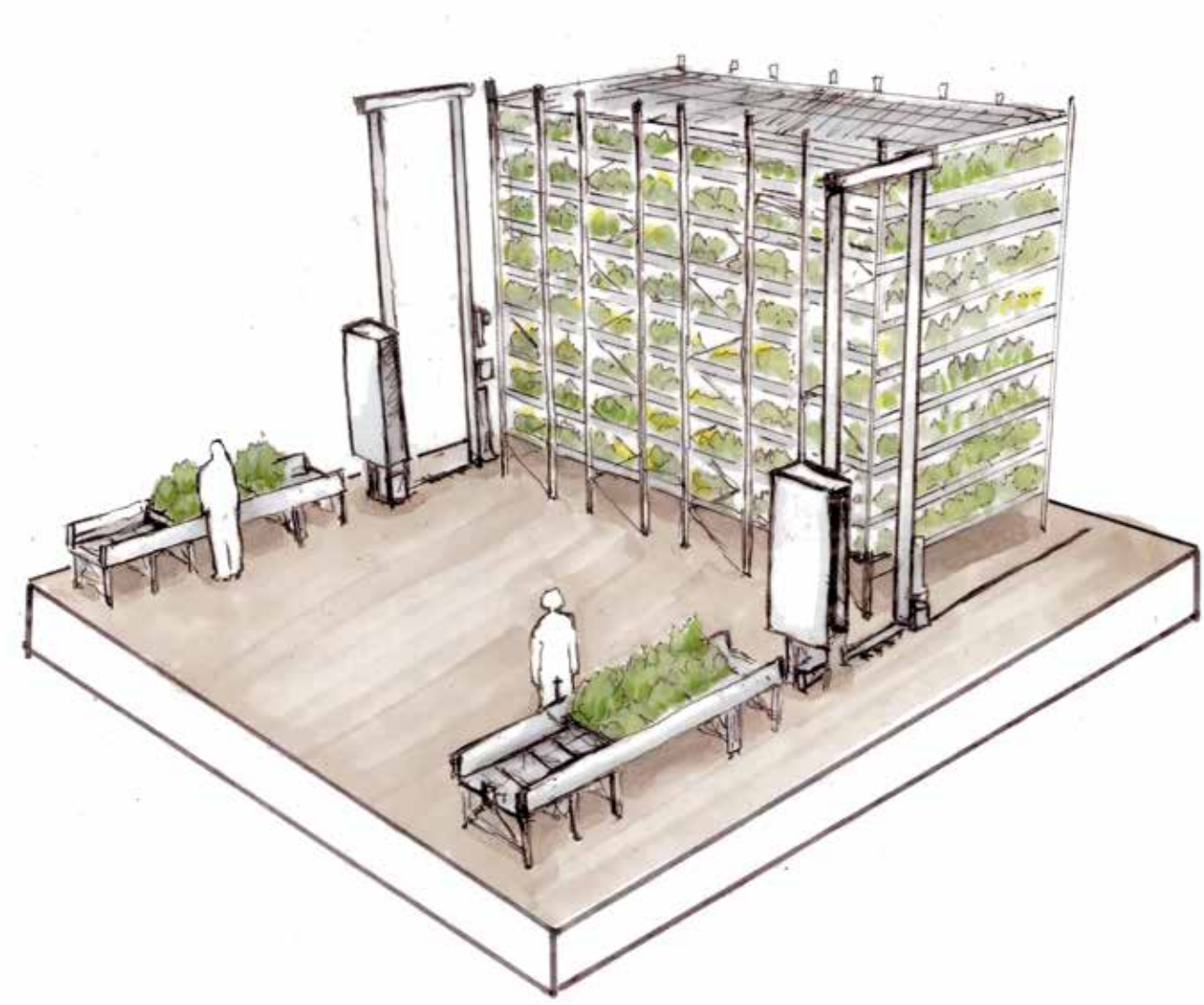
Defining "Controlled Environment Agriculture"

Controlled Environment Agriculture (CEA) is "a technologically advanced and intensive form of hydroponic/soilless based production of vegetables and small fruits" that covers a range of cultivation methods from high tunnels to "highly sophisticated greenhouses with control of temperature, light, relative humidity and carbon dioxide" (Mattson in Northbound Ventures, 2).

The 2019 study listed site attributes that CEA operators find appealing when locating a facility. Continuous space was a key attribute, with 50,000 to 100,000 square feet suggested as a desirable range (Northbound Ventures, 15). Other considerations included:

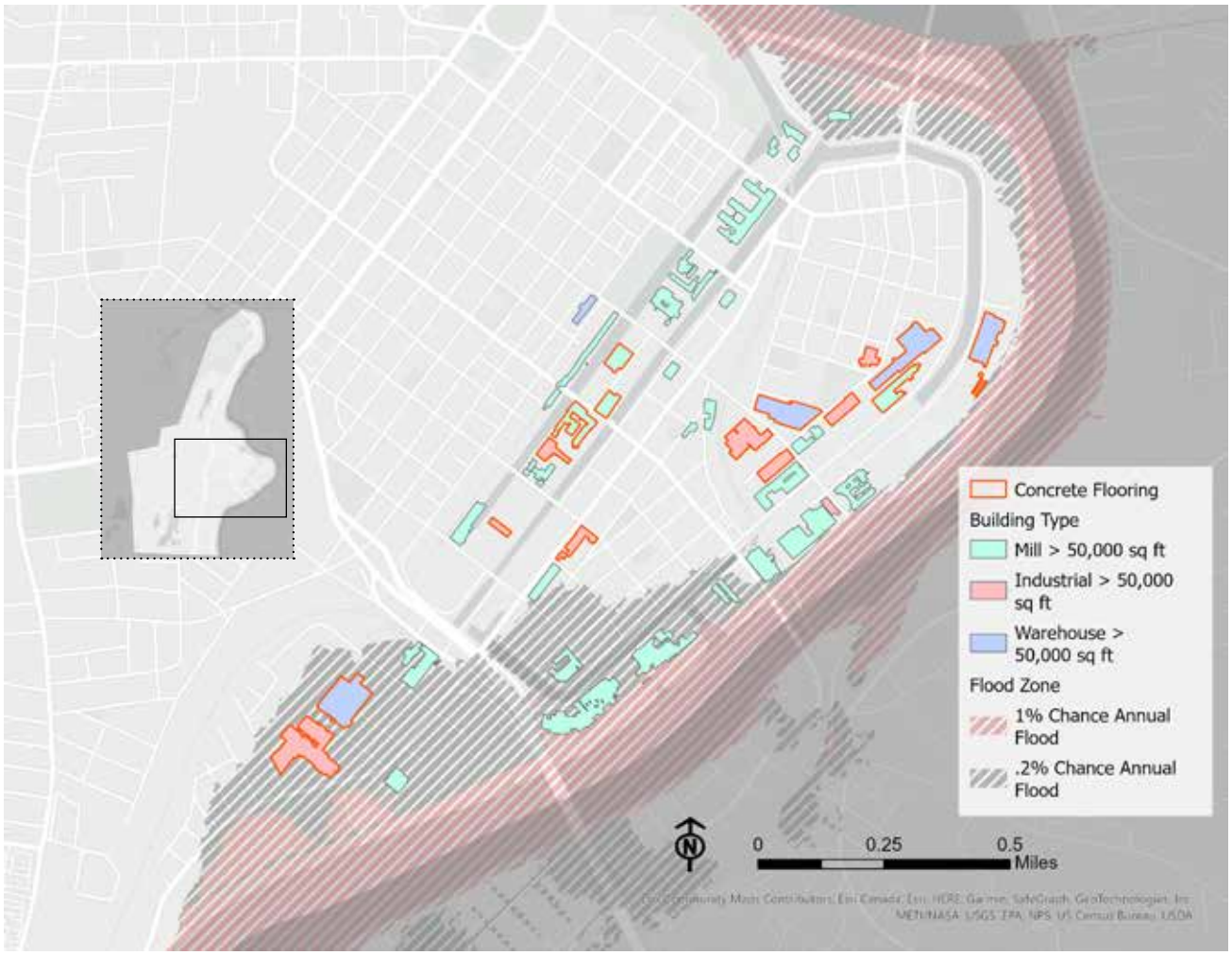
- Solid floors (e.g., concrete) versus wooden floors.
- Taller ceilings (over 15 feet, but ideally 28-30 feet) to accommodate stacking trays.
- Clear spans so as not to have to work around a lot of poles.
- Space to allow four feet of light distance to grow trays.
- Solid roof and structural engineering to host equipment.
- Upgraded electrical/HVAC systems. Mechanical, equipment and plumbing can be 40-50 percent of the total site development cost.
- Inexpensive electricity, which is 40-60 percent of costs (preferably around $0.05-$0.08 kWh including transmission charges in 2019).
- Ability to buy or lease for less than $5.00 per square foot.
- Longer lease terms (e.g. a ten-year lease with options to renew)
- Proximity to housing and public transportation for the workforce.

Of these considerations, those with a spatial component that could be mapped were used as criteria to map the potentially suitable buildings: these include floor area, floor type, proximity to downtown workforce. Additionally, buildings were mapped in relation to the 100-year (1 percent annual chance) and 500-year (.2 percent annual chance) flood zones as these buildings carry additional risk and these federally designated zones affect insurance rates and overall property costs.



Large-Scale Indoor Production Potential

Downtown Buildings Fitting CEA Criteria



This map applies the criteria drawn from the CEA Study to the downtown area of Holyoke. The methodology is detailed on the following page.

This analysis begins by isolating buildings with a finished floor area greater than 50,000 square feet. Where finished floor area was not available the total footprint of the building was used and multiplied by the number of floors.

The highest concentration of these structures are in Wards 1 and 2, with a total of fifty-seven buildings that meet the base criteria within this section of the city. These can be categorized by building type:

- **36 mill buildings totaling 4 million square feet (93 acres)**
- **9 warehouse buildings totaling 2 million square feet (28 acres)**
- **12 industrial buildings totalling 800,000 square feet (20 acres)**

Buildings in FEMA flood zones are vulnerable to significant flood events along with high flood insurance premiums. Of the 57 properties identified, 35 sit outside both the 100-year (1 percent annual chance) and the 500-year (.2 percent annual chance) flood zones. As these 35 properties would not be legally required to hold flood insurance in accordance with the National Flood Insurance Program, property costs would likely be less per square foot of space and likely more attractive to CEA operators.

Narrowing building options by flooring type, nineteen buildings with concrete floors lie outside the flood zones, and of these only four are historic mill buildings.

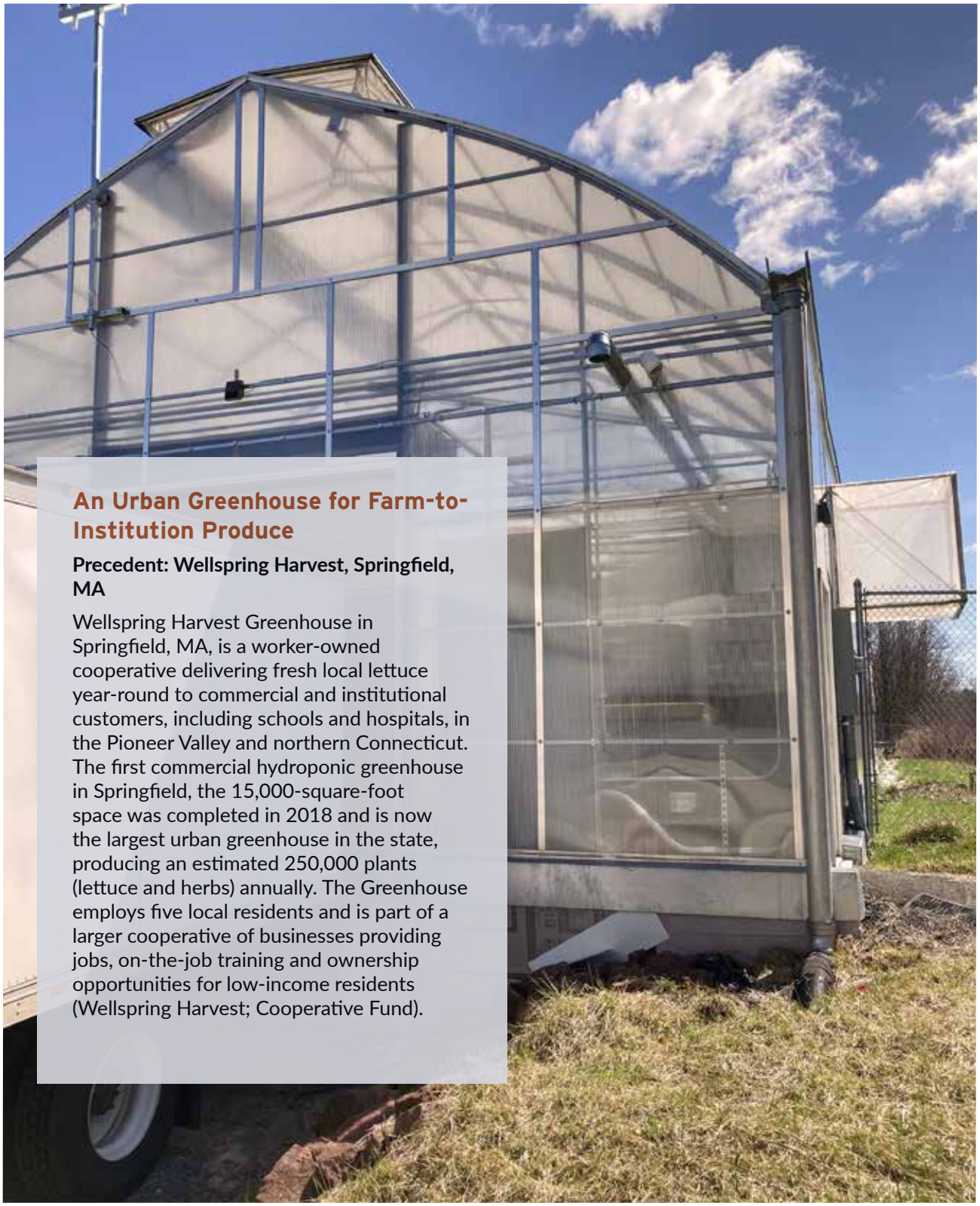
With 32 of 36 mill buildings having wooden floors, these may require renovations to support the necessary equipment for CEA operations, potentially becoming less attractive to CEA operators.

Ground-truthing Analysis

On February 19, 2022, the planning team visited two buildings that were identified using the GIS workflow presented on the preceding pages in order to ground-truth the analysis.

81 Sargeant Street: Mill building; 61,900 square feet of finished floor area; hardwood flooring; average building condition.

514 Main Street: Industrial building; 45,500 square feet of finished floor area; concrete flooring; average building condition.



An Urban Greenhouse for Farm-to-Institution Produce

Precedent: Wellspring Harvest, Springfield, MA

Wellspring Harvest Greenhouse in Springfield, MA, is a worker-owned cooperative delivering fresh local lettuce year-round to commercial and institutional customers, including schools and hospitals, in the Pioneer Valley and northern Connecticut. The first commercial hydroponic greenhouse in Springfield, the 15,000-square-foot space was completed in 2018 and is now the largest urban greenhouse in the state, producing an estimated 250,000 plants (lettuce and herbs) annually. The Greenhouse employs five local residents and is part of a larger cooperative of businesses providing jobs, on-the-job training and ownership opportunities for low-income residents (Wellspring Harvest; Cooperative Fund).

07

The Physical Parameters of Establishing a City-wide Composting Program

Introduction

Communities embracing a decentralized, diverse and small-scale composting system, before develping regional facilities "will be more resilient and will better reap the economic and environmental benefits that organics recovery has to offer" (Platt et al., ES-6).

Compost — crumbly, earthy-smelling material composed of decayed organic matter including food scraps and yard waste — is integral to improving soil quality and structure. According to the EPA, food waste constitutes approximately 22 percent of municipal solid waste streams in the United States. Food waste that is not diverted (over 35 million tons annually in the US) is dumped into landfills or burned in incinerators along with other garbage (US EPA 2017; PVPC, 32). Food waste is a costly component of the waste stream that could create valuable soil-enriching compost for gardeners and farmers.

Holyoke has been trying to find a site suitable for a municipal composting operation but has had difficulty finding a site of multiple acres and with the capacity to handle trucks coming in and out on a regular basis without impacting neighbors. Additionally, neighbors may perceive a composting operation to be a nuisance due to the potential for odors and pests, so both management of the system and distance from residences is a concern.

This chapter develops initial physical criteria for composting models appropriate to Holyoke and includes maps depicting sites in the city that meet these criteria and warrant further study.

GUIDING QUESTIONS

In order to explore the potential composting sites available to the City, this chapter asks the following questions:

What are the mappable criteria to a successful compost location in Holyoke?

What are some composting models available to Holyoke?

What are the barriers to implementing a compost program?

What food generators might be good to partner with?

Regional Research

The Central Pioneer Valley Organic Waste Management Working Group completed an organic waste reduction feasibility study for municipalities in Hampshire County in 2010, "Constructing a Regional Waste Management Program for the Central Pioneer Valley." The study showed that there was more than twice the food waste than what composting facilities serving Hampshire County had capacity for. The *Pioneer Valley Planning Commission Security Plan*, completed in 2013, noted "that this study demonstrated the need for, and feasibility of, a comprehensive food waste composting program. Additional research on food waste generation and geographic areas of relatively high waste generation in Hampden and Franklin Counties is needed to proceed with this effort" (PVPC, 33). Assessing compost

technologies, collection strategies, waste volumes, economic impacts, and environmental impacts are all factors impacting the viability of a regional composting facility (PVPC, 36). These factors are also important to investigate for smaller facilities.

A decentralized approach to food waste management may provide Holyoke more resiliency than a regional system, with easily accessible soil-enriching compost available for production within the City. Considerations are the time, money, and staffing required to establish sites and manage composting operations.

According to GreenBlue, an environmental nonprofit working towards the sustainable use of materials, of the 1,000 largest cities in the US, about 30 percent have some form of municipal or privately-run for food waste, whether by curbside pickup or drop-off system (GreenBlue).

Economic Impetus for Composting

Northeast landfill tipping fees were the highest in the country in 2020-2021, and Massachusetts ranked as the most expensive state to landfill municipal solid waste at $122.63/ton on average (BioCycle). High tipping fees increase the likelihood that a composting operations could save Holyoke money. The City would reduce the amount of garbage sent to landfills if it diverted organic waste to a composting operation.

Existing Composting System

In accordance with state regulations banning yard waste from being sent to landfills or incinerators, Holyoke currently diverts residential yard waste through a drop-off program. The Department of Public Works maintains a yard waste drop-off site located at the end of Berkshire Street near the wastewater treatment plant. The site is open to city residents from April until November to drop off bagged yard waste (grass clippings, weeds, hedge clippings, garden waste, leaves, twigs, brush, and branches). The space allocated to the yard waste collection area is approximately one-third of an acre, set back approximately 100 feet from the road. The City contracts with a disposal company to dispose of yard waste at one of the state-designated sites that accepts off-site generated waste. A city official estimated the City has spent, at times, approximately $100,000 per year on yard waste.

Composting is done on a small scale at Nuestras Raices' La Finca and some community gardens for garden material generated on site.

Yard-waste drop-off site at the Holyoke Wastewater Treatment Plant on Berkshire Street in mid-March.

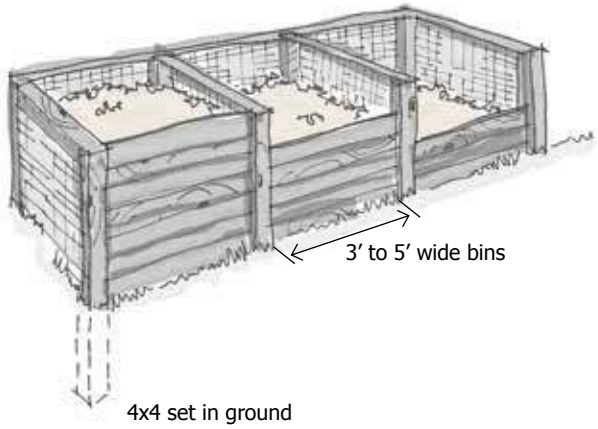
Composting Scales

Composting can be done on a range of scales from the home garden to the large facility that serves a whole region. Smaller sites managed in collaboration with community partners may benefit from being located near residences (e.g. adjacent to a community garden) to encourage active involvement, community management, and ease of transport.

Home Scale Composting

Backyard composting handles kitchen scraps and landscape debris at the home scale. Benefits include easy access for residents to the compost site and access to the finished compost. Lack of proper management of the compost system can be a downside.

HOME-SCALE OR SMALL COMMUNITY-SCALE COMPOST BINS



Community-Scale, Decentralized Composting

Sometimes found at community gardens, cooperative neighborhood composting is a scaled-up version of a backyard-style compost system. A large community-scale composting system typically handles 300 to 500 cubic yards of organic waste per year. There are community benefits to a well-managed system of this scale as finished compost stays in the community to benefit gardens and backyards. Downsides include potential difficulty finding adequate funding sources (Platt et al., 5).

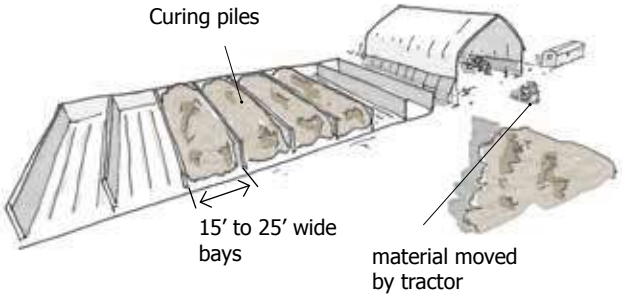
On-site Commercial or Institutional Composting

On-site composting at an institution or commercial operation is closer in size to a community-scale model, but collects waste from one facility rather than collecting waste from multiple waste generators. These systems typically handle 500 to 3,000 cubic feet annually (Platt et al., 7).

Large-Scale Centralized Composting

Centralized composting can be municipal or commercial in ownership, where operations process a few thousand cubic yards up to 100,000 cubic yards for large municipalities (Platt et al., 7). A regional model proposed by the PVPC would fall into this category.

LARGE-SCALE CENTRALIZED COMPOSTING IN BAYS



Community-scale, institutional, and a smaller-scale centralized composting systems would all be applicable in Holyoke for an initial operations to test viability.

Types of Composting Systems

Advantages & Disadvantages of Each

Common systems of composting include static systems, turned windrow, passive windrow, aerated static piles, and bioreactor (in-vessel) systems. Considerations for which system to choose include capital costs, source and type of food/yard waste, site and land impact, scale, community goals, regulations, resources, and time.

Static Systems

Static systems are piles that are passively aerated, without active management to encourage decomposition.

Advantages: low capital and operating costs, less equipment and staffing requirements, no electric power needed

Disadvantages: large area required, not suitable for materials liable to becoming putrid, no means of controlling odors, long processing time

Windrow Systems (turned or passively aerated)

Windrows are long, narrow, low piles. They can be actively managed by turning to increase air and speed decomposition, or piled on perforated pipes that allow some additional airflow.

Advantages: can handle materials liable to become putrid, low capital and operating costs, no electric power needed

Disadvantages: large area required, no means of controlling odors, more labor intensive, long processing time, weather exposure can be problematic

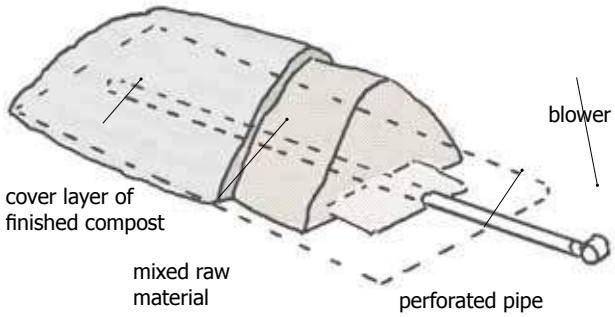
Aerated Static Piles

To maintain aerobic conditions, fans and blowers move air into aerated static piles through perforated pipes running underneath them. The piles do not need to be turned.

Advantages: low space requirements, odor control through bio-filtration possible, shorter composting times

Disadvantages: Higher capital costs, need for moisture management, need for feedstock mixing, operator skill, electricity supply

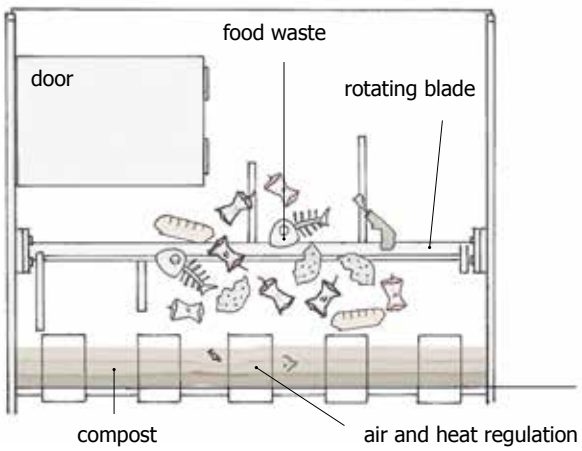
AERATED STATIC PILE



Bioreactor System (in-vessel systems, types vary)

A bioreactor is essentially a composting machine. It is an enclosed structure used to house the organic material with sensor equipment to manage temperature and airflow. There are many types of bioreactors using different mechanisms, such a rotation drums or blades, to mix and help decompose the material.

BIOREACTOR CROSS-SECTION



Advantages: low space requirements, high degree of odor control

Disadvantages: higher capital costs, finishing needed after initial composting process, not suitable for large-scale operations

(Platt et al., 13)

Composting Food Waste

Food scraps should be mixed with other materials for proper decomposition without smells or other issues. While recipes will vary in order to achieve the needed carbon to nitrogen ratio, food waste generally needs to be mixed with more carbonaceous material like leaves or wood chips for the proper ratio and moisture levels (UGA Cooperative Extension).

Taking into account space limitations and the need for odor control in an urban area, aerated static piles or a bioreactor system are the more promising systems to explore. Both systems can be used at varying scales depending on the amount of organic material needing to be processed. Multiple sites can be set up to process more material.

CREATING A DISTRIBUTED COMPOSTING SYSTEM

Precedent: Compost Crew, Dickenson, MD

With the goal of creating a network of decentralized composting stations close to the areas where waste is generated, a private company in Maryland installed a modular composting station using 20-foot shipping containers containing four bays on a small farm in the Washington DC area. The company, Compost Crew, brings in residential food waste from their residential compost pickup program, mixes it with hay and wood chips and lets the mixture sit in an aerated static pile in one of the bays for four weeks. It is then moved out into a small windrow for two months. Each bay can process up to one ton of food waste per week.

Called the Compost Outpost, the system can be installed on less than a quarter-acre of land in a variety of configurations. With the goal of more sites at schools, institutions and community gardens, the company is aiming to create a replicable model of a community-scale distributed composting system. Each location needs a part-time staff person and small tractor to move and turn piles, or the man-power to do it by hand (Goldstein; Compost Crew).

Regulations

City Regulations on Facilities

While zoning regulations set the minimum space required for waste disposal facilities at 10,000 square feet, composting is not explicitly defined as waste disposal and thus not necessarily subject to a 10,000 square foot minimum. While a large composting facility may be deemed a waste disposal site and subject to more strict zoning rules, a smaller operation may be allowed in more areas. Amending zoning regulations to explicitly allow for certain types and scales of composting would clarify rules.

There are no city regulations regarding organic waste material disposal beyond state-required regulations.

INCREASING MUNICIPAL COMPOSTING WITH AERATED STATIC PILES

Case Study: West Haven, CT

Funded in part from a USDA Natural Resources Conservation Service Urban Farming program grant, the City of West Haven, Connecticut, (population 55,000) upgraded its composting operation in 2021.

Prior to 2021, the City composted leaf and yard waste on a six-acre site adjacent to the West River. Using 15-foot-tall by 25-foot-wide static windrows, material took four to five years to fully process. The operation used one staff person and required a windrow turner. The City sold finished compost for $7 per yard to be used in urban fill.

Wanting to improve the efficiency and quality of their composting system, the City partnered with a private company, Atlas Organics, to install a solar-powered aerated static blower system in 2021. The City now incorporates food waste into the yard debris to build piles on top of 6-inch pvc pipes that blow air into the piles to accelerate decomposition. The system creates finished compost in 45 days and heats up the center of the piles enough to kill weed seeds. Seed contamination is down 80 percent compared to the cooler static windrows. The system uses about half the space it used to. While still figuring out the proper mix of materials, the City estimates that higher quality compost without weed seed and with better nutrient value from a more diverse mix of feedstock could be sold for $23 per yard. The system can manage up to 6,000 tons of compostable material per year.

The City would like to incorporate more residential food waste but has found collecting material that is free of plastics and other contaminants difficult. One potential solution is a recent pilot program with schools where staff and students are educated about composting and food waste generated on-site is separated for collection by the City (Colter; City of West Haven).

State Regulations on Facilities and Materials

Massachusetts Department of Environmental Protection regulations require that yard waste be recycled or composted, it cannot be disposed of in landfills or combustion facilities (Justia Law).

Massachusetts Department of Environmental Protection (MassDEP) regulations ban disposal of food and other organic wastes from businesses and institutions that dispose of more than one ton of these materials per week. These large food waste generators must find a way to dispose of the waste without sending it to a landfill, by composting on-site or contract out disposing of it at designated off-site composting locations (Platt).

There are specific MassDEP waste regulations pertaining to cannabis operations, which Holyoke has seen an influx of in recent years. For operations that generate less than one ton of plant waste material per week, MassDEP encourages, though does not require, that this material be composted. The cannabis industry is subject to the additional regulation that "cannabis plant parts and associated materials sent for composting or anaerobic digestion (AD) must first be ground and mixed with other organic materials such that the cannabis material is rendered unusable. Other organic materials may include growing media, soil, mulch, food waste, or agricultural material such as manure or other plant materials" (Cannabis Control Commission).

Non-Residential Composting Operations

State regulations allow non-residential composting operations, such as a single-generator commercial operation, if the organic material generated on-site is less than 20 cubic yards or less than 10 tons per week. The owner/operator must notify the DEP and the local Board of Health (Platt).

Municipal Food Material Collection Center

A small municipal facility, what the state calls a Municipal Food Material Collection Center, is permitted without special permit as long as storage guidelines are followed, and no more than one ton of food material is collected per day and no more than three tons are on-site at one time. The owner/operator must notify the DEP and the local Board of Health (310 CMR 16.03).

With the average American producing 4.2 pounds of food waste per week (US EPA 2017), one municipal food material collection center could handle the food waste from a few thousand people.

Initial Siting Criteria

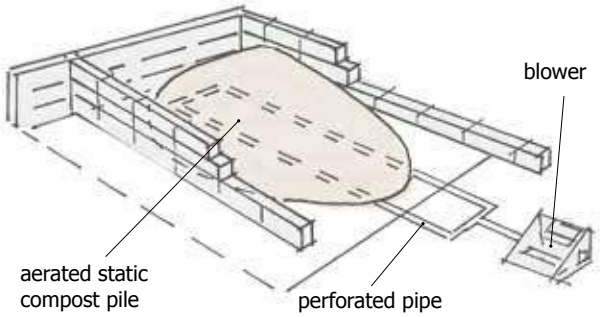
Potential Environmental Protection Criteria (applies to all following scales and systems)

Key concerns for environmental protection are siting with proper soil type (if on native soil), slope, and the type of buffer between the site and surface water or groundwater. Runoff from compost piles can contain high nutrient concentrations and possibly pathogens detrimental to water quality so all sites should be located so as to protect groundwater and surface water. A surface of compacted gravel, sand or concrete makes operations easier but can increase runoff (Richard).

To protect the environment, site should be:

- located outside of flood zones
- at least 200 feet from wetlands
- not located in critical natural landscapes or core habitat for species of conservation concern
- at least 300 feet from surface water
- at least 500 feet from active wells
- on a 2-3 percent slope ideally, 2-5 percent acceptable
- greater than three feet to seasonally high groundwater

(McSweeney, 5; Michigan Recycling Coalition)



Additional Criteria Based on composting scale and system

Municipal organic material collection with aerated static pile system

Processing 500 to 3,000 cubic yards of organic material annually depending on site size (Platt et al. 7). Site should be:

- one-third acre to three acres
- at least 100 feet from property boundaries and public roads to avoid the potential for nuisance
- at least 300 from residences, public buildings
- able to access water and electricity on site
- located in the Agricultural or General Industry districts if zoning requires it.

(McSweeney, 5)

Community-scale, decentralized composting location with an aerated static pile system

Processing 300 to 500 cubic yards of organic material annually (Platt et al., 7); assuming 20 feet wide by 12 feet high piles (Burnett et al., 130). Site should be:

- 5,000 square feet to one-third acre
- at least 20 feet from any residence or business
- at least 300 feet from more sensitive locations such as churches, schools, hospitals, and nursing homes.
- able to access water for managing moisture of the piles

(Burnett et al., 106)

Decentralized bioreactor (in-vessel) system

A bioreactor could be much closer to buildings and may need only 100 square feet depending on the type, but the site will still need an area for compost to cure.

Processing volume varies by size, midsize models: 500 pounds per day, 1.75 tons per week, 91 tons annually (EcoRich). Site should be:

- at least 2,000 square feet
- located adjacent to an institution or business building if needed

- 20 feet from any residence or business not on the site
- at least 300 feet from more sensitive locations such as churches, schools, hospitals, and nursing homes
- able to access water and electricity on site

Based on these criteria, the planning team developed a GIS methodology to identify sites in Holyoke suitable for an aerated static pile compost system at two small scales, that could be used for a pilot project. 5,000 square feet and one-third of an acre sites are identified on the following maps.

MUNICIPAL DROP-OFF SITES USING IN-VESSEL COMPOST MACHINES

Case Study: Stamford, CT

With tipping fees for garbage at $85 per ton, Stamford, Connecticut (population 135,000) is attempting to divert food waste from the garbage stream. In 2021 the City received a $45,000 grant from the USDA for a composting pilot project; the City also provided $15,000. Due to limited land options, the City decided to purchase a composting machine (also known as a bioreactor) from a private company, EcoRich, to compost food waste. The machine operates on about 100 square feet at the Stamford Museum & Nature Center, and can process up to 500 pounds of food waste per day. One staff person manages the composting.

The City established a voluntary composting program with residents, where residents can purchase 5-gallon buckets with compostable bags to collect food waste. Participating residents drop off their food waste at the site where the machine is loaded once a day. Once processed, ten percent of the waste weight comes back out as compost. This is put aside to cure in windrows for approximately three weeks. The facility can now process 91 tons of food waste annually, and the City has decided to add a second machine at another location (Colleluori; Henderson).

Small Municipal-Scale Sites

for Aerated Static Pile Composting System

The following methodology identifies sites in Holyoke suitable for an aerated static pile compost system on one-third of an acre, capable of processing 500-800 cubic yards of material.

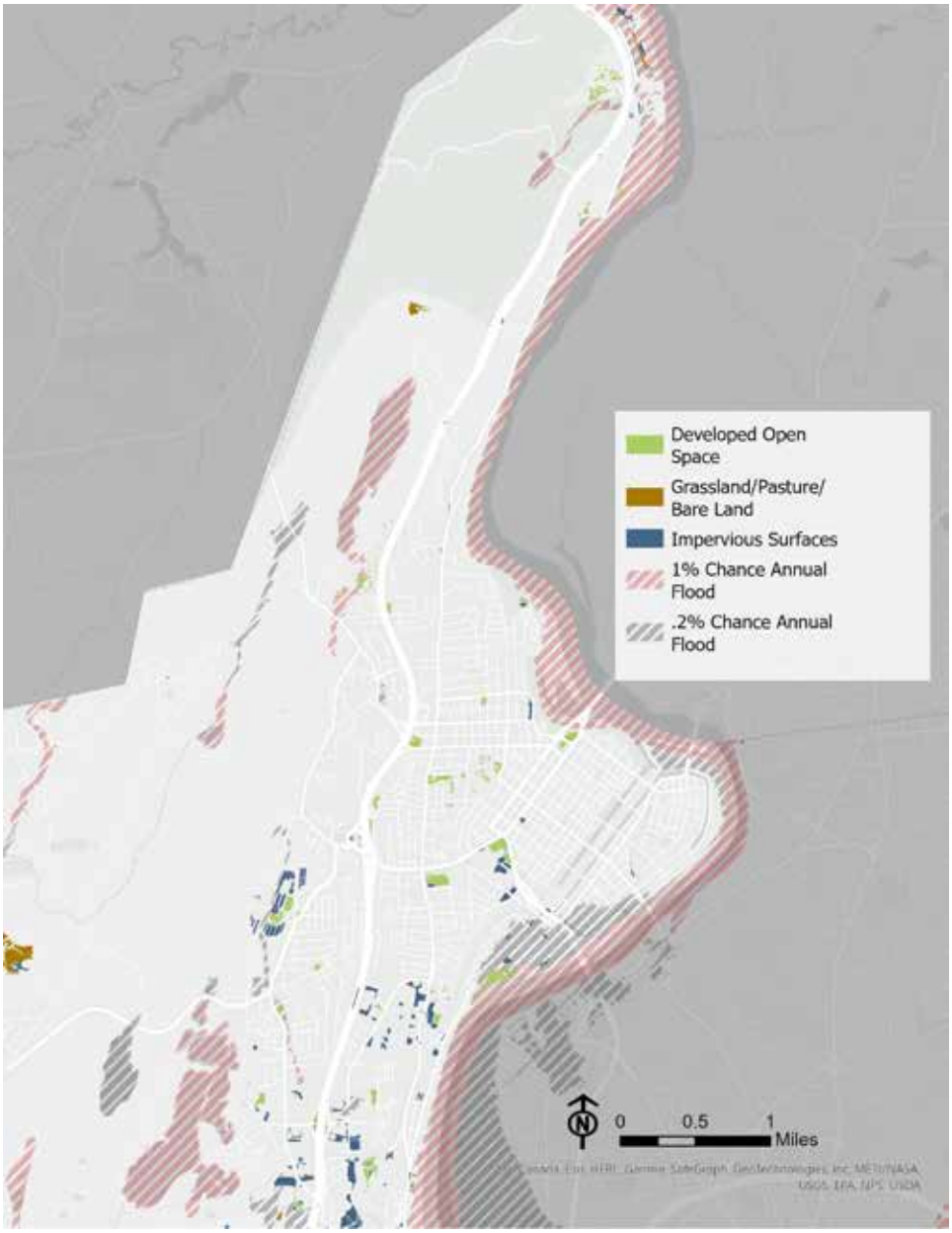
Mapped criteria:

- At least one-third of an acre of open land in order to use land already cleared, including bare land, scrubland, grassland, pasture, developed open space, and impervious surfaces
- At least 100 feet from any residence or building
- At least 200 feet from wetlands
- Not located in critical natural landscapes or core habitat for species of conservation concern
- At least 300 feet from surface water
- On a slope less than 5 percent
- At least 300 feet from places of worship, schools, hospitals and nursing homes.
- Flood zones are overlaid

The map is intentionally general as further analysis is needed before assessing any one site.

Small Municipal-Scale Sites

Sites of At Least One-Third of an Acre



Initial analysis shows that there are about 100 sites fitting the criteria: 50 on impervious surface, with a total of 103 acres; and 50 on permeable land, with a total of 104 acres. Some of these would warrant further study. Paving surface is a consideration — asphalt is not a preferable surface for composting as it will degrade quickly. Most locations on permeable surfaces are developed open space (46 sites totaling 79 acres) such as parks. Further investigation is needed to rule out parcels known to be currently used (parking lots, ball fields, etc.).

Community-Scale Sites

for Aerated Static Pile Composting System

The following methodology identifies sites in Holyoke suitable for an aerated static pile compost system on 5,000 square feet, capable of processing 300-500 cubic yards of material. Bioreactors (In-vessel) composters would also be suitable on these sites.

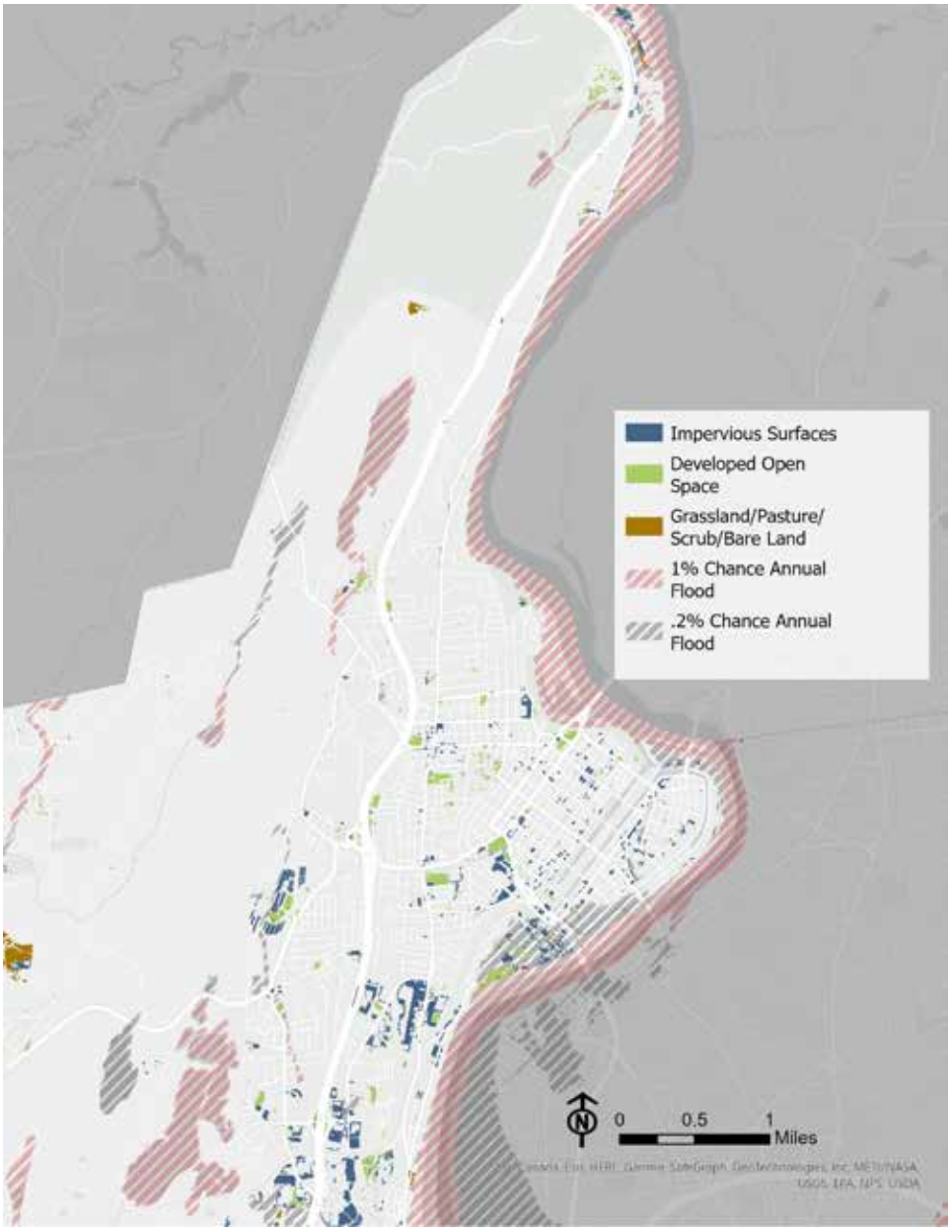
Mapped Criteria:

- At least 5,000 square feet of open land in order to use land already cleared, including bare land, scrubland, grassland, pasture, developed open space, and impervious surfaces
- At least 20 feet from any residence or building. While a farther distance would be better to ensure not being a nuisance, 20 feet was used so as not to rule out sites with a non-residential structure for which a compost operation would not be a nuisance.
- At least 200 feet from wetlands
- Not located in critical natural landscapes or core habitat for species of conservation concern
- At least 300 feet from surface water
- On a slope less than 5 percent
- At least 300 feet from more places of worship, schools, hospitals and nursing homes
- Flood zones are overlaid.

The map is intentionally general as further analysis is needed before assessing any one site.

Community-Scale Sites

Sites of At Least 5,000 Square Feet



There are significantly more sites fitting the 5,000 square foot criteria that could warrant further study: over 350 impervious surface (totaling 243 acres) and 200 permeable sites (totaling 150 acres) were identified using the methodology. Land designated as developed open space made up 178 of the permeable sites (totaling 118 acres). There are only twelve sites designated as bare land (totaling seven acres).

Further Considerations

Considerations for Developing an On-site Composting Program in Holyoke

In order to get a full understanding of the composting needs, priorities, and potential locations for composting in Holyoke the following would need to be looked at:

- What is the physical infrastructure, environment (including topography and soils), capacity and potential to gather material, relevant policy, and compost market in Holyoke?
- What is the volume of citywide food waste from residences, institutions, and commercial businesses?
- What would be the impact of diverted food waste in reduction of cost and carbon emissions, generation of compost sales, and availability of nutrients?

Without examining these criteria, this chapter only offers initial possibilities for site location based on general environmental and physical considerations.

Potential Funding

USDA Agriculture Grant Program: In 2020 and 2021, the USDA agriculture grant program awarded grants to municipalities for "cooperative agreements that develop and test strategies for planning and implementing municipal compost plans and food waste reduction plans" (USDA). This may continue in the coming years with expansion to additional states not within the first rounds of funding: farmers.gov/your-business/urban/opportunities

Sustainable Materials Recovery Program (SMRP) Municipal Grant: "Supports local recycling, composting/organics, reuse, source reduction, program development, and enforcement activities that increase diversion and reduce disposal" (mass.gov): mass.gov/how-to/apply-for-a-sustainable-materials-recovery-program-smrp-municipal-grant

A COMMUNITY-SCALE COMPOSTING PROPOSAL FOR DETROIT

Precedent: Detroit, MI

A 2020 study by the University of Michigan's Taubman College of Architecture and Urban Planning envisioned a Decentralized Compost System for Detroit. The study looked at the potential for a network of 5,000-square-foot sites in community gardens, parks, and vacant lots. The study proposed a covered multi-bay staging area, with food-scrap drop-off locations that could be incorporated into piles on a regular basis. Material could be made into static unaerated or aerated. Piles through aeration would speed up the decomposition process. Staffing requirements and community engagement were key to the proposal. The study estimated a 6,000-square-foot site could process 192 tons of organic material annually (Burnett, 130).

Recommendations

7.1 Investigate the feasibility of a city-wide composting plan including an analysis of the environmental, economic, and social impacts.

The analysis in this chapter indicates that community-scale and either aerated static pile or bioreactor systems of composting could be viable options for composting in Holyoke. While the site selection methodology identifies sites that could work for composting, in order to consider other factors and ultimately start a successful program, further study is needed.

7.2 Amend zoning regulations to explicitly allow for certain types and scales of composting in residential zones of Holyoke in order to support urban agriculture.

City regulations are not explicit regarding the allowance of composting in city zones. Amending zoning regulations to recognize the economic and environmental benefits of composting would would support a more resilient food system.

Map, Image, and Work References

Map Data

Physical Zones of Holyoke, Pg.24

- MassGIS - 2016 Land Cover/Land Use
- NOAA - 2015_ME_MA_Lidar
- Drawing by The Conway School Planning Team

Land Cover, Pg.25

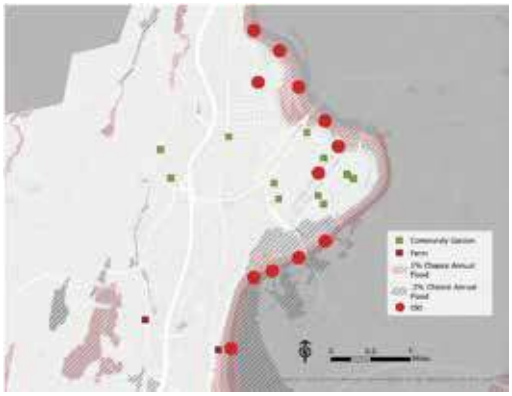
- MassGIS - 2016 Land Cover/Land Use

Water Quality, Pg.26

- MassGIS - Outstanding Resource Waters; 2016 Land Cover/Land Use

Organic Waste Recovery, Pg.26

- MassGIS - Property Tax Parcels



Combined Sewer Overflows (CSO), Pg.27

- Tighe & Bond. Draft CSO Long-Term Control Plan Update Report. 30 Dec. 2019, Page 3
- City of Holyoke - Food Economy Spreadsheet
- Nuestras Raíces - Community Gardens
- Neighbor to Neighbor - Community Garden Locations
- FEMA National Flood Hazard Layer

Poverty Rates, Pg.30

- U.S. Census Bureau's American Community Survey (ACS) 2016-2020 5-year estimates - ACS Poverty Status Variables - Boundaries

Housing by Occupancy, Pg.31

- U.S. Census Bureau's American Community Survey (ACS) 2016-2020 5-year estimates - ACS Housing Units Occupancy Variables - Boundaries

Community Gardens and Farms, Pg.33

- MassGIS - 2016 Land Cover/Land Use
- City of Holyoke - Food Economy Spreadsheet
- Nuestras Raíces - Community Gardens
- Neighbor to Neighbor - Community Garden Locations

Commercial Food Processing, Pg.34

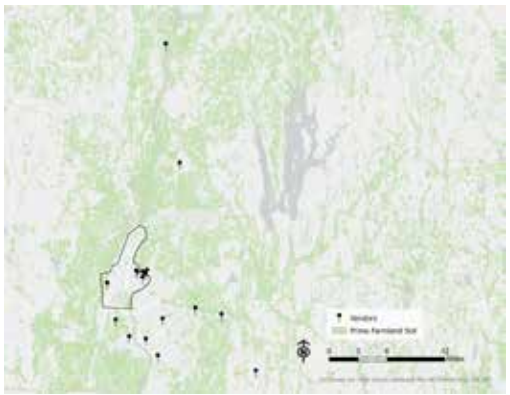
- City of Holyoke, Department of Planning and Economic Development - Food Economy Spreadsheet

Restaurants and Venues, Pg.36

- City of Holyoke, Department of Planning and Economic Development - Food Economy Spreadsheet

Food Stores, Pg.37

- USDA Food and Nutrition Service - SNAP Store Locations; Holyoke Farmers Market- Official Vendors List



Farmers Market Vendors, Pg.38

- Holyoke Farmers Market Official Vendors List
- MassGIS - Soils SSURGO-Certified NRCS (2021)

Farmers Market Vender Zoom-in, Pg.39

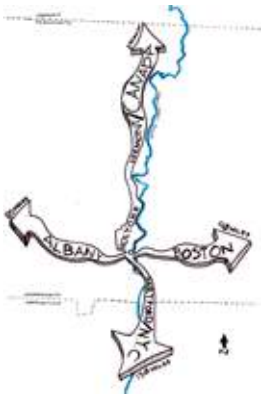
- Holyoke Farmers Market Official Venders List

Community Institutions, Pg.40

- MassGIS - Places of Worship, Non-Acute Care Hospitals, Pre-Kindergarten through High School Buildings (2020), Colleges and Universities Buildings

Emergency Food Distribution, Pg.41

- The Food Bank of Western Massachusetts - The Food Bank's Emergency Feeding Program Network



Major Transportation Routes, Pg.45

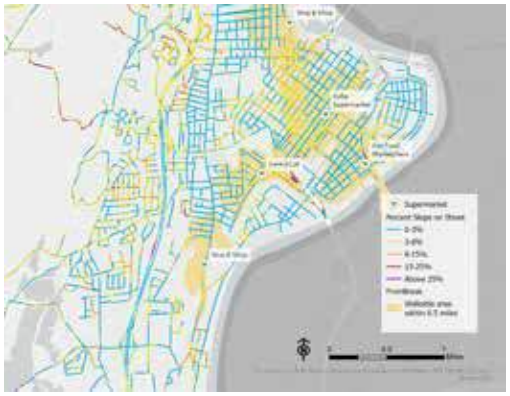
- Drawing by The Conway School Planning Team

Mobility and Transportation, Pg.49

- U.S. Census Bureau's American Community Survey (ACS) 2016-2020 5-year estimates - ACS Vehicle Availability Variables - Boundaries

Food Access Barrier: Distance, Pg.50

- USDA Food and Nutrition Service - SNAP Store Locations



Food Access Barrier: Hills, Pg.51

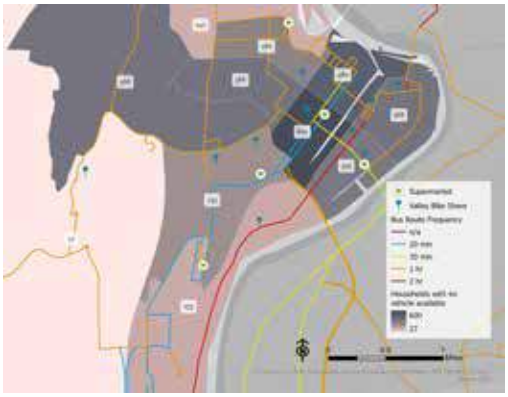
- MassGIS - Massachusetts Department of Transportation (MassDOT) Roads
- NOAA - 2015_ME_MA_Lidar
- USDA Food and Nutrition Service - SNAP Store Locations

Food Access Barrier: Heat, Pg.52

- McManus et al, Mike. Holyoke Urban Forest Equity Plan.

Public Transportation, Pg.54

- USDA Food and Nutrition Service - SNAP Store Locations
- MassDOT - RTA Bus Routes
- Valley Bike -Holyoke Locations



Food Access Barrier: Transit, Pg.55

- USDA Food and Nutrition Service - SNAP Store Locations
- MassDOT - RTA Bus Routes
- Valley Bike -Holyoke Locations; U.S. Census Bureau's American Community Survey (ACS) 2016-2020 5-year estimates - ACS Vehicle Availability

The Potential for Food Access, Pg.57

- USDA Food and Nutrition Service - SNAP Store Locations
- Holyoke Farmers Market- Official Vendors List

Supermarkets and Street Slopes Around Save A Lot, pg.58

- MassGIS - Massachusetts Department of Transportation (MassDOT) Roads
- NOAA - 2015_ME_MA_Lidar
- USDA Food and Nutrition Service - SNAP Store Locations

Initial Areas of Open Land, Pg.64

- MassGIS - 2016 Land Cover/Land Use

Initial Areas of Open Land Downtown, Pg.65

- MassGIS - 2016 Land Cover/Land Use

Potential Locations for School, Place of Worship, and Hospital Gardens, Pg.66

- MassGIS - Soils SSURGO-Certified NRCS (2021); 2016 Land Cover/Land Use
- City of Holyoke - Official Parcel Data

Potentail Locations for Community Gardens, Pg.68

- MassGIS - 2016 Land Cover/Land Use; Soils SSURGO-Certified NRCS (2021); Property Tax Parcels
- Nuestras Raíces - Community Gardens Data
- City of Holyoke - Official Parcel Data

Initial Areas of Impervious Surfaces, Pg.70

- MassGIS - 2016 Land Cover/Land Use

Impervious Surfaces Downtown, Pg.71

- MassGIS - 2016 Land Cover/Land Use; Massachusetts Department of Transportation (MassDOT) Roads

Agriculture and Single-Family Residence Zone, Pg.72

- City of Holyoke - Official Zoning Data

RA Zone with Parcels Greater than 5 Acres, Pg.72

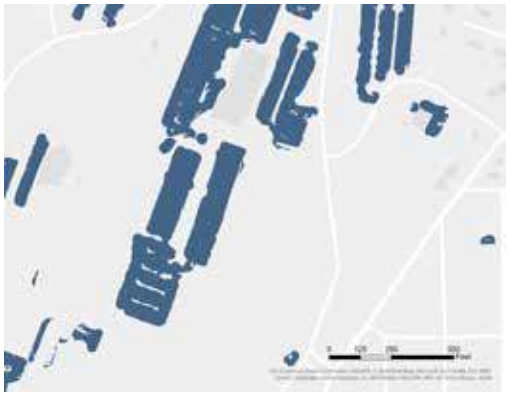
- MassGIS - Property Tax Parcels
- City of Holyoke - Official Zoning Data

Residential Production Possibilities, Pg.73

- MassGIS - 2016 Land Cover/Land User

Open land at Holyoke Community College, Pg.74

- MassGIS - 2016 Land Cover/Land Use; Soils SSURGO-Certified NRCS (2021)



Impervious Surfaces at Holyoke Community College, Pg.76

- MassGIS - 2016 Land Cover/Land Use

Springdale Park, Pg.78

- MassGIS - 2016 Land Cover/Land Use; Soils SSURGO-Certified NRCS (2021); Property Tax Parcels

Immaculate Conception, Pg.79

- MassGIS - 2016 Land Cover/Land Use

Our Lady of the Cross Parish, Pg.79

- MassGIS - 2016 Land Cover/Land Use

Existing Mill Buildings, Pg.87

- City of Holyoke - Official Parcel Data
- MassGIS - Building Structures

Large-Scale Indoor Production Potential, Pg.90

- MassGIS - Building Structures; FEMA National Flood Hazard Layer

Small Municipal-Scale Sites Pg.107

- MassGIS - 2016 Land Cover/Land Use; FEMA National Flood Hazard Layer

Community-Scale Sites, Pg.109

- MassGIS - 2016 Land Cover/Land Use; FEMA National Flood Hazard Layer

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Atlas Farm Van, by Atlas farm, Pg 44

“Paradise Lot” by Roxy Finn, Pg, 83

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“Compost SD1M0891” by Stefan Szczelkun is licensed under CC-BT-NC-SA 2.0 Pg.97

“Compost Outpost” by Compost Crew, Compostcrew.com, Pg.101

All other photos and drawings by The Conway School Planning Team

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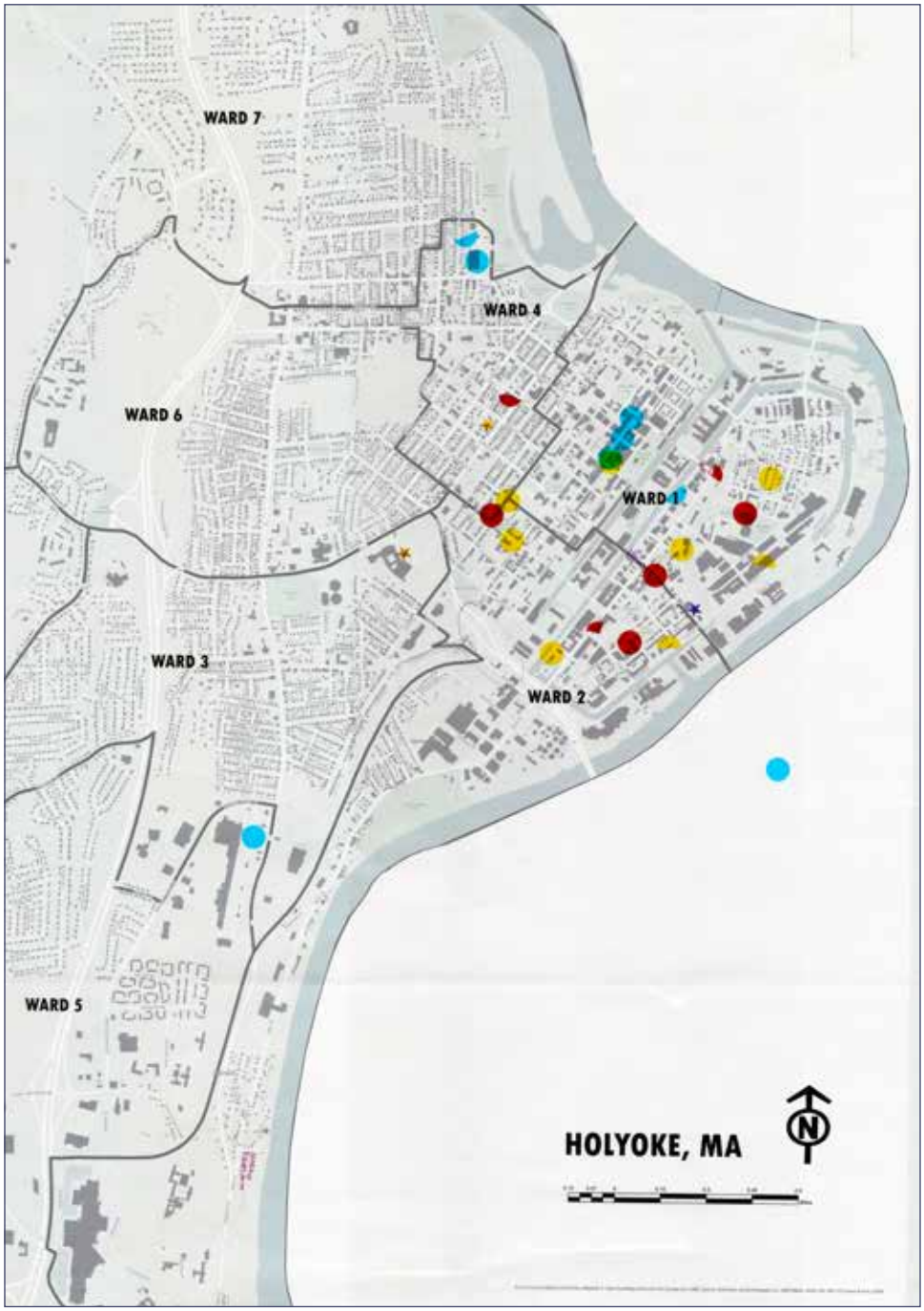
Appendix

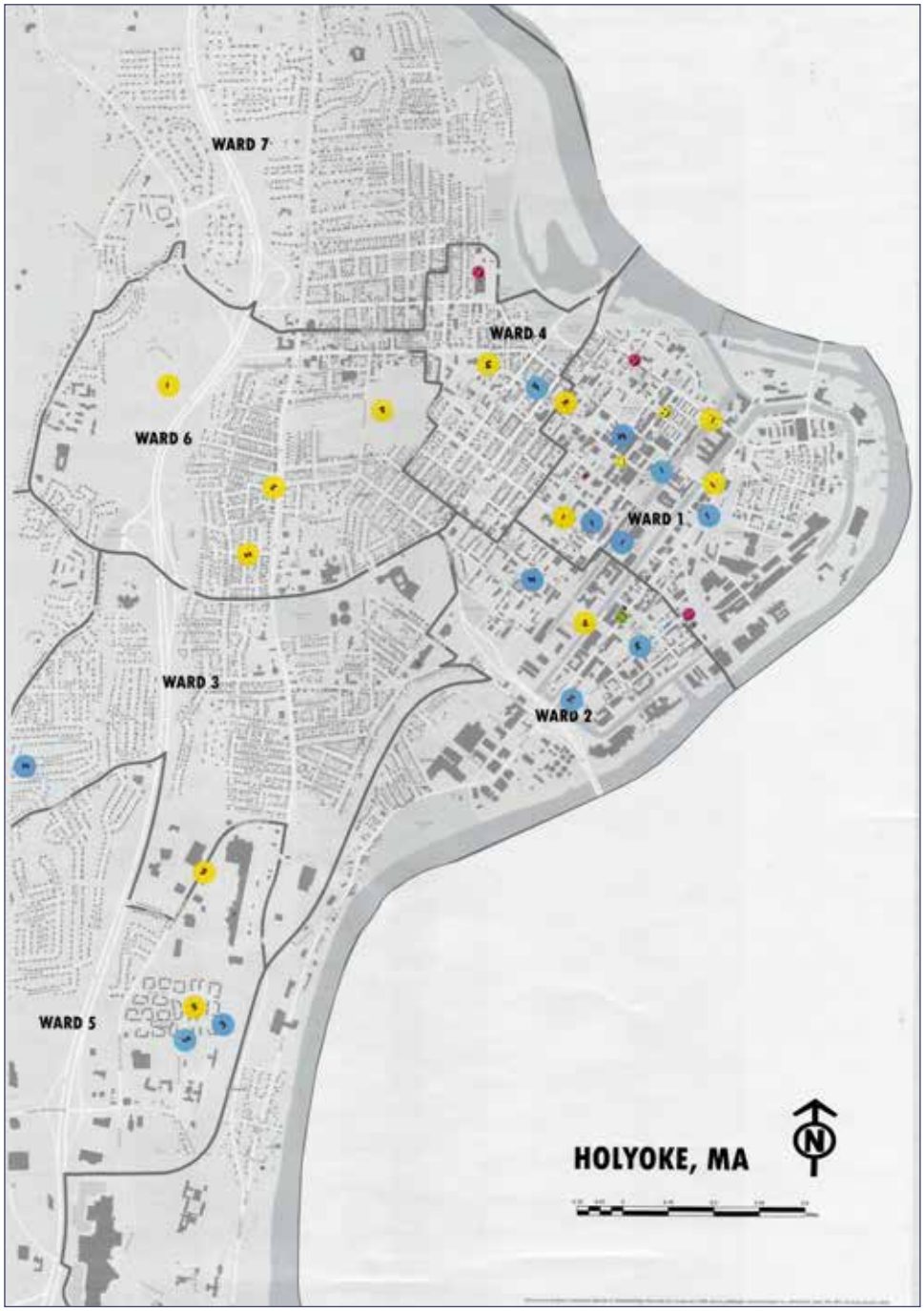
Focus Group Maps

Feb. 8 Focus Group Mapping Exercise Results



Participants placed red dots in areas where people have the hardest time accessing food; yellow dots in areas that need more resources; and blue dots where participants purchase food.

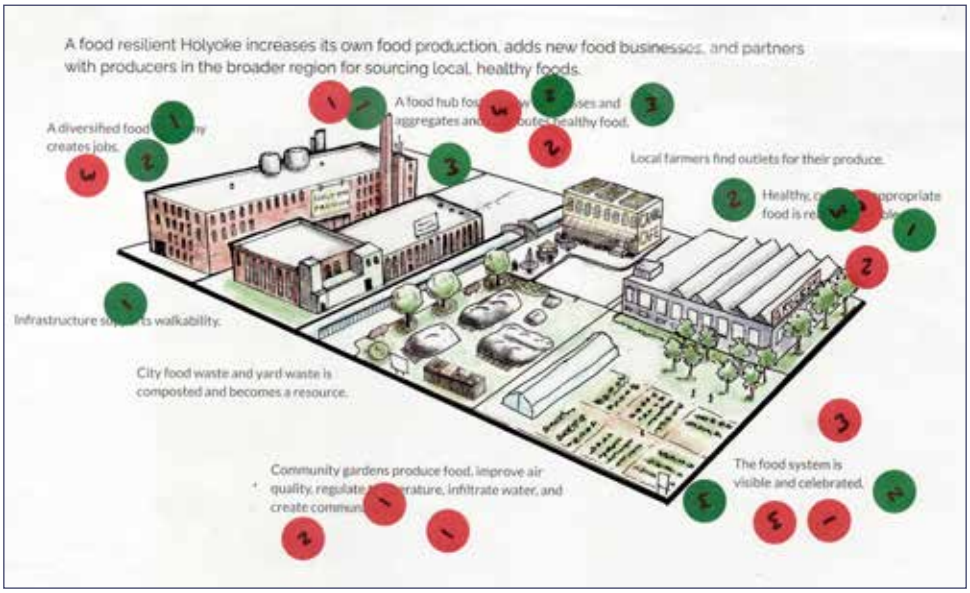
Mar. 2 Focus Group Mapping Exercise Results



Participants placed blue dots in areas where people have the hardest time accessing food; yellow dots in areas that need more resources, with numbers indicating priority; and smiley face stickers where participants purchase food.

Focus Group Visual

Mar. 2 Focus Group Food System Resiliency Exercise Results



This food system resiliency vision was used to spur discussion in the March 2 focus group. Participants placed green dots on statements with which they had agreement. They placed red dots on statements with which they had disagreements, whether in vision or feasibility. Numbers indicated weight, with the lowest numbers representing the degree to which they most agree or disagree.

For Further Investigation

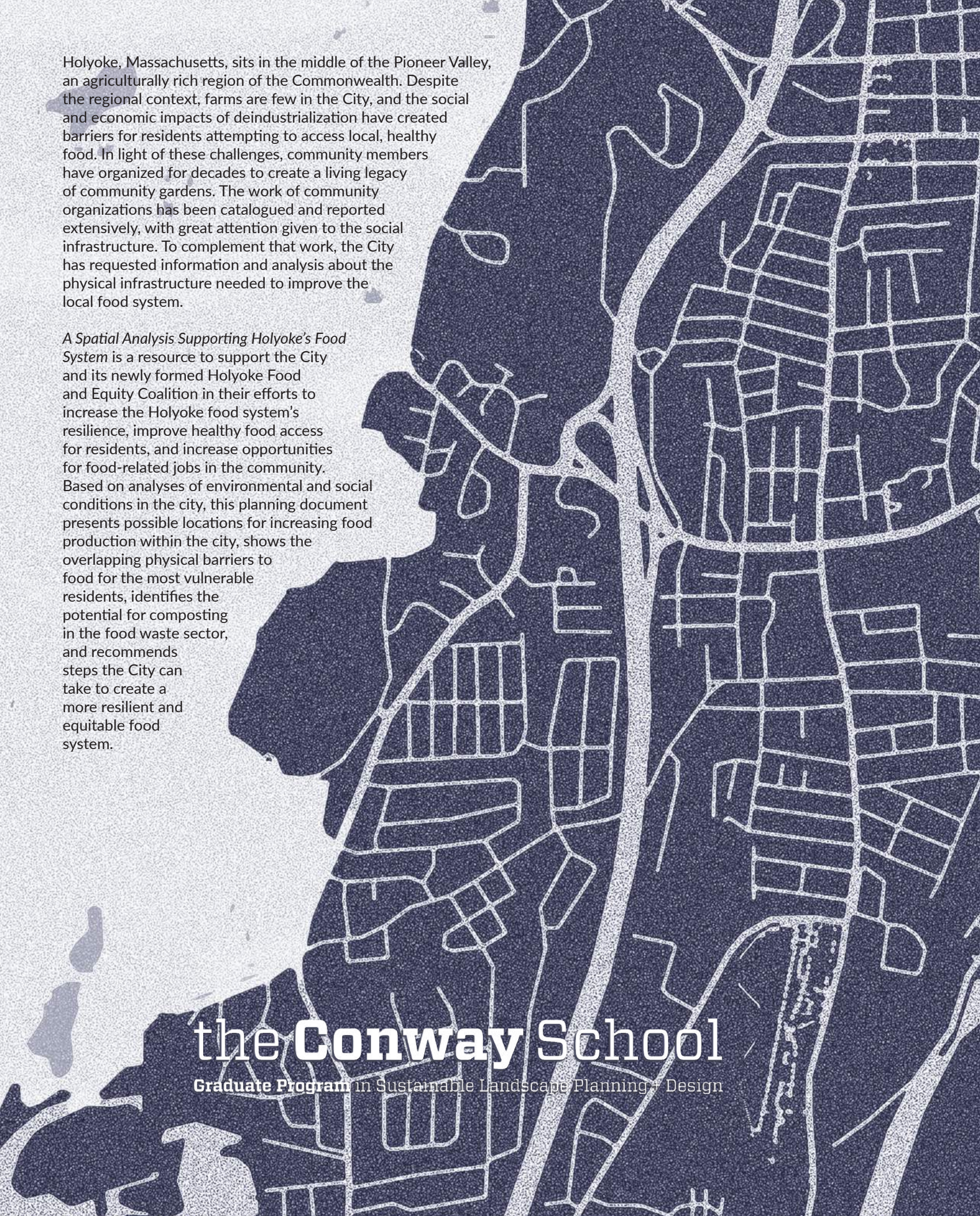
Additional Ideas from Focus Group Discussions

Additional recommendation ideas arose from focus group and interview discussions. Because these were outside the scope of this project the planning team could not provide supporting analysis; however, constituents' feedback suggests these are worth investigating.

- Revisit the *Community Action Plan* Action Item 1.4: "Establish a centralized system or place for communication and resource sharing for all local food programs, initiatives, and ideas."
- Increase awareness of the available services of Holyoke community organizations.
- Promote the Western Massachusetts Food Bank hunger relief programs website to make sure people know the available days and times of emergency food availability.
- Increase fresh produce and healthy food options in food pantry distributions.
- Revisit *Community Action Plan* Action Item 2.2: "Conduct a community survey to determine which foods local residents want to buy, cook, and eat."
- Conduct an inventory of smaller grocery stores and bodegas to identify those already carrying fresh produce and the barriers to carrying healthy food.
- Design and distribute a survey to restaurant owners in the city to investigate what local food they would be interested in purchasing, if any, and the barriers to doing so.
- Revitalize the Holyoke community land trust.
- Turn brownfield locations into assets by considering them for food system related endeavors.
- Create a community-based processing center to help increase the number of processing-based businesses in Holyoke and diversify the food economy. Use the Western Massachusetts Food Processing Center in Greenfield as a model for developing an incubator space in the southern part of the Pioneer Valley.
- Create a community-based food hub, a physical location for food aggregation, distribution, and marketing of source-identified food.
- Encourage and support food entrepreneurship by promoting organizations such as E for All.
- Establish a tool lending library to benefit backyard growers and community garden users alike and increase equitable access to tools.

Holyoke, Massachusetts, sits in the middle of the Pioneer Valley, an agriculturally rich region of the Commonwealth. Despite the regional context, farms are few in the City, and the social and economic impacts of deindustrialization have created barriers for residents attempting to access local, healthy food. In light of these challenges, community members have organized for decades to create a living legacy of community gardens. The work of community organizations has been catalogued and reported extensively, with great attention given to the social infrastructure. To complement that work, the City has requested information and analysis about the physical infrastructure needed to improve the local food system.

A Spatial Analysis Supporting Holyoke's Food System is a resource to support the City and its newly formed Holyoke Food and Equity Coalition in their efforts to increase the Holyoke food system's resilience, improve healthy food access for residents, and increase opportunities for food-related jobs in the community. Based on analyses of environmental and social conditions in the city, this planning document presents possible locations for increasing food production within the city, shows the overlapping physical barriers to food for the most vulnerable residents, identifies the potential for composting in the food waste sector, and recommends steps the City can take to create a more resilient and equitable food system.



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