An Evaluation of Somerville Winter Mobile Farmers’ Market

Sarah Marina
Janaki Blum
Caitlin Bettisworth

Prepared For: Groundwork Somerville and Shape Up Somerville
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Unless otherwise stated, all maps and photographs included in this report are the work of the authors.

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ABSTRACT

The following is a detailed evaluation of the 2014 Somerville Winter Mobile Farmers’ Market (WMFM), which seeks to close the gap faced by low-income, potentially food-insecure residents of Somerville, Massachusetts in accessing fresh fruits and vegetables during winter. Key findings included the discovery of a committed user base of customers who believed they were eating more fruits and vegetables because of the WMFM. Several challenges were also discovered, such as a lack of operational coordination, and a desire among visitors to see more culturally appropriate exotic fruits. In answer to these challenges, recommendations on potential improvements were made in response to these findings in five key areas: Advertisements, Atmosphere, Customer Expansion, and Technical/Operational. Overarching all suggestions is the strong recommendation to convene a standing Mobile Market Advisory Board.
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1. EXECUTIVE SUMMARY

The following report is a detailed evaluation of the 2014 Winter Mobile Farmers’ Market (WMFM), a joint initiative of Shape Up Somerville, part of the City of Somerville Department of Public Health, and Groundwork Somerville, a non-profit focused on environmental stewardship and urban agriculture. Established in 2012 as the companion to a Summer Mobile Farmers’ Market, the WMFM seeks to close the gap in accessing fresh fruits and vegetables during winter faced by a target population of low-income, potentially food-insecure residents of Somerville, Massachusetts. In addition the WMFM is seen as a place where connections within and between communities are forged. The market’s sponsors see both components as leading to healthier families and stronger communities.

Groundwork Somerville and Shape Up Somerville approached the Tufts University Team to perform a detailed evaluation of the WMFM. Both sponsors expressed concern that the market was not performing well with respect to attendance and as a community space. Shape Up Somerville specifically was also interested in whether the WMFM had a measureable impact on fruit and vegetable consumption among its target population. During the evaluation, the WMFM faced the loss of its major source of funding, beginning in September 2014, due to the defunding of Centers for Disease Control Community Transformation Grants. Thus exploring new avenues for funding became an element of this project.

Research Questions

Working with both partners the following questions were developed to guide the evaluation:

1. To what extent does the Winter Mobile Farmers’ Market have an impact on fruit and vegetable consumption among its target population?
2. What can the Winter Mobile Farmers’ Market do to increase its impact, both in terms of customers and in fruit and vegetable consumption among customers?
3. What are other potential avenues for funding elements of the Winter Mobile Farmers’ Market?
**Methods**
To answer these questions, we conducted reviews of relevant research and literature; gathered and analyzed information at the 2014 WMFM including attendance counts, transaction data, produce data, ethnographic observations, customer surveys, and interviews with market workers; collected information from comparable markets; interviewed managers of comparable markets; interviewed our clients; and performed a Geographic Information Systems mapping of the food environment around the WMFM.

**Findings**
Our analysis of the WMFM data indicated clear areas of impact, tied to elements of the market that are currently working well. We also discovered several main limitations, areas that can be improved upon moving forward.

We found that the WMFM has several measurable impacts on its visitors and community. These impacts include:

- In a survey of visitors to the 2014 WMFM, 80% said that they eat more fruits and vegetables because of the market.
- 318 visitors attended the 2014 WMFM season, which ran from January 11 to March 1.
- 72% of 2014 season transactions were to members of the target population.
- Due to price matching (1/2 price offered to Mystic Housing Development residents and those using food assistance), WMFM produce prices are even lower than EBT prices at other farmers’ markets, and markedly lower than prices for conventional produce at area grocery stores.

Several key areas of improvement were also discovered. These include:

- Publicity and outreach to customers
- Current market atmosphere and market space as both a shopping and community space
- Further increase in number of customers
- Avenues of sustainable funding
- Business and operating practices, especially with regard to market responsibilities

**Recommendations**
In response to the strengths and limitations outlined above, our team set out a series of detailed recommendations that will help the WMFM better meet the goals of the market sponsors. One of the strongest recommendations that emerged from our data was the establishment of a Mobile Market
Advisory Board, made up of community members and market managers, to assist Groundwork Somerville and Shape Up Somerville in the oversight of the Summer and Winter Mobile Farmers’ Markets moving forward. Specifically, we think that implementation of selected recommendations chosen by the Advisory Board will foster the growth of the market, and thereby increase the consumption of fresh fruit and vegetables among the target customers, as well as further connections among the community.

Additional recommendations are grouped into five key improvement areas, based on the five key improvement areas found in our study, with further sub-recommendations within each laid out from mild, or easiest to implement, to wild, or most far-reaching or difficult to realize. Highlights among these recommendations include a call to expand the scope of advertisements, both in print and online. Doing so will allow the market to expand its customer base while engaging current customers. Several changes to the market atmosphere were also suggested, from minor layout changes designed to ease the shopping experience to the major suggestion of moving the market outside into a heated tent. Ideas for Customer Expansion, such as a loyalty punch card program, are suggested. We make several suggestions to increase market Funding, key among them applying to Bank Community Reinvestment Act boards to gain access to more stable, long term funding. Finally, several recommendations were made to improve the market in Technical/Operational terms, such as using a Point of Sale (POS) system to retain better records, and reimagining the Green Team’s role in a more formal way.

Conclusions
With the implementation of selected recommendations, we are confident that Shape Up Somerville and Groundwork Somerville can sustain the strong base of the Winter Mobile Farmers’ Market with respect to serving food insecure, low-income customers, while growing overall impact in future market sessions.
2. INTRODUCTION

Our Field Project’s team was tasked with evaluating the Somerville Mobile Winter Farmer’s Market (WMFM), a farmers’ market with the main goal of providing access to organic, low-cost fruits and vegetables to low-income, food insecure residents of Somerville, MA, with the secondary goal of becoming a sustaining a community space, both for residents of the housing developments that host the market, and for neighboring communities. The market is run in collaboration by Shape Up Somerville (SUS), an initiative of the City of Somerville Department of Public Health working to “build and sustain a healthy community” and Groundwork Somerville (GWS) a non-profit focused on the environmental stewardship and urban agriculture. In 2014 the winter market was held at the Mystic Housing Development in the Winter Hill area of Somerville. GWS and SUS approached the Tufts University Team to perform a detailed evaluation of the 2014 WMFM. Both sponsors expressed concern that the market was not performing well with respect to attendance and as a community space.

Figure 1: Map of the Mystic Housing Development.
*The development shown in scale on a map of Somerville, and expanded.*
SUS specifically was also interested in whether the WMFM had a measurable impact on fruit and vegetable consumption among its target population. Additionally, facing the loss of market funding in September 2014 due to the defunding of Centers for Disease Control Community Transformation Grants Program, new avenues for funding became a priority for both clients during the evaluation period. Based on our evaluation of the market and other secondary data we were asked to prepare recommendations on potential improvements to the WMFM.

**Defining the Problem**

![Figure 2: Mystic Housing Development Food Environment](image)

*Food stores within 0.6 miles of the Mystic Housing Development (marked as 222 Memorial Rd.) are shown.*

The Winter Mobile Farmers’ Market aims to help close the gap in food access among a **target population** of the low-income residents of the Mystic Housing Development, located in Winter Hill section of Somerville in an area of low food access. The Mystic Housing Development includes the Mystic River Development, a 240 unit state family housing development, and the Mystic View, a 215
unit federal family housing development.¹ 62% of families at the Mystic Housing Development earn less than $20,000 per year according to 2012 data², far below the median income of about $55,000 for the overall census tract based on 2010 census data. 78% of residents are non-white. This is in contrast to the overall population of Somerville, reported as approximately 74% white in the 2010 census. It is also higher than the overall area census tract, reported as 58.03% white. Many residents are also immigrants and/or are elderly.³

Figure 3: Bringing food to the WMFM. Unloading produce (left) and produce display at market (right).

In addition to these demographic factors, the Mystic Housing Development is located in an area of low food access. While not a food desert as defined by the United States Department of Agriculture, the Development has limited access to fresh fruit and vegetables, as well as other staples. Although many convenience stores can be found within 0.5 miles, the closest grocery store is a Stop and Shop located 0.6 miles away, accessible via an infrequent bus, or by walking next to several major highways. Due to price considerations more residents report shopping at the Somerville Market Basket, a 1.3 mile walk or 80+ minute total trip via public transit, which is reportedly unreliable. Residents also reported shopping at Haymarket, an open-air market in Boston which can only be reached by a 30-40 minute trip by bus with transfer. Due to the transportation struggles reported by residents, Shape Up Somerville argues

¹ Somerville Housing Authority: http://www.sha-web.org/findhousing/tour/mystic_river.html
³ Ibid.
that the Mystic area is a food desert, as it can be ‘dangerous’ and ‘scary’ to walk to the closest area
grocery store, especially in winter when area sidewalks are often covered with ice and snow.⁴

**Creating a Solution**

In answer to these challenges the Winter Mobile Farmers’ Market was founded in 2012 as a companion
to a Summer Mobile Farmers’ market established in 2011. It was the idea of area residents, who
questioned why more was not being done to deal with the increased challenges to food access in the
winter. The major goal of both markets is to serve the *target population* by increasing fruit and
vegetable intake. The winter market addresses a specific goal of closing the gap in food access caused
by harsh winter conditions, which can make shopping for food more difficult for the elderly, disabled,
and those without access to transportation. Since its inception, the WMFM has varied in location
(Mystic Housing Development in 2012, Clarendon Hill Towers in 2013, Mystic Housing Development in
2014), but plans to remain at the Mystic River Development for the foreseeable future, in part to create
a consistent relationship with residents there throughout the year.

In 2014 the WMFM was held 1pm-4pm on Saturdays, from January 11 to March 1. The 2014 market
was located in a classroom in building 35 C, Memorial Road, at the Mystic Housing Development.
‘Local’ produce is provided by Enterprise Farm, a certified organic farm located in Western
Massachusetts that offers Community Supported Agriculture food shares throughout the greater Boston
area. Non-local foods such as citrus and avocado sourced by Enterprise Farm are also offered. All
produce is provided to the market at wholesale prices, and is sold by a Market Manager employed by
Shape Up Somerville, who is also a resident of the Mystic Housing Development. The Market manager
serves as cashier and is assisted by members of the Green Team, youth employees of Groundwork
Somerville who currently provide support hanging signs and setting up the market.

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⁴ Rachael Plitch, SUS, interview, March 6, 2014.
Produce is offered at half price for Mystic Housing Development residents, Electronic Benefit Transfer (EBT) users, and Supplemental Nutrition Assistance Program (SNAP) recipients.

**Research Questions**

Our clients were concerned that due to low attendance, the WMFM was not having the desired effect on fruit and vegetable intake among the residents. To remediate this issue, they were interested in how to increase its impact in terms of both attendance numbers and amount of produce purchased. Client questions and the above background information were paired with a comprehensive literature review leading to the formulation of three main research questions to guide the evaluation of the WMFM:

**Figure 4: Winter Mobile Farmers’ Market.** *Exterior view of access (top) and interior view of market (bottom).*
1. To what extent does the Winter Mobile Farmers’ Market have an impact on its target population of low-income, potentially food-insecure residents of the Mystic Housing Development?

2. What can the Winter Mobile Farmers’ Market do to increase its impact, both in terms of audience and amount of fruit and vegetable consumption among visitors?

3. What are other potential avenues for funding elements of the Winter Mobile Farmers’ Market?

The question of impact is one of the most important issues to assess for a market of this type, and also one of most challenging to answer, as the idea of impact may be construed in different ways. For instance, farmers’ markets are seen not only as helping to increase consumption of fresh produce in a community, but also in promoting bonding among community members through shared space. Thus the effectiveness of a farmers’ market might be a reflection of its atmosphere as well as of the quality and variety of its produce. Both of our clients desire impact in terms of access to local fresh produce and the creation of community space, but how they rank these goals may differ. For the purposes of this study, we evaluated impact in terms of both access to fruits and vegetables and presence in the Mystic Housing Development community, striving to assess all levels at which the WMFM 2014 season created change without making a value judgment about what type of impact is most important.
3. METHODOLOGY

Research Process
Our research process arose from the types of basic data that our clients desired. A review of the literature then gave us two models, Rapid Market Assessment and Five Dimensions of Access (discussed in detail in the Literature Review, Appendix C). Each in turn gave us a mixed array of techniques to use, such as door counts, dot surveys, checkout observations, and price comparisons (See Chart 1 and Table 1)

Chart 1: Research Design Process.

<table>
<thead>
<tr>
<th>Client Questions</th>
<th>Literature Survey</th>
<th>Methodology</th>
<th>Techniques</th>
</tr>
</thead>
<tbody>
<tr>
<td>• How many attend market?</td>
<td>• Farmers market evaluations</td>
<td>• Rapid Market Assessment</td>
<td>• Door Counts</td>
</tr>
<tr>
<td>• Do shoppers like the market?</td>
<td>• Food deserts</td>
<td>• Five Dimensions of Access Model</td>
<td>• Dot Survey</td>
</tr>
<tr>
<td>• How much do shoppers spend?</td>
<td></td>
<td></td>
<td>• Checkout Observation</td>
</tr>
<tr>
<td>• Are prices comparable to stores?</td>
<td></td>
<td></td>
<td>• Price Comparisons</td>
</tr>
<tr>
<td>• Is attendance health improving?</td>
<td></td>
<td></td>
<td>• GIS Data</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Ethnographic Observation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Interviews</td>
</tr>
</tbody>
</table>

Table 1: List of Data Required and Method of Collection.

<table>
<thead>
<tr>
<th>Data to be Collected</th>
<th>Method of Collection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visitor and customer perceptions</td>
<td>Dot and other surveys</td>
</tr>
<tr>
<td>Number of total visitors at market</td>
<td>Market Attendance/counts</td>
</tr>
<tr>
<td>Number of customers, purchases, purchase details</td>
<td>Market Transactions</td>
</tr>
<tr>
<td>Price and availability of produce at WMFM and other markets.</td>
<td>Comparison of Markets</td>
</tr>
<tr>
<td>Locations of food sources around WMFM</td>
<td>GPS/GIS mapping around WMFM location</td>
</tr>
<tr>
<td>Information on other farmers’ markets</td>
<td>Interviews with market managers, visits to local winter farmers' markets</td>
</tr>
<tr>
<td>Information on WMFM background</td>
<td>Interviews with WMFM staff</td>
</tr>
</tbody>
</table>
Using these methods, we conducted our research work in two main phases: 1: Primary Phase at the WMFM itself and 2: Secondary Phase outside the WMFM. In both cases we developed templates to help us collect data efficiently for analysis. A brief overview of the main research methods used in each phase of our research is presented below. More details may be found in Appendix E.

**Primary Phase - Research at the WMFM**

To set a baseline of data as well as to answer our first research question “To what extent does the WMFM have an impact on its target population?” we attended each of the eight sessions of the market and collected a variety of information split into three categories (Surveys, Market Attendance, and Transactional Information) each with their own methodology and unique results.

**Surveys:** To gather information on customer habits and perceptions a dot survey was administered during two of the eight market sessions. The dot survey method asks participants to place a dot or sticker next to statements with which they agree. As an incentive for participating in the survey, each participant received a two-dollar coupon redeemable at the next market. The dot surveys were displayed on large sheets of paper separated by question (see Figure. 5 for an example). Some questions required just one answer while others allowed for multiple answers. The questions asked about means of travel, awareness of advertisements, frequency of attendance, frequency of attendance at other markets, perceptions on produce consumption, as well as many others that are detailed in Appendix E. Customers over the age of 18 were given a sheet of multi colored dot stickers after purchase and asked to complete the survey. In some instances researchers were required to read out the survey questions in three of the local languages (English, Spanish, French\(^5\)) for clarification, for ease of participation, or because the participants were unable to read.

To better gain an appreciation of the customer perceptions of the market an open-ended survey was also given to participants. The researchers asked customers and visitors three questions: What do you

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\(^5\) Several creole speaking residents reported reading only French (Ethnographic Observations).
like about the market, what don’t you like about the market, and if you could change anything about the market what would it be? Any responses were written down on a large sheet of paper. If another participant answered a question in a manner similar to a previous answer a check was placed next to the answer to gain a tally of how many customers and visitors answered in the same fashion. The results were tabulated, analyzed, and depicted as a word cloud.

**Figure 5: Completed Dot Survey.** Conducted at WMFM session 7.

**Market Attendance:** Recording attendance is one method used by farmers’ markets to determine the reach of the market and to gain insight into visitor demographics. A researcher stationed by the front door documented observations on relative age, gender, time of arrival, and time of departure to give an overall visitor count for each session. Due to unexpected logistics, these observations were

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6 For the purposes of this report, **visitors** are defined as all persons entering the market. Workers and observers were counted as visitors only when they shopped, so as to correspond to transaction data.
only able to be collected seven out of the eight market sessions. However, the researchers believe that these seven observations still accurately portray the basic demographics of the 2014 WMFM.

**Transactional Information**: Information gathered at checkout is useful not only to record sales, but also to determine customer numbers, preferences, intake of produce, and produce volume required for future markets. As with the market attendance above, each transaction during the WMFM was recorded. To accomplish this, a researcher was stationed next to the cashier and documented all observations on type of food purchased, quantity purchased, time of transaction, resident/non-resident, new/returning, presence of coupons, and payment method.

**Secondary Phase - Research Outside the WMFM**
Both to supplement the information gained at the WMFM and to find answers to the second and third research questions on increasing the impact of the WMFM and finding funding options, respectively, we examined the food environment both surrounding and related to Mystic Housing Development and the WMFM. Our research involved three distinct activities (Comparison of markets, GPS/GIS mapping around WMFM location, Interviews) with their own methodology and unique results.

**Comparison of Markets**: Comparisons to similar markets can provide valuable information on how a particular market could be improved. Information was collected at local winter farmers’ markets such as, Somerville Winter Farmers Market, Medford Winter Farmers Market, and Dorchester Winter Farmers Market. Data gathered included the assortment and prices of produce, market attendance, publicity, any relevant customer services, as well as the general atmosphere. The results were tabulated and scored on a scale of 1 (lowest) to 4 (highest) to show where the WMFM market excels or where it falls short in comparison to its local peers, to help us formulate recommendations (See Chapter 4). To examine customer perceptions of price, comparisons of produce and prices were also performed at the area grocery stores where customers reportedly shop: Market Basket and Stop & Shop in Somerville, and Haymarket in Boston.
**GPS GIS mapping around WMFM location:** Global Positioning System (GPS) Geographic Information System (GIS) mapping was used to more accurately portray the food resources found in the area around the WMFM. GPS GIS mapping of individual food resource locations as well as of transportation options were carried out within a half-mile of the Mystic Housing Development. To enhance the transportation aspect of the GIS analysis as it pertains to the Mystic Housing Development, data from the 2011 Massachusetts Vehicle Census was included in analysis. This dataset determined the relative amount and age of cars within the apartment complex. By mapping individual food resource locations and the public transportation possibilities our team can better analyze all the food options available to Mystic Housing Development residents.

![Figure 6: Dorchester Winter Farmers’ Market. Image credit Dorchester Community Food Co-op.](image)

**Interviews:** To explore the breadth of options available to the WMFM, an Internet search was conducted to find other mobile farmers’ markets in the Northeast that concentrate on serving low-income inner city populations. Two relevant markets were found and phone interviews were used to gather information on market operations from Casey Burns of the Regional Environmental Council (REC), manager of the Mobile Farmers’ Market in Worcester, Massachusetts, and from Diane Turner, who runs the year round Farm Fresh Mobile Market in Syracuse, New York. (Chapter 4). Additionally, in
order to ensure an accurate portrayal of both the history and present of the market, interviews with several people associated with the WMFM were carried out in person with WMFM Market Manager Kawsar Jahan, with Rachael Plitch, Coordinator and David Hudson, Director, Shape Up Somerville, and Chris Mancini, Executive Director Groundwork Somerville.
4. CASE STUDIES

The field project team examined five markets in order to see how they addressed the challenges that the WMFM currently faces. The information gained is reported in the case studies presented in the following section. These case studies helped us to gain insight into the operations of other markets, contextualize our WMFM findings, and to have a real-world basis for specific recommendations.

The first two case studies concern mobile markets in particular. Each market chosen had unique attributes that identified them for selection. An internet search found five other mobile farmers’ markets catering to individuals, as opposed to schools and businesses, in the Northeast region\(^7\). They all serve low-income urban communities with higher than average ethnic and minority compositions. The REC Mobile Farmers’ Market in Worcester is of the same vintage as the WMFM, and though operating in summer and fall, was chosen for comparison because it utilizes a youth program, and also seeks many options for funding. Unlike the others, Syracuse Farm Fresh Mobile Market runs all year and hence was also chosen for study. Interviews with the managers of both markets were conducted by telephone on February 6, and March 17, 2014, respectively.

The second three case studies concern winter farmers’ markets local to the WMFM, which were visited to compare their atmosphere and amenities with that of the WMFM. The observations were then tabulated, scored, and ranked on a scale from 1 (lowest) to 4 (highest).

Case Studies

1. REC Mobile Farmers’ Market, Worcester, MA
2. Farm Fresh Mobile Farmers’ Market, Syracuse, NY
3. Dorchester Winter Farmers’ Market, Boston, MA
4. Medford Winter Farmers’ Market, Medford, MA
5. Somerville Winter Farmers’ Market, The Armory, Somerville, MA

\(^7\) For the purposes of this report, the Northeast region is considered to include Connecticut, Rhode Island, Maine, Massachusetts, New Hampshire, New York, and Vermont.
Comparison of Winter Farmers’ Markets

6. Ranking of WMFM and local Winter Farmers’ Markets

1. REC Mobile Farmers’ Market, Worcester, MA
The Regional Environmental Council of Central Massachusetts (REC) (http://www.recworcester.org/) launched the Mobile Farmers’ Market (REC-MFM) in 2012 with support from Harvard Pilgrim Health Care Foundation, the Worcester Regional Transit Authority and other donors. The market serves all five of the federally designated Neighborhood Revitalization Strategy Areas in Worcester. A 2013 REC-MFM survey reported that 72% of participants earned a family income of less than $49,000 annually and 50% less than $17,000 annually.

In 2013, the market ran 3 days a week from June through October covering 17 locations, including WIC offices, senior centers, and low-income housing. Staff and volunteers operated REC-MFM for about 1.5 hours per site. An alum of REC’s YouthGROW (a training program focusing on life skills, healthy eating and growing food) served as market assistant, helping with daily operations such as set up, sales, and driving the van. Left over produce was donated or stored at the elder center for next day’s market.

Customers were encouraged to visit REC-MFM through flyers and posters all over the city, handout materials, newspaper and radio advertisements, as well as information online. Materials were available in English, Spanish, Portuguese, Vietnamese, Arabic, and Nepali. Fruit, vegetables, meat, eggs, and dairy were sourced from various local farmers, including the YouthGROW urban farm. REC did not compare produce prices with supermarkets. The market accepted cash, debit, and credit, and matched SNP/EBT dollar for dollar. REC-MFM events at WIC and Senior Farmers’ Market Coupon distribution sites were reportedly attended by hundreds of recipients. Other inducements included cooking demonstrations and educational talks/materials by local chefs and community organizations, recipe cards, and free samples, children’s activities, and music. These incentives were made possible through partnership with Cooking Matters (a non-profit that trains low-income families on culinary and nutritional
Closing The Winter Gap

skills) under a two-year Farmers’ Market Promotion Program Grant. Using USDA funds, in 2013 REC-MFM launched a service with Elder Services to provide homebound seniors with produce. Though REC-MFM also solicits donations online, its main funder is the Harvard Pilgrim Foundation. It is also supported by United Way and many corporate sponsors but is actively canvassing for funds from more local companies, such as banks.

The REC-MFM was evaluated throughout its season, using EBT and other revenues to estimate sales. Volunteers from the USDA-funded Mass-in-Motion program noted attendance, and surveyed visitors through questionnaires. REC feels that it is reaching target demographic, as 76% of mobile market customers surveyed agreed that they consume more fruits and vegetables because REC-MFM stops in their neighborhood. The biggest challenge has been fundraising to cover staffing for the on-site, in depth outreach and education required to build the customer base. Another challenge was maintaining inventory and presentation while attempting to keep costs and waste down. In addition, the “competition” of a second vendor required for REC-MFM to qualify as a farmers’ market and be able to accept Massachusetts Dept. of Agricultural Resources coupons presented challenges, such as having adequate sales in order to generate income through mark up for the program.

REC is currently looking into the feasibility of an equivalent winter mobile market.

2. Farm Fresh Mobile Farmers’ Market, Syracuse, NY

Founded in 2008, the Farm Fresh Mobile Farmers’ Market (FFMM) (http://ssinterfaithcdc.org/projects/farm-fresh-mobile-market/) is modeled after a similar project in Oakland, CA. Originally funded by the Gifford Foundation, Onondaga County, and the New York State Department of Agriculture & Markets, FFMM is currently operated by the Southside Interfaith Community Development Corporation (SSICDC) of Syracuse, NY, whose president, the indefatigable Virginia Diane Turner, also acts as market manager and part-time driver.
Though open to the public, FFMM concentrates on inner city residents living at or below poverty line $^8$, who are unable to shop due to lack of mobility or transportation. FFMM thus gives them a sense of independence. FFMM also operates in winter because many customers rely exclusively on it for their groceries, and most cannot venture out to stores in bad weather. The schedule is posted on the SSICDC website monthly and is printed on fliers for customers.

The market sets up at 13 different locations per week, including apartment complexes, community centers and hospitals, where Turner or a paid driver and volunteers vend for 2 to 3 hours per site. Cheerful tablecloths and an array of local and exotic fruits, vegetables and staples such as beans, draw in approximately 50-95 mostly regular customers at each location (or over 500 in total). Produce is sourced from farmers and dealers from over 40 states, and even Mexico. Prices are wholesale as producers, who are not charged participating fees, are happy with another outlet for produce. FFMM also accepts EBT, SNAP, WIC, debit, and cash as payment, but does not offer dollar matching programs. To make every dollar count, FFMM provides recipes and classes on meal preparation, as well education on good nutrition, aided occasionally by a nurse.

FFMM is currently sustained by grants and donations to cover the cost of food sourcing over the money the market brings in. Partnerships also help. Wegmans supermarket provided access to their wholesale suppliers, as well as training on safe food handling procedures. The New York Department of Health holds an annual promotion for hospital employees and visitors, which donates $2.00 out of every $5.00 in sales to FFMM.

FFMM is supervised by a Mobile Market Committee that reviews attendance and transaction information from the various sites once a week. A monthly survey also assesses FFMM performance and customer wants. Produce is always sold out, and SSICDC board members are required to volunteer once a month to help coordinate the constant ordering and allotment of food. The biggest

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$^8$ Poverty thresholds for census purposes are set by annual income. In 2013, these ranged from $11,173 for individuals to $23,707 for a family of four, depending on age and household size. (U.S Census Bureau n.d)
success, as well as challenge, has been to keep FFMM functioning with a 1980’s truck that needs much mechanical care, but missed only 2 bad weather days in winter 2014. FFMM is currently raising funds through crowdfunding for a new truck to meet the demand by seniors for expanded service to new market locations.

3. Dorchester Winter Farmers’ Market, Boston, MA
Founded in 2011, Dorchester Winter Farmers’ Market is organized by the Dorchester Community Co-op, an initiative to build a market that provides economic opportunity and healthy affordable food. The market aims to provide area residents with access to local food in the winter after the area’s summer farmers’ markets close. A bright and cheerful market, it is held at Codman Square Great Hall in Boston, MA, and in 2014, ran between 12 and 4 pm on Sundays from January through March. According to the Co-op website, it was attended by over 2,800 people though the season, including the mayor. The market had over 10 vendors selling meat, seafood, cheese, and other products as well as fresh produce. It also featured free coffee, food trucks, activities, music, and cooking demonstrations. The Dorchester market participates in the Boston Bounty Bucks program that matches SNAP/EBT dollars up to $10.

4. Medford Winter Farmers’ Market, Medford, MA
The Medford Winter Farmers’ Market was founded in 2012 and is organized by the Medford Square Market Committee. This winter, it was held from December 2013 to March 2014 on Thursdays between 3 and 7 pm in the parking garage of the Hyatt Place Hotel in Medford, MA. It was the least inviting of all markets studied. The market was officially opened by the mayor, and over 10 farmers and artisans provided local goods including fresh produce, bread, meat, eggs, honey, and crafts. In addition it offered children’s activities, raffles, recipes, free samples, and occasional festivals and music performances. It also provided a dollar for dollar matching program for up to $20 per week to SNAP recipients.
5. Somerville Winter Farmers’ Market at the Armory, Somerville, MA
The Somerville Winter Farmers’ Market was initiated in 2010 by Shape Up Somerville to provide the city with access to fresh, local, healthy food throughout the winter months. The largest, liveliest, and busiest of the three markets the researchers visited, it was located at the Center for the Arts at the Armory every Saturday from December 2013 through March 2014 from 9:30 am to 2 pm. The market attracted about 25 vendors a week offering produce (mainly root vegetables), fresh fish, meat, eggs, cheeses, baked goods, and crafts. Kicking off with a celebration, the market often had live music and activities. Vendors accepted cash, credit or debit cards and SNAP/EBT are matched up to $10. The market organizers encouraged visitors to walk, ride a bike, or take the bus.
### Chart 2: Ranking of WMFM and local Winter Farmers’ Markets.

*Ranking is from 1*sup*th* to 4*sup*th* based on highest total score. Section score highest is 4. Lowest score is 1.*

<table>
<thead>
<tr>
<th>Ranking</th>
<th>Overall</th>
<th>4th</th>
<th>3rd</th>
<th>2nd</th>
<th>1st</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section</td>
<td>Category</td>
<td>WMFM</td>
<td>Med</td>
<td>Arm</td>
<td>Dot</td>
<td></td>
</tr>
<tr>
<td>Advertisements</td>
<td>Publicity</td>
<td>1</td>
<td>4</td>
<td>2</td>
<td>3</td>
<td>Flyers, newspapers, businesses</td>
</tr>
<tr>
<td>Advertisements</td>
<td>Web</td>
<td>1</td>
<td>4</td>
<td>2</td>
<td>3</td>
<td>Website</td>
</tr>
<tr>
<td>Advertisements</td>
<td>FB</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>4</td>
<td>Facebook updates</td>
</tr>
<tr>
<td>Advertisements</td>
<td>Signage</td>
<td>1</td>
<td>4</td>
<td>2</td>
<td>3</td>
<td>Entrance and in area</td>
</tr>
<tr>
<td>Atmosphere</td>
<td>Space</td>
<td>2</td>
<td>1</td>
<td>4</td>
<td>3</td>
<td>Interior</td>
</tr>
<tr>
<td>Atmosphere</td>
<td>Atmosphere</td>
<td>2</td>
<td>1</td>
<td>4</td>
<td>3</td>
<td>Welcoming or not</td>
</tr>
<tr>
<td>Atmosphere</td>
<td>Seating</td>
<td>3</td>
<td>1</td>
<td>4</td>
<td>2</td>
<td>Places to sit, to eat at etc.</td>
</tr>
<tr>
<td>Atmosphere</td>
<td>Community place</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td>As gathering place</td>
</tr>
<tr>
<td>Atmosphere</td>
<td>Music</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>Live or recorded</td>
</tr>
<tr>
<td>Atmosphere</td>
<td>Display</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>4</td>
<td>Presentation of items</td>
</tr>
<tr>
<td>Atmosphere</td>
<td>Flow</td>
<td>1</td>
<td>4</td>
<td>2</td>
<td>3</td>
<td>Circulation</td>
</tr>
<tr>
<td>Customer Expansion</td>
<td>Attendance</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td>Number of visitors counted during study</td>
</tr>
<tr>
<td>Customer Expansion</td>
<td>Diversity</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>Attendance by minorities</td>
</tr>
<tr>
<td>Customer Expansion</td>
<td>Customer incentives</td>
<td>1</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>Special coupons etc.</td>
</tr>
<tr>
<td>Customer Expansion</td>
<td>Activities</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>Children’s activities, cooking demonstrations etc.</td>
</tr>
<tr>
<td>Customer Expansion</td>
<td>Access for passersby</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td>Easy to see from road</td>
</tr>
<tr>
<td>Customer Expansion</td>
<td>Access for low income</td>
<td>4</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>Easy for local low-income residents to get to/ find</td>
</tr>
<tr>
<td>Technical/Operations</td>
<td>Timing</td>
<td>1</td>
<td>3</td>
<td>4</td>
<td>2</td>
<td>Duration of market in months</td>
</tr>
<tr>
<td>Technical/Operations</td>
<td>Vendors/ Stations</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td>Number of tables for items/activities</td>
</tr>
<tr>
<td>Technical/Operations</td>
<td>non-produce</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>Cooked food, beverages, crafts</td>
</tr>
<tr>
<td>Technical/Operations</td>
<td>Selection of F&amp;V</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>Number of vendors with produce</td>
</tr>
<tr>
<td>Technical/Operations</td>
<td>Veggies</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>4</td>
<td>Variety</td>
</tr>
<tr>
<td>Technical/Operations</td>
<td>Fruit</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>Variety</td>
</tr>
<tr>
<td>Technical/Operations</td>
<td>Labeling produce</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>4</td>
<td>Presence and consistency</td>
</tr>
</tbody>
</table>

**Total** | 43 | 55 | 66 | 76 |
5. FINDINGS
The research team was asked to evaluate the WMFM in terms of its impact on fruit and vegetable consumption among its target population, the low-income residents of the Mystic Housing Development. The team was also charged with finding ways in which to grow the market to increase its impact. Because both clients have complementary visions of their desired WMFM, which emphasizes the intake of fresh produce among the residents while also stressing the market’s role in building community, the researchers regarded both aspects as equally important to a healthy and successful market.

**Figure 7: Word Cloud - What is liked about the WMFM.** Responses to an open-ended survey of a total of 20 eligible market goers (those over 18 years of age). The larger and the darker green color indicate that more responses emphasized these answers. The lowest response was 1 and the highest was 10.
As there had been no comprehensive data collected at previous WMFM seasons, the researchers gathered a variety of information at each of the eight sessions of the WMFM to establish a baseline, as well as outside of the market, for comparative analysis.

**Key Strengths – What Works Well**

- a. Perceived Produce\(^9\) Consumption
- b. Market Location
- c. Increase in Customers
- d. Price and Quality of Produce

**A. Perceived Produce Consumption**

Most significant to the goals of the WMFM, an average of 80% of dot survey respondents over both sessions thought that they were eating more fruit and vegetables because of the WMFM (see Table 2).

**Table 2: Customer Perceptions of Produce Consumption.**

*Response to dot survey question “Do you think you are eating more Fruit & Vegetables because of this market?” A total of 20 eligible customers (those over 18 years of age) per session responded.*

<table>
<thead>
<tr>
<th>Response</th>
<th>Session 6</th>
<th>Session 7</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>85%</td>
<td>75%</td>
<td>80%</td>
</tr>
<tr>
<td>No</td>
<td>15%</td>
<td>25%</td>
<td>20%</td>
</tr>
<tr>
<td>I don’t know</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

To clarify this further, respondents were asked how often they purchased produce at other food stores to which over 20% reported buying produce only at the WMFM, 16% shopped at other markets once every few weeks, almost 50% shopped at least once a week, and 16% many times a week (Figure 8). However, when asked how much fruits and vegetables respondents usually purchase elsewhere, only 10% maintained they bought no produce at other stores, whereas almost equal numbers of respondents reported purchasing elsewhere just a little produce (47%) or a lot of produce (43%)

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\(^9\) For the sake of this report’s analysis, the term fruit is inclusive of more commonly known fruits at the market (oranges, apples, grapefruits, and strawberries). Although the scientific definition of fruits would deem anything with seeds (tomatoes, jalapenos, and avocados) a fruit, these are included in the analysis as vegetables due to perceptions among the general public and observed perceptions of market customers.
compared to that purchased at the WMFM (Table 3). Thus the WMFM appears to be the sole source of fresh produce for at least 10% of the respondents, and a supplementary source to a greater or lesser extent for 50% or more visitors.

**Table 3: How Much Produce is Purchased at Other Markets.** Response to question, “How much fruit and vegetables do you buy at other markets?” From a total of 19 responses

<table>
<thead>
<tr>
<th>Quantity of Produce</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>10%</td>
</tr>
<tr>
<td>Yes, a little Fruit &amp; Vegetables</td>
<td>47%</td>
</tr>
<tr>
<td>Yes, a lot of Fruit &amp; Vegetables</td>
<td>43%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>

Given this discrepancy, the researchers surmise that respondents were potentially overly enthusiastic in responses about their consumption of produce from the WMFM because of fear that a negative response would affect its continuance adversely. This said, that more than half of respondents use the
Closing The Winter Gap

WMFM to greatly supplement purchases of produce made elsewhere, indicates that the WMFM has a significant role in increasing the consumption of fresh produce in the target population. This finding is in keeping with a rigorous study showing that the use of farmers’ markets positively influences vegetable consumption among low-income populations, particularly SNAP clients (Obadia and Porter 2012) 10.

10% to 20% of survey respondents rely exclusively on the WMFM for their fruits and vegetables. Over 50% of respondents use the WMFM to supplement purchases of produce made elsewhere.

B. Market Location
As the word cloud (Figure 7) shows, the largest response to what market goers liked about the WMFM was its location, shared by 10 participants. This is not surprising as our GPS GIS mapping confirmed the difficulty of food access near the Mystic Housing Development, with the closest full grocery store located 0.6 miles from its center. It is a finding that illustrates the continued necessity of closing the winter gap in food access in the Mystic Housing Development area, and demonstrates that our client’s goal of providing a co-located market is something desired by current customers.

I like this market because it is near my house – Survey participant

C. Increase in Customers
Analysis of transactional information shows that the 2014 WMFM garnered more than double the customers (visitors who purchased at least one item) on average—28 per market session—than the 10-

10 See full list of references in Appendix D.
12 visitors in the Winter 2013 season.\textsuperscript{11} The current WMFM also attracted from 34 to 60 visitors (visitors who may or may not have purchased an item) per week or session, yielding an average of 39 visitors per session (Table 4). Though there was no attendance data from the previous season for comparison, it may be reasonable to assume that this number too has increased.

Table 4: Market Attendance and Transactions per Week. \textit{Total number of visitors and customers per session.}

<table>
<thead>
<tr>
<th>Market Session</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>Total</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attendance (visitors)</td>
<td>34</td>
<td>36</td>
<td>31</td>
<td>39</td>
<td>49</td>
<td>32</td>
<td>37</td>
<td>60</td>
<td>318</td>
<td>39</td>
</tr>
<tr>
<td>Transactions (customers)</td>
<td>23</td>
<td>24</td>
<td>25</td>
<td>30</td>
<td>31</td>
<td>26</td>
<td>26</td>
<td>41</td>
<td>226</td>
<td>27</td>
</tr>
</tbody>
</table>

70% of these customers were residents of the Mystic River Development who came regularly as discussed below.

Table 5: Customers by Type. \textit{Residency status at the Mystic Housing Development was determined by monitoring transaction pricing at checkout (residents are given $\frac{1}{2}$ price.) and confirmation by the Market Manager. Total customer number was determined by noting numbers of returning customers.}

<table>
<thead>
<tr>
<th></th>
<th>Total Transactions</th>
<th>Customers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Residential Transactions</td>
<td>Non-Residential Transactions</td>
</tr>
<tr>
<td>Number of Transactions</td>
<td>162</td>
<td>63</td>
</tr>
<tr>
<td>Percentage of Total</td>
<td>72%</td>
<td>28%</td>
</tr>
</tbody>
</table>

\textsuperscript{11} Market Manager interview, March 6, 2014.
Table 5 also indicates that there were 12 same day repeat customers over the market period. It becomes clear that all repeat customers were residents of the Mystic Housing Development. Figure 9 shows that as the market progressed, an increasing percentage of each week’s customers had visited the market during a previous market date. This consistency of attendance by residents bodes well for the impact of the WMFM on fruit and vegetable intake by residents, as well as on visitor’s happiness with the market as evidenced by their return in following weeks.

Taken together, the results from dot surveys and transactional information demonstrate that the WMFM had a **positive impact** on the **purchase** of produce by customers, most of whom are members of the target population, as compared to anecdotal evidence from the 2013 WMFM. In addition, the proportion

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**Figure 9: Returning Customers.** Percentage of customers who returned after visiting the WMFM in a previous week.
of non-residents (30%) to residents (70%) is equivalent to the mix (30% residents to 70% non-
residents) that our clients desire to see at the WMFM when considered as a community space\textsuperscript{12}.

\section*{D. Price and Quality of Produce}

Customers appreciate the price and quality of produce at the WMFM, as the word cloud in Figure 7 demonstrates. Both were given as the second highest response to the question “What do you like about this market?” representing 9 or 18% each of 51 responses by a total of 20 respondents. To verify this perception, researchers compared prices at WMFM with those at grocery stores customers usually shop at (based on client and customer feedback), as well as at other winter farmers’ markets. For context, prices at the WMFM are wholesale\textsuperscript{13}, and the WMFM and other farmers’ markets visited use

\textbf{Figure 10: WMFM Prices are More Affordable}. \textit{Comparison of the average price of five most bought items at WMFM with grocery stores and farmers’ markets.}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure10.png}
\caption{WMFM Prices are More Affordable (Based on 5 Most Purchased Items)}
\end{figure}

\begin{thebibliography}{9}
\bibitem{Hudson} David Hudson, SUS interview, March 6, 2014
\bibitem{Plitch} Rachael Plitch, SUS, interview, March 6, 2014.
\end{thebibliography}
dollar for dollar SNAP/EBT matching programs. Both Market Basket and Stop & Shop accept SNAP/EBT without matching, while Haymarket does not accept any benefits programs. However, while conventional produce prices at the latter can be up to $1.24 cheaper than at the other grocery stores, it did not appear to offer organic produce during the observation period. For ease of comparison with the WMFM, the markets were categorized into “Grocery Stores” or “Farmers’ Markets.” The 5 most-purchased items at WMFM that were also available at both types of markets (apples, beets, carrots, lettuce, and tomatoes) were used as the basis of comparison. For each market category, the cumulative price of one unit each of the 5 produce items was determined and then averaged to give the average cost of equivalent amounts comparison. Prices at WMFM were found to be generally lower than at grocery stores and at other farmers’ markets (Figure 10). For residents of the Mystic Housing Development (who pay half price) WMFM produce prices are even lower than EBT prices at other farmers’ markets, and markedly lower than prices for conventional produce at grocery stores.

Figure 11: Word Cloud - What is Not Liked about the WMFM. Responses to survey mentioned above. The lowest response was 1 and the highest was 4.
Key Limitations – Areas for Improvement

a. Publicity and Outreach
b. Atmosphere and Limitations of Market Space
c. Customer Acquisition
d. Sustainable Funding
e. Consistent Business and Operating Practices

In studying the WMFM and its peer markets, several key limitations emerged, indicating areas where the WMFM can be improved in order to better meet its stated goals. Several critical areas for development, including corresponding visual and tabular data will be discussed below. Two other limitations, sustainable funding and consistent business and operating practices, will be discussed in detail in the Recommendations section below.

A. Publicity and Outreach
Several customers responding to the open-ended survey questions voiced concerns that the WMFM was hard to find at first, as depicted in the word cloud in Figure 11. Visitors made statements such as, “I looked all day for the market,” and “I live here but I did not know until today there was a market.”14 This

Figure 12: Comparison of Signage. Shows WMFM sign compared to that of the Medford Market.

14 Ethnographic information, sessions 5 and 6 respectively.
is not surprising as WMFM signs are small and do not indicate the location of the market or the times of operation. This is in contrast to signage at other markets, which do both (Figure 12). In other studies, not knowing where farmers’ markets were was reported as the primary reason that low-income populations gave for non-attendance (Obadia and Parker 2012).

Dot survey participants at session 6 reported learning about the WMFM mainly through family, friends or neighbors, that is, word of mouth (Table 6). There was some confusion over the word “signs,” so that at session 7, both “signs” meaning outdoor signage, & “flyers”, denoting handouts, were offered as choices. At the latter session, word of mouth, signs and flyers were seen as almost equally important means of market publicity. Our clients have colorful flyers in the 4 main languages spoken at the Mystic Housing Development, and post them in some of the Mystic Housing Development buildings. However as this was most often done on the day of the market, overlapping with the market’s hours, there was little time left for residents to see them and attend the market. Online communication was the least important method of communication according to market customers, confirming the observations of other market managers with respect to low-income farmers’ market customers (Obadia and Parker 2012, National Mobile Market n.d.) All the winter farmers’ markets studied for this report have an active Facebook page. Among these, the WMFM Facebook page is updated the least regularly, at about 1 or 2 times a week, whereas Dorchester had 8 posts per week (Table 7).

**Table 6: How Visitors Find Out About WMFM.** Response to dot survey question “How did you learn about this market?” A total of 24 and 27 eligible customers (those over 18 years of age) responded at sessions 6 and 7 respectively.

<table>
<thead>
<tr>
<th></th>
<th>Session 6</th>
<th>Session 7</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saw signs</td>
<td>21%</td>
<td>26%</td>
<td></td>
</tr>
<tr>
<td>Online (email, Facebook)</td>
<td>0%</td>
<td>7%</td>
<td>Email</td>
</tr>
<tr>
<td>Friend, neighbor, family</td>
<td>38%</td>
<td>26%</td>
<td></td>
</tr>
<tr>
<td>Been before</td>
<td>28%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flyer</td>
<td></td>
<td>26%</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>13%</td>
<td>15%</td>
<td>School, Head Start</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>
Table 7: WMFM Updates Online Presence Infrequently. Facebook posts for each market’s page during its season were counted and posting rate was determined.

<table>
<thead>
<tr>
<th>Winter Mobile Farmers’ Market</th>
<th>WMFM</th>
<th>Medford</th>
<th>Armory</th>
<th>Dorchester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facebook posts</td>
<td>11</td>
<td>80</td>
<td>99</td>
<td>98 posts</td>
</tr>
<tr>
<td>Season length (weeks)</td>
<td>8</td>
<td>13 (including pre-publicity)</td>
<td>17 (including pre-publicity)</td>
<td>12 (including pre-publicity)</td>
</tr>
<tr>
<td>Posts/ week</td>
<td>1</td>
<td>6</td>
<td>56</td>
<td>8</td>
</tr>
<tr>
<td>Ranking</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>4</td>
</tr>
</tbody>
</table>

B. Atmosphere and Limitations of Market Space
Both of our clients indicated a desire for the WMFM to be a welcoming space for visitors. However the present space has drawbacks compared to other local winter farmers’ markets. The market's atmosphere was generally genial but spartan (Figure 13). The market was made up of two interconnected rooms and included several unused spaces, including a kitchen as shown in the layout in figure 14. On the right of the resource table sat a large table with a printer and several chairs, creating a space that was often used by customers to gather and chat. To the left, an open square of tables was set up, stacked with boxes/baskets of produce, creating small sub-areas of the larger room that could become quickly cramped during busy periods of the market. To the immediate left of the front door were two chairs, next to the window, where customers or children often waited for others to complete their shopping. The check out was at the rear...
corner of a square, a set up that often caused bottlenecks for customers. Behind the shopping area there was a great deal of open space, stacked with chairs. There were several cubbies with toys, as the room is usually used for the pre-school program, Head Start. The produce display and labeling was improved over the course of the market, from boxes to baskets, in many cases, and from hand-written labels to laminated labels including translations.

While the space has two entrances, only the outside door, which requires walking up several steps, was considered by the WMFM staff to be an entrance. Customers entering through the back door, also called the ‘fire door’, had to navigate around the back of the produce tables to reach the shopping area. Over the course of the market due to fears about slipping on the stairs. During the eight market sessions the main door was always left open, which, while inviting, caused the room to often become quite cold. The open door allowed in street sounds such as passing cars and children playing, and occasionally also smells such as cigarette smoke. No music was played at most sessions, and when music was played occasionally it was often played from a cell phone. For several market sessions the lights remained off, which caused the room to become increasingly dark over the market period.

**Figure 14: Layout of WMFM.** *Bottlenecks in customer flow are demonstrated in the figure below.*
C. Customer Acquisition
As noted previously, transactional information indicated that the 2014 WMFM more than doubled the number of customers it received the previous year. Even so, the average of 27 customers per market session is far below the 50 or more per session desired by SUS,\textsuperscript{15} and much less than the 50-95 customers per location reported by the comparable Syracuse Farm Fresh Mobile Market (Diane Turner, market manager, interview March 17, 2014).

\textsuperscript{15} David Hudson, SUS interview, March 6, 2014
Analysis of market attendance data showed an average of 39 visitors attending the WMFM per session (Figure 15.) Attendance data also demonstrated that the number of visitors to the WMFM increased slightly towards the end of the market season, most likely due to the dot-survey associated coupons, whose existence was broadcast by word of mouth. The popularity of the game-like survey, as well as the various stickers for children also supplied by the researchers, point to the effectiveness of small-scale entertainments in bringing customers into the WMFM.

The researchers also found that offering a greater variety of produce items had a positive effect on how many items customers bought. When the average amount of food items\textsuperscript{16} purchased per transaction was compared with the amount offered at each market, purchases tended to see a corresponding slight increase (Figure 16). The average WMFM customer generally buys about 4 different food items per transaction. Customers also demonstrated a slight preference for fruit over vegetables, as seen in the analysis of both offered and purchased fruit and vegetables in Figure 17. While slight, this preference might be taken into consideration during future markets.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{food_items_offered_purchased.png}
\caption{Food Items Offered and Purchased. \textit{Comparison of the average number of food items bought per transaction with the number offered.}}
\end{figure}

\textsuperscript{16} For the purpose of this report the term ‘food item’ refers to a category of food and not its quantity.
These trends indicate that intake of fresh produce might be increased by offering more variety, especially of fruit, and through the introduction of some form of coupons, at least intermittently. These and more complex suggestions are compiled in our Recommendations.

**Figure 17: Comparison of Available and Purchased Fruit and Vegetables.**

![Comparison of Available and Purchased Fruits and Vegetables](image)
6. RECOMMENDATIONS
The Tufts Field Projects Team presents the following recommendations for changes, updates, and upgrades to the Somerville Winter Mobile Farmers’ Market. These recommendations are based on our detailed observations and data collection at the 2014 winter market as outlined above, as well as a thorough literature review, comparisons with other winter markets and supermarkets, and interviews with key stakeholders. They are tied directly to our findings of key areas for improvement. Many of the recommendations are designed to help the WMFM principals better meet their goals of increasing the scope of their impact on their target population. Additional recommendations are designed to help meet the goal of funding market elements such as price matching.

Table 8: Overview of Recommendations.

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Complexity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobile Market Advisory Board</td>
<td>Mild</td>
</tr>
<tr>
<td>Advertisements</td>
<td></td>
</tr>
<tr>
<td>Atmosphere</td>
<td></td>
</tr>
<tr>
<td>Customer Expansion</td>
<td></td>
</tr>
<tr>
<td>Funding</td>
<td></td>
</tr>
<tr>
<td>Technical/Operational</td>
<td>Wild</td>
</tr>
</tbody>
</table>

Recommendations have been separated into five categories: Advertisements, Atmosphere, Customer Expansion, Funding, and Technical/Operational (Table 8). Each category will begin with an explanation of the Tufts Field Projects Team’s general recommendations for opportunities found in each area and will then outline specific potential opportunities in that area. Within each category, recommendations will go in order from mild—those recommendations that in our view will take the least amount of effort, energy, and/or expense—to wild—those recommendations that would require a substantial input of time and/or effort, and a potential readjustment of goals and expectations. While these categorizations do assess our view of the increasing level of difficulty in putting them into
practice, the order does not imply a value judgment as to the importance or potential level of impact of each recommendation.

As a team, we feel strongly that each of our recommendations has a great deal of transformative potential. We acknowledge however the boundaries to our understanding of the market itself and of the population of customers, due to the limited nature of our observations, and our position as non-residents of either the Mystic Housing or Clarendon Hill Developments. As an initial recommendation, we therefore think it is imperative that this report and the recommendations suggested within be shared with a newly formed Mobile Market Advisory Board. This group—which we envision being made up of ethnically diverse and representative stakeholders from each market host community, members of Shape Up Somerville and Groundwork Somerville, and other interested community members—should use their experience in the area and at the market to assess our recommendations and decide which in each area to implement or explore further. Moving forward, we foresee this group meeting before each summer and winter market to review new data gathered using the templates provided below, access the success of current initiatives, and make new recommendations for the markets moving forward. We think that in this way the market can continue its evolution into a resource of the communities it serves, not simply for them.

Advertisements
While the Winter Mobile Farmers’ Market advertises through a Facebook page, small flyers, and signs, efforts to get the word out are much more limited, less consistent, and less visible than other winter markets, leading to our key finding of a lack of publicity and outreach to customers. We believe that with increased signage, a more in-depth web presence, and better and more detailed branding the WMFM would reach a larger number of residents of the Mystic Housing Development, as well as the Somerville Community at large. This belief is borne out by the attendance at other area winter farmers’ markets, as
well as by comparable mobile markets with a similar target population. An increase in knowledge about the market has the potential to impact attendance and fundraising efforts.

**Increased and Consistent Signage and Flyers**
The Field Projects team often heard feedback from customers that the market was difficult to find, something with which we concurred. If this is true for residents of the Mystic Housing Development, it is likely even more difficult for other community members. Clearly demonstrating where the market is with *increased signage* in key locations such as entrances and intersections is essential. Also important is signage *clarity* to help direct passers by to the exact market location, a matter of confusion for the 2014 season in part due to a lack of direction as to which of two Head Start classrooms the market was located in. Once a customer has entered the market, they become one of the best free tools to publicize the market. Because *word of mouth* was found to be one of the most effective ways to gain customers in our findings, give each customer *detailed and informative advertisements* such as postcards, fridge magnets, or flyers, while asking that they share word of the market with friends, neighbors, family, colleagues.

**Increased and More Consistent Web Presence**
While the market has a Facebook page, during the 2014 WMFM it was updated only one to two times a week. *Maintaining active social media presence* on sites such as Facebook and Twitter should be a priority. These pages should give market dates, times, and location, and be updated at least once a week to maintain a sense of connection with the online market audience. Additionally, we recommend that the market have a *dedicated, user-friendly webpage* on wordpress.com or similar free platform (see for example [http://freshapproach.org/mobile-farmers-market/](http://freshapproach.org/mobile-farmers-market/)) to firmly establish the WMFM presence online. The website should host: The purpose/mission of the market, the location with map, market days and times, contact information, food sourcing information, history, management, partners, sponsors, internship opportunities, volunteer opportunities, matching programs, and donorship opportunities, news, press coverage, and links to social media. While such a website will likely not reach the majority of target customers, who may not have online presence, it will help in raising the
market’s profile among the larger Somerville community, which can be of help in raising money and in finding volunteers. Moreover, a clear and updated website will be useful in gaining the support of grant-making organizations such as foundations, corporate sponsors, and community organizations.

**Advertisements in Local Media Outlets and Stores**

In coordination with the efforts above, similar information should be sent to local media outlets, such as Wicked Local Somerville, The Somerville News, and The Somerville Beat. As with a website, this increased awareness of the market among the larger Somerville community has many potential benefits, including increased attendance, volunteers, and donations. Large format flyers posted in local stores are another way to reach this audience, while at the same time building contacts among local businesses. A Dedicated Public Relations Person, likely a volunteer or intern, is an excellent way to ensure consistency of message across these platforms, and would allow one clear contact for media inquiries.

**Improved Signage**

While our survey of other area winter markets showed a large variety of signage (Figure 18), a constant among them was large, colorful banners. Whether homemade or professionally printed, this signage advertises to the community where and when the market is, and is another way to draw customers.

![Figure 18: Signage at Area Markets](image)
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Current WMFM signage, while bright, is small and does not use pictures to convey to a viewer what will be found at the market. Investment in an *increased number of signs* while not a trivial one time cost if printed, is an excellent way to advertise to both Mystic Housing Development residents and the larger Somerville Community. Another way to increase reach is to improve branding, through an *updated logo and market name*, an identity package that could be used to re-launch the market. For example, while the Mobile name is a useful way to differentiate from the Somerville Winter Farmers’ Market held at the Armory, it can be confusing in the winter, where the market remains in one location throughout the season. Discussing updated naming opportunities with the newly appointed advisory board would be a way to create excitement about the market through a relaunch.

**Atmosphere**

While the customers of the WMFM help to improve its atmosphere, the space in which the market is currently held has many drawbacks in terms of décor, market layout, and location, leading to our key area for improvement, current market atmosphere and market space as both a shopping and community space. Additionally, the current layout of the market and lack of activities and gathering spaces are detrimental to the sense of community that both Shape Up Somerville and Groundwork Somerville have expressed a desire to invest in. There are many potential changes to the market pulled from our experience as well as other area markets, both small and large, which will increase customer comfort by improving the WMFM atmosphere.

**Minor Changes/Additions to Existing Space and Produce Displays**

Based on our ethnographic observations, and observations of other local markets, we believe that minor changes to the existing market space such as turning on the *lights*, providing *music* in the form of a radio or CD player, and investing in *decorations* such as colored posters/fabric to hang on walls will greatly improve the stark atmosphere described in the Background in Chapter 1. Should the door be left open to increase visibility, the use of a *space heater* would help keep the market from becoming too chilly. *Salting and shoveling* front stairs will increase access among the elderly and disabled. The use of *tablecloths* on produce tables, and *baskets or crates* instead of boxes, will make tables friendly and
produce a more attractive ambience. *Keeping food groups together* (i.e. greens area, fruit area) and in the same spaces by week will increase customer comfort with the market over the season and make shopping easier. Using *laminated produce labels* will allow the addition of updated prices with washable markers throughout the season.

During the market, hiding empty boxes and keeping the floor clear of debris will assist in making the space look fresh and clean. Additionally, *restocking of produce* as it is used to make displays look full, placing newer produce behind older produce, and removing heavily damaged produce to a compost bin will also increase customer perception of quality.

**Children’s Activities**

Small activities for children such as *balloons*, *stickers*, or *toys* incentivize parents to attend the market, especially in the winter when activities for children in the Mystic Housing Development area are few. Such activities are used at local markets such as that in Medford with a great deal of success (Figure 19). Activities that keep children busy also allow parents more time to shop and socialize, increasing the likelihood that they will both purchase items at the market and become a repeat customer.

**Free Food and Drinks**

Providing visitors with *coffee*, *water*, or *small snacks* helps to transform the market into a social gathering space. Like a loss leader at a larger grocery store, providing something to snack on or drink will incentivize customers to stick around, making the market livelier and inviting, and increasing the likelihood that customers will return each week, and invite their friends.
Closing The Winter Gap

Moderate Space Changes
The current market layout creates a bottleneck for customers, is centered around one of two potential entrances, and does not offer inviting space for customers to gather and chat. Updating the layout and offering a dedicated seating area would solve many of these issues, and make the WMFM shopping experience more enjoyable (Figure 20).

Activities and Take-Aways
Many winter markets create an exciting atmosphere by offering activities such as music performances or cooking demonstrations. While space at the WMFM is currently limited, offering activities that take up a small amount of room, such as samples of local products, or take-aways such as recipe cards or other items related to the Shape Up Somerville and Groundwork missions would create an air of excitement around attending the market from week to week. This excitement could be built by providing a calendar of upcoming giveaways and events, potentially as a magnet that would serve as an advertisement of and reminder for the market. Additionally, an opening and/or closing party attended by local officials such as the Mayor would be a fun way to demonstrate the City’s commitment to the market.

Major Space Changes
While the Head Start space has successfully hosted two winter market seasons, it has obvious limitations, most notably in terms of space available and atmosphere. We recommend investigating whether a larger space is available at the Mystic Housing Development. Another option is to use a heated tent. A tent would offer several benefits including added space, an easier location to find and access for residents and community members, and an opportunity to advertise to those driving by, as is found during the summer market when passers-by are visually aware of the market.
Customer Expansion

Key to the goals of both Shape Up Somerville and Groundwork Somerville is an expansion of the customer base of the Winter Mobile Farmers’ Market, in terms of both percentage of Mystic Housing Development families served, and total number of market visitors. In our findings, we demonstrated a key limitation in the current number of customers, and current ways to remediate low customer numbers. While many of our general recommendations have the potential to increase customer numbers, we have several specific ideas targeted toward engaging active customers and enticing new customers to visit the WMFM.

Loyalty Incentives

Many grocery stores use loyalty programs to differentiate themselves from similar competition, create loyalty to their brand, and give customers incentives to stay such as points. The WMFM can use simple loyalty programs such as punch cards tied to number of visits or variety of foods purchased to increase
customer engagement and promote return customers each week, used successfully at the Medford winter market. An alternative tied to the target population is to use *building based contests* offering incentives for the building with the most visitors in a given week. Having the cashier ask which building the customer lives in would provide data to enable more detailed tracking of where people are coming from within the Mystic Housing Development, while also operating as a means to offer incentives for the building with the most customers.

**Food Giveaways**
Many WMFM customers requested foods that were not available at the market due to the restrictions of Enterprise Farm. Food giveaways of items such as *tropical and culturally appropriate fruits* or less-popular market items is a way to both incentivize customers to come to the market and to introduce them to new foods. Items not available via local farms, such as bananas, could be donated by local grocery stores, capitalizing on relationships already existing between these stores and our clients. To ensure that market profits are not undercut and availability is maintained throughout the market period, giveaways could be limited to one item per household, upon purchase. We believe this is a way to increase variety at the market and demonstrate that customer concerns are being heard, while respecting the goal of providing local food.

**Shuttle Buses from other Areas**
The Mystic Housing Development is an area of low food availability in large part because of lack of access to public transit, and difficulty in walking to major Somerville hubs. This issue also makes it difficult to incentivize Somerville residents from outside the Mystic Housing Development area to visit the market. *Providing shuttle busses* from other areas will promote a larger customer base from outside the Mystic Housing Development, as well as those who reside at the Mystic Housing Development and would be attracted to the market through the lure of free transit to another part of Somerville. Shuttle buses also open the opportunity to *partner with local stores* in more central areas of Somerville. By stopping in front of a local Somerville establishment the shuttle bus can *encourage patronage* of the partner business, and help the WMFM develop deeper ties with potential donors.
Funding
For the summer 2013/winter 2014 season, both SMFM and WMFM were funded through a Community Transformation grant, a funding source from the Centers for Disease Control by way of the Massachusetts Department of Public Health. This program was defunded on a national level in early March 2014, leading to questions about where funding for market sessions beyond the summer of 2014 will come from. Even before the loss of Community Transformation funding, finding and increasing sustainable funding sources for the summer and winter market was a top priority, and lack of sustainable funding was an identified key limitation. Beyond grant funding, the Mobile Farmers’ Market has held a successful crowdfunding campaign in 2013, but has not solicited direct business or local resident sponsorships by other means. By contrast, the Syracuse Farm Fresh Mobile Market solicits donations online as well as from the community at large. In addition, both the Syracuse market and the Regional Environmental Council (REC) Mobile Farmers’ Market in Worcester looks for local business sponsorship.17

Shape Up Somerville and Groundwork Somerville have an excellent view of available Federal and foundation funding. With that in mind, we have developed several potential avenues to gain non-grant funding to fund market operations in future seasons.

Local Resident Sponsorship
Many Somerville residents who support the mission of the WMFM do not shop there, as evidenced by the contrast between the success of the crowdfunding campaign and the amount of non-residents shopping at the market. Capturing funds from this group is an important piece of sustaining matching funds, paying for staff, and other necessary budget items. Tabling at the Armory, which similarly provides access to locally grown food and is reaching a much larger population, is one way to capture this group. Donation tiers, with for example $10 matching 1 Market visit for SNAP, WIC and Seniors Farmers’ Market Nutrition Program customers is a simple way to communicate to a group that values

17 Casey Burns, REC, interview, February 6, 2014.
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access to farmers’ markets how they can help. This table could be staffed by volunteers, advisory committee members, or members of the Green Team. A *Friends of the Somerville Mobile Market* program could be set up using a similar tiered system to provide a more dependable source of funds, developed and maintained through an *annual appeal*.

**Business Sponsorship**

Sponsorship from *local businesses* could be solicited to help defray market costs, a model used by the Worcester REC market. Similar to the tiered model above, named levels of *corporate sponsorship* could be offered with varying levels of benefits, such as logos on signage, clothing worn by WMFM and SMFM team members, and branded giveaways. Businesses could also be approached to offer in-kind donations such as tablecloths, baskets/crates, and printing for flyers. *Local banks* can be specifically approached to solicit funds donated as a part of community development stipulated by the Community Reinvestment Act\(^\text{18}\) (CRA). While some banks work only within census tracts in which they are active, others operate on the level of the Metropolitan Statistical Area (MSA). As the MSA of the Mystic Housing Development (15764, Cambridge-Newton-Framingham) covers a large, populous area that is home to many different bank offices, branches, and ATMs, this opens a large pool of potential donors. Many banks have a dedicated CRA Board, and CRA Officer who will work with applicants for funding to help them fine-tune requests.

**Technical/Operational**

It was exceedingly clear to the Field Project’s Team that all stakeholders involved in the Winter Mobile Farmers’ Market care deeply about the market and its mission. Despite this, we identified business and operating practices, especially in regard to market responsibilities as a key limitation of the WMFM. With that in mind, we have designed several recommendations to assist Shape Up Somerville, Groundwork Somerville, and future stakeholders to ease barriers to working together on the market, and increase market efficiency. These recommendations are pulled from our observations of the WMFM, our own experience in business and non-profits, from our observations of other local markets,

and from our case studies and detailed literature review.

**The Green Team**

Our observations, as well as comparable teams at other farmers’ markets, make us believe that the Green Team is a major underutilized resource of the WMFM. By increasing consistency, training, and responsibilities, their true potential as members of the WMFM team can be unlocked. First, we recommend that the Green Team be asked to attend a preliminary meeting so that each member clearly knows what needs to happen at the market and their role. This will allow the Green Team to hit the ground running at the beginning of each market session. A Green Team farm visit to Enterprise Farm or other WMFM suppliers is another way to give the Green Team an increased sense of ownership, by allowing them to follow the path from production to customer. Additionally, we recommend that the Green Team address any market information and concerns with their supervisor at regular meetings during the market season.

At the market itself, we recommend that there be only one shift of workers at each market session to allow the Green Team adequate working hours and provide for the most efficient work force at the market. A uniform of a market branded t-shirt, jeans, and a nametag would also provide a sense of cohesion for Green Team workers, while also showing customers who they can talk to with questions. For each market session, each Green Team member should be given a specific role. This will help maximize efficiency by ensuring that each Green Team member is the expert at their given tasks, and will also increase Green Team investment in the market. These roles could be assigned via an internal Green Team structure, which will create both sustainability and motivation. This structure could have both a Junior and Senior level, with the ability to ascend to more responsibility providing motivation to become more invested in the market. This will also support a more sustainable workforce in promoting worker loyalty during service and an opportunity for newer employees to learn from older ones. To ensure that the job training provided is of maximum value to Green Team members, they should be
given feedback on their performance both midway through and end of both the market seasons. They should also have the opportunity to give any feedback they have on the operations of the Market.

To maximize efficiency, we recommend a clearly defined workflow for the Green Team. The workflow would include set times and tasks that should be completed throughout a shift, and should provide details for each task including where to be and what exactly to do. An example workflow for a market that runs from 1:00-4:00 might be:

<table>
<thead>
<tr>
<th>Time</th>
<th>Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>12:15-12:45</td>
<td>Hang up signs and make sure steps are safe for customers</td>
</tr>
<tr>
<td>12:45-1:00</td>
<td>Set up Market</td>
</tr>
<tr>
<td>1:00-4:00</td>
<td>Customer Service at the Market</td>
</tr>
<tr>
<td>4:00-4:45</td>
<td>Clean up the Market and Take down all Signs</td>
</tr>
</tbody>
</table>

**Updates to Market Business Practices**

First, we recommend that the WMFM season be expanded. Our data demonstrates that the market season currently ends just as momentum is beginning. Starting earlier and ending later will increase food access in a major way, while also making the WMFM a more permanent fixture for customers. Secondly, we recommend that the Market Manager role be clearly defined. This will prevent any confusion over Green Team management and Market management, and will empower the market manager to take a firmer supervisory role. A possible tree or chart of personnel could be established to accomplish this goal. We also recommend simple methods such as taking photos of available produce, with a camera or cellphone, and making and retaining photocopies of other records, to insure that consistent records are tracked through each season, and for several seasons in a row, necessary for business, funding, and research purposes. To assist in gathering clear baseline data for recordkeeping and grant applications, a Point Of Sale (P.O.S.) system—an electronic way of completing transactions—could be purchased. A P.O.S. system, potentially used as a shadow system to the paper tracking requested by Enterprise Farm, can keep track of the same transactional information collected by the Field Projects team over the course of our evaluation. Available for operating systems such as...
Android, a P.O.S system will be able to produce graphs and data instantly, and can also be used to teach market workers to look at projections and make goals based on past market information.

To be more customer friendly on price by pound items, it would be helpful to have an average quantity that equals a pound, or price by piece. This will allow customers to plan their shopping budget, and make check out transactions simpler for the market manager. We also recommend setting whole number prices that are easy for those receiving matching to split.

In terms of ongoing data tracking, we recommend keeping a logbook for the market, a binder for storing tracking data. The Green Team can be engaged in this record keeping. In this book market sponsors should maintain transaction records, including how many customers, how much was spent by each customer, SNAP/EBT, WIC coupon sales, and total sales on each market day. Additionally, a record of what and how much produce was supplied, brought to the market by weight, and is leftover at the end of each market will assist in ordering. Lastly, total attendance counts should be conducted at the start, midpoint, and end of each market. All of the recommendations above could be stored in or pulled from a P.O.S. system if implemented.

**Changes to Food Offerings**

One of the most common pieces of feedback received by the Field Projects Team was the request to add to the variety of foods available at the market, and to increase to number of staple foods. To meet this customer request, we recommend that the market prioritize types of foods available at the market. This includes ensuring that staple crops such as apples, potatoes, and onions are readily available in quantities large enough to meet demand. For foods that are more outside the norm such as dandelion greens, we recommend adding only 1-2 challenging foods per market. This will allow purchases of these foods to be closely tracked, and for education through a cooking demonstration or recipes to be provided specifically for those foods. We also recommend increasing the variety of foods. This could be accomplished via donations specifically designated for the purchase and sale of non-local exotic fruits.
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and vegetables. Additionally, the market could take advantage of Somerville’s newly implemented ordinance allowing any resident to sell items at a farmers’ market by *inviting members of the community* to sell at the market would increase the scope of available products while also making the market a larger and more exciting space.
6. CONCLUSIONS

Areas for Future research
The research performed during the 2014 season of the WMFM sets a baseline for future work, particularly for the regular evaluations that are crucial for the smooth operation of a farmers’ market.

Three areas in particular stood out with respect to future research needs.

Firstly, while we used an array of research tools and methods to learn some important information about the WMFM and its customers, more depth is needed as to the shopping habits of Mystic Housing Development residents in particular, especially with regard to how much of their total food purchases come from the WMFM. Information on why residents did not shop at the WMFM would be especially illuminating with regard to outreach efforts. The differences in fruit and vegetable consumption between WMFM customers and non-customers may also be determined using the Behavioral Risk Factor Surveillance Survey, developed by the Centers for Disease Control and Prevention, which asks respondents about the frequency with which they consume various produce items (Obadia and Parker 2012). Secondly, more information needs to be gathered about the residents’ general health over time, so that accurate determinations of the WMFM’s impact on fruit and vegetable consumption can be made. These two types of data would increase the validity of claims that the WMFM has a measurable impact on the health outcomes of its target audience.

Another area for future research is the opinions of customers about the market itself. We feel that this data is of particular importance because it demonstrates in the opinion of customers themselves where they feel the market is having an impact, and where it can and should be improved. We recommend maintaining the type of perception data presented in the word cloud in Key Findings above across markets to allow for performance trends to be tracked, and to include customers not only as the target of the WMFM intervention, but as true participants as well.
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Building on Strengths

Throughout our observations of the Winter Mobile Farmers’ Market, it was clear to all members of the Field Projects Team how important the WMFM is to its community of customers, both within the target group and among the larger Somerville community. The sense that the WMFM fills a need for access to fresh fruits and vegetables in an area that lacks access to both becomes more pronounced in the winter was clear both among our clients and among market customers. The WMFM has done an admirable job of beginning to close this gap, as evidenced by our findings of areas that are currently working well. Its customers perceive that they are eating more produce because of market. Customers like the current market location in Mystic Housing Development. The WMFM is growing and had more customers in 2014 compared to 2013. Finally, WMFM produce price and quality is better than at most other shopping options, a factor customers identified as a high priority.

As with any intervention there are of course many areas for potential improvements, as outlined in our findings. Publicity and outreach to customers is limited, and can be enhanced. The current market atmosphere and market space have shortcomings as both a shopping and community space. Customer numbers are low when compared to the number of housing units at the Mystic River Development. Funding is dependent on grants, without consistent year-to-year funding. Business and operating practices, especially in regard to market responsibilities, have room for improvement and professionalization. We suggested changes based on our research to alleviate these concerns in our recommendations. Building on the current strengths of the WMFM we believe that there is a high likelihood of continued and expanded success for the market intervention across future seasons.
CLOSING THE WINTER GAP

5/2/2014
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# APPENDIX A: ABBREVIATIONS AND ACRONYMS

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<th>Acronym</th>
<th>Description</th>
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<tr>
<td>GIS</td>
<td>Geographic Information System</td>
</tr>
<tr>
<td>GPS</td>
<td>Global Positioning System</td>
</tr>
<tr>
<td>GWS</td>
<td>Groundwork Somerville</td>
</tr>
<tr>
<td>EBT</td>
<td>Electronic Benefit Transfer</td>
</tr>
<tr>
<td>POS</td>
<td>Point of Sale System</td>
</tr>
<tr>
<td>REC</td>
<td>Regional Environmental Council, Worcester, MA</td>
</tr>
<tr>
<td>SMFM</td>
<td>Summer Mobile Farmers’ Market, Somerville, MA</td>
</tr>
<tr>
<td>SNAP</td>
<td>Supplemental Nutrition Assistance Program</td>
</tr>
<tr>
<td>SUS</td>
<td>Shape Up Somerville</td>
</tr>
<tr>
<td>WMFM</td>
<td>Winter Mobile Farmers’ Market, Somerville, MA</td>
</tr>
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</table>
APPENDIX B: DEFINITIONS

Customer: Person who engaged in purchasing food items at the market. Also called “shoppers” in this report.

Food Items: For the purposes of this report the term “food item” refers to a category of food, not the quantity.

Fruit: For the sake of this report’s analysis, the term fruit is inclusive of more commonly known fruits at the market (oranges, apples, grapefruits, and strawberries). Although the scientific definition of fruits would deem anything with seeds (tomatoes, jalapenos, and avocados) a fruit, these are included in the analysis as vegetables due to perceptions among the general public and observations of the perceptions of market customers.

Northeast Region: For the purposes of this report, the Northeast Region is considered to include Connecticut, Rhode Island, Maine, Massachusetts, New Hampshire, New York, and Vermont.

Poverty Line: Poverty thresholds for census purposes are set by annual income. In 2013, these ranged from $11,173 for individuals, to $23,707 for a family of four, depending on age and household size.

Point of Sale (POS) System: A system in which a computer replaces a cash register. A POS system records transactions, accepts credit and debit card data, and tracks inventory.

Target Population: The target population refers to the low-income food insecure residents of the Mystic Housing Development.

Visitor: For the purposes of this report, a visitor is defined as anyone entering the market. Workers and observers were counted only once throughout a market session. Also called “market goer.”
APPENDIX C: LITERATURE REVIEW

In order to orient our evaluation and methods, we prepared a thorough review of literature in the area of food deserts and farmers’ market evaluations. The information found below is reflected in both the methods used in our evaluation of the WMFM, as well as in our thinking about the Mystic Housing Development as a food desert.

Do Food Deserts Impact Health Outcomes?
The phrase “food desert”—credited to a resident of public housing describing the lack of access to fresh and healthy food in their neighborhood (McEntee and Agyeman 2010)—is widely used by scholars and politicians in discussing the lack of access to healthy foods such as fruit and vegetables, especially among residents of low-income areas. Defined as “areas of relative exclusion where people experience physical and economic barriers to accessing healthy food” (McEntee and Agyeman 2010, 165), many scholars agree that there is a suggested link between food deserts and food choices (McEntee and Agyeman 2010; Oakes et al. 2009. S177; Sharkey 2009; Jennings et al. 2011). But both what research methodology should be employed to accurately study food deserts, and what actual effect they have on diet and weight, remain an open question. This lack of a consistent methodology negatively impacts researchers’ ability to study causal links between food deserts and health outcomes such as lack of fruit and vegetable intake and obesity among both children and adults (Oakes et al. 2009; An 2012; Moore, et al. 2008; Caspi et al. 2012). We will first outline the theories of access upon which much current research around food deserts is built. Next, we will provide an overview of current methodology and findings on associations, or lack thereof, between food deserts and health outcomes. Lastly, we will discuss criticisms of current research methodologies, and suggestions for improvements of future research design.
Theories of Access in Studies of Food Deserts

In research on food deserts, many study designs attempt to evaluate the food environment in relation to the Five Dimensions of Access (Penchansky and Thomas 1981), where access is defined as the degree of "fit" between clients and a given system. In the evaluation of food deserts, clients are residents of a neighborhood or study area, while the system is the food environment in the study area, made up of food outlets. Many types of food outlets make up the food environment. They include: conventional or traditional outlets, such as supermarkets, grocery stores and specialty food stores; convenience stores, such as gas stations and other food marts; nontraditional outlets such as drug stores with food, dollar stores, or large retailers such as Target or Walmart (Sharkey 2009). Though originally designed to measure health care, the Five Dimensions of Access model is widely applied to food availability. As defined for food access by Capri et al. (2012), they are:

- **Availability**: The amount and type of healthy foods, a measure of the adequacy of supply.
- **Accessibility**: The location of food stores as compared to the location of residents. Should take into account the transportation resources, costs, time, distance of customers.
- **Accommodation**: The way that services at food stores are offered to a customer, versus the needs of the customer. This can include hours, types of groceries available, etc.
- **Affordability**: The price of food and its perceived quality versus those costs.
- **Acceptability**: Whether or not the local food environment meets the standards of residents, often assessed through measures of perceived quality (Capri et al. 2012).

It is important to note that despite this model being widely cited, studies have varying amounts of emphasis on the five dimensions. Many studies focus on two major dimensions: the geographical food environment, and the number and variety of types of food available therein (Truong et al. 2010). In a review of approximately 3 dozen studies, one group found that while methods varied widely, most studies measured availability, a third measured accessibility, and far fewer studied affordability, acceptability and/or accommodation (Caspi et al. 2012). This focus can lead to study designs that
measure only potential access or availability of food, which is different than realized access, or actual use (Sharkey 2009), an issue that will be discussed in more depth below. In answer to this difference, three main barriers to realized access have been established (McEntee and Agyeman 2010). They include informational access, defined as “a wide range of factors that relate to the educational, cultural, and social constraints that influence how and why people choose to eat certain foods” (McEntee and Agyeman 2010, 167); economic access, defined as “the examination of not only poverty, but other financial elements that impact one’s ability to acquire food, such as food prices and transportation costs” (McEntee and Agyeman 2010, 168); and geographic access, defined in many different ways (McEntee and Agyeman 2010), an issue of inconsistency described in more depth below. While many studies address multiple aspects of access, few go beyond relatively simplistic measures of access of availability. This limits the utility of current studies, as well as the researchers’ ability to find causal links between food access and health benefits or problems.

Current Research Findings and Methodological Approaches

While many studies acknowledge the difficulty of finding causal linkages in the complex food environment, there is nonetheless a robust literature around food deserts and their link to health. These studies are geographically variant and have a variety of methodologies. A representative sample of the current state of the literature will be reviewed here. The United States Department of Agriculture (USDA), in a report to Congress represents the broadest-based study of food deserts to date. The report focuses on availability and accessibility via distance to the nearest supermarket, trying to determine the extent of food deserts in America. It does not attempt to infer a causal relationship between access to healthy food and health, as the report argues there is not enough evidence to link low access to food with lower intake of healthy foods (USDA 2009). The 1-year study found that the average distance to nearest supermarket changed little from 2006-2010, and that households more than 1 mile from a supermarket are more likely to have a vehicle than in past findings (Ver Ploeg et al.,
Over the same time period, the number of people in low-income areas more than 1 mile from a supermarket increased (Ver Ploeg et al. 2012). Additionally, the USDA found that those who live in urban low-income areas—described as at least 40% of people with incomes under 200% of the federal poverty level in a 1km square area (USDA 2009)—actually live closer to supermarkets than moderate and high income people, while the reverse is true of the rural low income areas (Ver Ploeg et al. 2012). The report also had interesting findings concerning shopping habits among the low income. The USDA found that low income people spend almost 25% more time on average traveling to the grocery store (19.5 min vs 15 min) versus the non-low income, and that 93% of residents in a low-income area more than 1 mile from a grocery store said they traveled to the store in a vehicle driven by themselves or a household member (USDA 2009). This high level of travel by car may be due to the price differential between supermarkets and small stores, as small stores have higher average food costs (USDA 2009).

Indeed, the report found that low-income households shop based on price, when possible, with 86% of 2008 SNAP benefits redeemed at supermarkets or large grocery stores (USDA 2009). The report states that “[d]ata from the 1996/1997 NFSPS show that SNAP participants were, on average, 1.8 miles from the nearest supermarket. However, the average number of miles both SNAP participants and eligible nonparticipants traveled to the store most often used was 4.9 miles” (USDA 2009, 4). This last finding puts a fine point on using distance as the primary measure of accessibility of healthy food, as many residents of food deserts do not access their closest store for a variety of reasons. The USDA acknowledges that as of 2009, there was not enough research to determine which areas with limited access to healthy food in fact have inadequate access (USDA 2009).

None of the other studies reviewed have the scope or breadth of the USDA study, and instead look at the issue of food deserts from a case-study perspective. Several studies attempt to define food access and food deserts in a more individualized manner that moves away from tract-based methods such as
those used in the USDA study, which are deemed to be too broad. Despite the smaller size of their data sets, other studies try to unearth correlations between access to healthy food and several different health outcomes, using a variety of methodologies and analysis techniques. Several studies looked at the potential link between the food environment and obesity among children. Among these studies, there is a lack of agreement about the current state of research. While one study cites the “equivocal” results between access to fast food and weight in adults as a compelling reason to study this linkage in children (Jennings et al. 2011), another decries lack of compelling evidence that either removal of access to fast food and other small food stores, or an increase in the amount of supermarket availability, will decrease obesity generally (An 2012). Despite their differing rationale, each study attempts to find a link between neighborhood food environment and weight status in children and/or adults. One of the most compelling issues with finding a causal linkage between the food environment and obesity is the sheer number of related and unrelated variables that must be accounted for. Each study searching for linkages between environment and obesity attempts to remediate this issue through novel methods and differing controlling variables. Multiple studies compared the availability versus non-availability of fast food options within a neighborhood limit (Jennings et al. 2011; An 2012; Truong et al. 2010). One study compared this data against self-reported food intake and subject body mass index (BMI) (An 2012); while another used a measure that divides the number of healthy (supermarket) versus non-healthy (fast food, small store) food options in a given census tract to assign a Physical Food Environment Indicator (PFEI) score (Truong et al. 2010). Despite methods designed specifically for robustness, findings were mixed. While one study found correlations between fast-food availability and a variety of health outcomes, all had a p-value of between .02 and .05, indicating that the correlation did not meet new Bayesian standards of strength (Jennings et al. 2011). Null findings were demonstrated for the relationship between neighborhood environment on both food intake and body weight in the study that compared BMI to food environment (An 2012). However, the same study also
found no evidence that improved access to supermarkets or reduced exposure to fast food/convenience stores improved diet quality or reduced BMI among the study population (An 2012). The third study found that while at the census tract level, PFEI was predictive of an increased risk of higher BMI (P <.001) and obesity (P <.01), that (with the caveat that PFEI is a weak measure of food environments) the physical food environment had minimal impact on BMI and obesity (Truong et al. 2010).

Regardless of outcome studied, each inquiry focused on where subjects lived, studied and worked as an essential part of understanding relationships with food. As Sharkey (2009) writes, “[it] is generally accepted that personal, structural, and neighborhood characteristics serve as barriers or enhancements to healthful eating” (Sharkey 2009, S151). To define this space, use of ArcGIS to construct a ‘neighborhood’ around each subject’s home was a common method in both obesity and availability studies, confirming the finding that the software’s role in terms of analysis and not simply presentation has greatly expanded in recent years as a precursor to statistical analysis, greatly speeding up analytic areas such as measurements of distance (McEntee and Agyeman 2010). While all studies reviewed used GIS software, the execution of this analysis varied widely. In one study, a neighborhood is defined as an 800m zone where there were walking paths (Jennings et al. 2011), while another proposed a .5-1 mile boundary Moore, et al. 2008). Yet another study included both home and school neighborhoods using actual subject locations, radii from 0.1miles to 1.5 miles from each individual (An 2012). This technique answered an issue with home-only studies raised by many (Sharkey 2009; Caspi et al. 2012). A fourth study created “shopping areas” which tried to overlay actual usage over census tract data (Block et al. 2004). A fifth determined both walking access of 1000m (10-15 minute walk) public transit access of a 10-minute bus ride without transfers, combined with no more than a 500m walk combining both the beginning and end of each trip (Larsen and Gilliland 2008). As Moore (2008) writes,
“[a] major challenge in this work has been developing valid and reliable measures of the local food environment” (Moore, et al. 2008, 206). As is demonstrated by the varying measures of an individual's food environment above, this challenge remains, which makes both replicating studies and comparing across studies difficult, contributing to the difficulty in determining causal linkages between food environment and health outcomes.

**Criticisms of Current State of Research**

As is demonstrated above, current research on food deserts and food environments suffers from a lack of cohesive methodology, both in terms of study design and variables studied. This has led several critics to both point out the flaws with the current state of research in the field, and to offer suggestions for the performance of stronger studies. One critique finds that existing studies that purport that food environments influence food intake and exercise suffer from “methodologic obstacles, including a lack of clear conceptual models, the slow adoption of rigorous research designs, limited use of proper analytic techniques, and ubiquitous measurement error” (Oakes et al. 2009, S177). Another critique found that “though the number of studies on the subject [of food access] is substantial, overall reproducibility was lacking because of the absence of an “industry standard” for measuring local food access” (Caspi et al. 2012, 1181). One reason found for this lack of quality in existing studies was over reliance on intermediate data collection methods such as GIS and datasets, at the expense of primary data approaches. Limitations of these methods versus direct methods, which include in person visits and ‘ground-truthing’, or walking the study area, include a tendency to either undercount or overcount food availability, overestimate distance to nearest stores, misunderstand true neighborhood barriers, and lack rich data about each food store (Sharkey 2009). Additionally, while many studies of food deserts use GIS to study food access via an exposure assessment, what the boundaries of access are is ill defined across the field (Caspi et al. 2012). While the data is more complex, some argue that qualitative case-study approaches should be used more widely, as they provide more nuanced data
and a better understanding than quantitative studies (Oakes et al. 2009). Several reviewers argue for mixed methods studies combining GIS and on the ground and/or perception based assessments, which have demonstrated more nuanced results, and could assist with both interpretation of existing data and the creation of more robust instruments (Moore, et al. 2008; Caspi et al. 2012).

Beyond using a mixed methods approach, critics of existing study design also call for sharper and more nuanced methods (Oakes et al. 2009), as measures that are standardized and validated will be better able to capture “multiple dimensions of food access” (Caspi et al. 2012, 1184). In addition, several critics recommend that less studied measures, such as food quality (acceptability) be developed and refined (Caspi et al. 2012; Sharkey 2009). Another common critique is the need for assessment of not simply the number or type of stores, but what types of foods they carry and how many. It’s too simplistic to say grocery stores are good and convenience stores are bad, as grocery stores also carry large amounts of packaged, processed foods, and the amount of healthy food they carry varies by size (Caspi et al. 2012; Moore, et al. 2008). Finally, there is a call to move beyond the Five Dimensions of Access, and find new definitions, including categories such as proximity, diversity, availability, affordability, perception, which have been proposed in some existing studies but deserve broader inclusion (Caspi et al. 2012, 1186).

**Farmers’ Markets and Winter Farmers’ Markets**

As demonstrated above, it is difficult to evaluate whether living in a food desert has an impact on consumption of fruits and vegetables. Despite the lack of a clear causal connection between food deserts and food consumption, the correlations found in many studies, and resident’s stated desires to have better access to healthier food, have caused a need for action. In answer to the lack of access to healthy foods and vegetables, many towns and organizations have turned to farmers’ markets (PPS 2003), causing an increase in their overall numbers, which have more than doubled over the last
decade (3.6% over 2012 alone) to 8,144 for 2013 (USDA, 2013). Farmers’ Markets are differentiated from other retail activity by having public goals or a defined civic purpose, creating a public space in the community, and consisting of locally owned, independent businesses operated by their owners (PPS 2003).

Farmers’ markets are almost always seasonal because a short growing season limits the provision of fresh produce during the cold months in temperate regions such as New England. One avenue that communities and municipalities have explored to address this constraint is the establishment of winter markets as an opportunity to supply customers with year-round fresh food (Ciulla 2010), as well as to support local farmers who need the extra income. The USDA considers markets that operate at least once between November and March as being winter farmers’ markets, and reports an increase of 52 percent in their numbers, from 1,225 in 2011 to 1,864 in 2012, accounting for about 24% of all markets listed in the USDA’s National Farmers’ Market Registry (USDA 2012). Of the top cold region states in terms of winter market numbers, New York State had 196 winter markets, Massachusetts 56, and Pennsylvania 58, each of which offered a variety of products including fresh fruit, root and other winter vegetables, and greens (USDA 2012). A survey of farmers’ markets reported that markets that expanded their seasons as long as possible were more likely to be successful: markets that operated seven months or more were as profitable as those open twelve months (Ragland and Tropp 2009). In New Hampshire, some winter markets ran until the end of March or middle of April, and were replaced by outdoor summer markets in May, so as to offer fresh food year-round (Ciulla 2010).

Despite large numbers of farmers’ markets and widespread enthusiasm for their use to promote and increase community-wide fruit and vegetable consumption, little is known about their influence on

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1 For instance, in New England, with a USDA Hardiness Zone of 3-6, the growing season ranges from 120 to 180 days, from the end of April to the end of October, and can be extended into November and December, particularly along the coast. However, the short days do not capture enough solar energy for plant growth. (National Gardening Association, n.d)
Appendix: Closing the Winter Gap

One rigorous review of the scientific literature found only 16 pertinent studies carried out in the USA between 1980 and 2009 that qualitatively or quantitatively examined nutrition-related outcomes, including dietary intake; attitudes and beliefs regarding buying, preparing, or eating fruits and vegetables; and behaviors and perceptions related to obtaining produce from a farmers’ market or community garden (McCormack et al. 2010). As with the general population of food environment impact studies, differences in design among the various studies made drawing definite conclusions about farmers’ markets as venues for enhancing uptake of fruits and vegetables difficult. Critics recommended that future studies employ more robust parameters such as the use of control groups, as well as valid, reliable, and widely accepted dietary assessment methods to avoid this issue.

**Methodology for Evaluating Farmers’ Markets**

This increase in Farmers’ markets has been accompanied by several grassroots initiatives to provide tools for farmers’ markets to assess and report their impacts so as to leverage support from policymakers and funders (Brown and Miller 2008). Our survey of the literature showed that farmers’ market evaluation methodology employed variations of customer counts and surveys, vendor and market manager surveys, financial records, market observations, and market comparisons (Bachman 2008; Ragland and Tropp 2006). Much of the literature concerns assessments at the town or regional level and involve multiple markets, and/or specific topics such as government nutritional assistance programs (Racine, Vaughn and Laditka 2010). At the market level, manuals for setting up farmers’ markets emphasize the importance of periodic market self- and peer-evaluations to improve performance as part of best practice, and include some or all of the above mentioned methods to a greater or lesser degree (Brennan 2003; WSUE 2012). The two most used market-level assessment
tools recognize that small markets typically lack the information, resources, and skills to record and plan for their future. We describe them below.

**Sticky Economy Evaluation Device (SEED)**
Developed by the non-profit organization MarketUmbrella and Loyola University, the Sticky Economic Evaluation Device (SEED) model uses vendor sales, consumer spending surveys, and interviews with customers and community members to measure the internal impact, external impact, and anecdotal impact of small public markets (MarketUmbrella 2005). SEED also offers market managers survey templates, including some in Spanish, as well as online accounts to store and analyze their collected data. While there appears to be no peer-reviewed literature on this process, there are a few evaluations available online (MarketUmbrella 2009), but not accessible from the SEED website.

Though SEED assists in collecting data that would help market performance, it appears to be used mainly in a complicated, time consuming process for determining and comparing the economic impact of farmers’ markets on its vendors, host neighborhood, and surrounding region (NMFMA 2012). This makes it a less useful model for assessing the impact of a market on fruit and vegetable consumption.

**Rapid Market Assessment**
First developed in 1998 and revised in 2008 (Lev et al 2008), The Rapid Market Assessment (RMA) has become a popular farmers’ market evaluation tool because of its simple and interactive nature. A RMA consists of three effective, low cost, complementary methods that help gather relevant information quickly: 1) counts of entering visitors; 2) a “dot survey” with a limited number of closed-ended questions on posters that visitors answer by applying stick-on circles; and 3) constructive observations and comments about a market’s characteristics, such as physical site, atmosphere, and vendor mix. RMAs are carried out during one full market day, ideally in a participatory way involving a diverse assessment team of outside market organizers and others, who then submit a report that focuses on the host
market’s strengths and suggests improvements. Many farmers’ markets employing RMAs have experienced high levels of participation (around 90%) and report that though quantitative analytical procedures are limited, important market data can be easily obtained while adding to the atmosphere of the market (Lev Brewer and Stephenson 2007; Brown and Miller 2008). A disadvantage to the RMA approach is that it represents a snapshot of the market on a particular day, and is not a comprehensive market assessment. To be most useful, the data collected should be supplemented with continuous observations and record keeping, as well as by feedback from vendors, visitors, staff, and managers.
APPENDIX D: REFERENCES CITED


Closing the Winter Gap

https://www.census.gov/hhes/www/poverty/data/threshld/


http://agr.wa.gov/Marketing/SmallFarm/docs/FMM1.pdf
APPENDIX E: TEMPLATES

Sets of templates were created to enable the researchers to gather data efficiently and are presented in the following pages. These templates can be used to replicate our study.

- Dot Survey Questions: Set 1
- Dot Survey Questions: Set 2
- Visitor Count Template
- Transaction Template
- Market Produce Comparison Template
<table>
<thead>
<tr>
<th>Question</th>
<th>Answer Options (* = multiple answers allowed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 How often do you come to the market?</td>
<td>Every week / 3x a month / 2X a month / Once a month / First time</td>
</tr>
<tr>
<td>Cuantas veces usted viene al mercado</td>
<td>Cada Semana / Muchas veces al mes / Una vez al mes / Primera vez</td>
</tr>
<tr>
<td>Est-ce que vous venez souvent au marché</td>
<td>Chaque semaine / Plusiér fois par mois / Une fois par mois / Première fois</td>
</tr>
<tr>
<td>2 Why did you come to the market today?</td>
<td>*Location / Prices / Quality / To eat more fruits and vegetables</td>
</tr>
<tr>
<td>Por que usted vino al mercado hoy?</td>
<td>Locacion / Precios / Calidad / Para comer mas frutas y vegetales</td>
</tr>
<tr>
<td>Porquoi est-ce que vous venez au marché aujourd'hui?</td>
<td>Location / Prix / Qualité / Pour manger plus de fruit et legumes</td>
</tr>
<tr>
<td>3 How did you find out about the market?</td>
<td>* Saw signs / Facebook/Twitter / From a friend, neighbor, family member) / Have been before / Other (please explain)</td>
</tr>
<tr>
<td>Como se entero usted del Mercado?</td>
<td>Miro los rotulos / Facebook-Twitter / De un amigo, besino, o familia / Ha estado aqui antes / Otras (por favor explica)</td>
</tr>
<tr>
<td>Comment est-ce vous avez entendu du marché?</td>
<td>J’ai vu des signs / D’un ami, voisin, member de famille / venu avant / Autre Façon (expliquez s’il vous plait)</td>
</tr>
<tr>
<td>4 How do items at the market compare in price and quality to fruits and vegetables at Market Basket or other grocery stores?</td>
<td>*More expensive / Less expensive / Same Price / Lower quality / Better quality / Equal quality</td>
</tr>
<tr>
<td>Como los productos se comparar en precio y calidad en frutas y verduras al Market Basket y otras tiendas?</td>
<td>Muy caro / Barato / El mismo precio</td>
</tr>
<tr>
<td>Comparer la nourriture ici (en prix et qualité) aux fruits et legumes au autres supér-marchés comme Market Basket?</td>
<td>Baja calidad / mejor calidad / la misma calidad / Plus chère / Moin chère / Même prix / Plus mauvais qualité / Meilleure qualité / Même qualité</td>
</tr>
<tr>
<td>5 How do items at the market compare in price and quality to fruits and vegetables at Haymarket or other outdoor markets?</td>
<td>*More expensive / Less expensive / Same Price / Lower quality / Better quality / Equal quality</td>
</tr>
<tr>
<td>Como lo productos se comparar en precio y calidad en frutas y verduras al Haymarket o otros mercados?</td>
<td>Muy caro / Barato / El mismo precio</td>
</tr>
<tr>
<td>Comparer la nourriture ici (en prix et qualité) aux fruits et legumes au autres marchés comme Haymarket?</td>
<td>Baja calidad / mejor calidad / la misma calidad / Plus chère / Moin chère / Même prix / Plus mauvais qualité / Meilleure qualité / Même qualité</td>
</tr>
<tr>
<td></td>
<td>Do you think you are eating more fruits and vegetables because of this market?</td>
</tr>
<tr>
<td>---</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td><strong>Usted piensa que está comiendo más frutas y verduras por (debido?) a este Mercado?</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Est-ce que vous pensé que vouz manger plus de fruits et legumes a cause de ce marché?</strong></td>
</tr>
<tr>
<td>6</td>
<td><strong>How often do you shop somewhere other than this market for fruit and vegetables?</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Cuantas veces usted compra en otro lado que no sea este Mercado para frutas y vegetales?</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Est-ce que vous acheter des fruits et des legumes souvent dans des autre marches?</strong></td>
</tr>
</tbody>
</table>
## Dot Survey Questions: Set 2

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer Options (* = multiple answers allowed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1  How often do you come to this market?</td>
<td>Every week / Many times a month / Once a month / First time Cada Semana / Muchas veces al mes / Una vez al mes / Primera vez Chaque semaine / Plusier fois par mois / Une fois par mois / Première fois</td>
</tr>
<tr>
<td>¿Cuántas veces usted viene a este Mercado?</td>
<td></td>
</tr>
<tr>
<td>Venez-vous souvent a ce marché?</td>
<td></td>
</tr>
<tr>
<td>2  Do you think you are eating more fruits and vegetables because of this market?</td>
<td>Yes / No / I don’t know</td>
</tr>
<tr>
<td>Usted piensa que esta comiendo mas frutas y verduras debido a este Mercado?</td>
<td>Sí / No / No lo sé</td>
</tr>
<tr>
<td>Est-ce que vous pensé que vouz manger plus de fruits et legumes a cause de ce marché?</td>
<td>Oui / Non / Je ne sais pas</td>
</tr>
<tr>
<td>3  Do you buy fruit &amp; vegetables at other stores or markets?</td>
<td>No / Yes, a little / yes, a lot</td>
</tr>
<tr>
<td>¿Usted compra frutas y verduras en otros mercados o tiendas?</td>
<td>No / Sí, algunas / Sí, muchas</td>
</tr>
<tr>
<td>Achetez-vous des fruits et des légumes dans des autres super-marchés ou des marchés?</td>
<td>Non / Oui, un peu / Oui, beaucoup</td>
</tr>
<tr>
<td>4  How do you go to other markets?</td>
<td><em>(Put a dot on every answer that is true for you)</em></td>
</tr>
<tr>
<td>¿Cómo se llega usted a otros mercados?</td>
<td>Walk / Car / Taxi / T (Bus, Train)</td>
</tr>
<tr>
<td>Comment allez-vous à d’autres marchés?</td>
<td>Caminar / Coche / Taxi / T (Bus, Metro)</td>
</tr>
<tr>
<td><em>(Mettez un point sur chaque réponse qui est vraies pour vous )</em></td>
<td>Marche / Auto / Taxi / T (Bus, Metro)</td>
</tr>
<tr>
<td>5  Why do you come to this market?</td>
<td><em>(Put a dot on every answer that is true for you)</em></td>
</tr>
<tr>
<td>¿Por qué usted vinó a este mercado?</td>
<td>Convenience / Prices / Quality / To eat more fruits and vegetables Conveniencia / Precios / Calidad / Para comer mas frutas y vegetales</td>
</tr>
<tr>
<td>Porqué venez-vous a ce marché?</td>
<td><em>(Mettez un point sur chaque réponse qui est vraies pour vous )</em></td>
</tr>
<tr>
<td><em>(Commodité / Prix / Qualité / Pour manger plus de fruit et legumes</em></td>
<td></td>
</tr>
<tr>
<td></td>
<td>How did you first find out about the market?</td>
</tr>
<tr>
<td>---</td>
<td>---------------------------------------------</td>
</tr>
<tr>
<td>6</td>
<td><em>How did you first find out about the market?</em></td>
</tr>
<tr>
<td></td>
<td>Como se entero usted del Mercado?</td>
</tr>
<tr>
<td></td>
<td>Comment est-ce vous avez entendu du marché?</td>
</tr>
<tr>
<td></td>
<td><em>(Put a dot on every answer that is true for you)</em></td>
</tr>
<tr>
<td></td>
<td>Saw signs / Flyer / Internet (Email, Facebook, Twitter) / From a friend, neighbor, family member / Other (please explain)</td>
</tr>
<tr>
<td></td>
<td>(Mire los rotulos / Folleto / Internet (Email, Facebook, Twitter) / De un amigo, besino, o familia / Otras (por favor explica)</td>
</tr>
<tr>
<td></td>
<td>J’ai vu des signs / Dépliant / Internet (Email, Facebook, Twitter) / D’un ami, voisin, member de famille / Autre Facon (expliquez s’il vous plait)</td>
</tr>
<tr>
<td>7</td>
<td>Price: Fruits and vegetables at Market Basket or Haymarket are:</td>
</tr>
<tr>
<td></td>
<td>Precios: Las frutas y verduras en Market Basket o Haymarket son:</td>
</tr>
<tr>
<td></td>
<td>Prix: Les fruits et legumes a Market Basket ou Haymarket sont:</td>
</tr>
<tr>
<td></td>
<td><em>More expensive / Less expensive / Same Price</em></td>
</tr>
<tr>
<td></td>
<td>Más caros / Más baratos / Los mismos precios</td>
</tr>
<tr>
<td></td>
<td>Plus chers / Moin chers / au même prix</td>
</tr>
<tr>
<td>8</td>
<td>Quality: Fruits and vegetables at Market Basket or Haymarket are:</td>
</tr>
<tr>
<td></td>
<td>Calidad: Las frutas y verduras en Market Basket o Haymarket son de:</td>
</tr>
<tr>
<td></td>
<td>Qualité: Les fruits et legumes a Market Basket ou Haymarket sont:</td>
</tr>
<tr>
<td></td>
<td><em>Lower quality / Better quality / Equal quality</em></td>
</tr>
<tr>
<td></td>
<td>Baja calidad / mejor calidad / la misma calidad</td>
</tr>
<tr>
<td></td>
<td>Plus mauvais qualité / Meilleure qualité / La même qualité</td>
</tr>
</tbody>
</table>
### Visitor Counting Template

<table>
<thead>
<tr>
<th>Market Period</th>
<th>Hourly Tally</th>
<th>Family count</th>
<th>Family Size</th>
<th>Time In</th>
<th>Time Out</th>
<th>R</th>
<th>P</th>
<th>Notes (Females, Males, Adult, Children, Ethnicity, other notes)</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>

**Date:**

R = Returning visitor this market

P = returning visitor previous markets
## Transactional Observations Template

<table>
<thead>
<tr>
<th>Trans #</th>
<th>Item</th>
<th>Quantity</th>
<th>Resident</th>
<th>Coupons</th>
<th>Price</th>
<th>EBT/Card</th>
<th>Single/Family</th>
<th>Time In</th>
<th>Time Out</th>
<th>New/Returning</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
</tbody>
</table>
### Comparison of WMFM & Other Market Template

<table>
<thead>
<tr>
<th>WMM</th>
<th>Other Market Name</th>
<th>Organic</th>
<th>Conventional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item</td>
<td>Price ($)</td>
<td>Size</td>
<td>Price ($)</td>
</tr>
<tr>
<td>Apples</td>
<td>1.50</td>
<td>lb</td>
<td></td>
</tr>
<tr>
<td>Avocado</td>
<td>1.00</td>
<td>each</td>
<td></td>
</tr>
<tr>
<td>Basil</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beets</td>
<td>1.25</td>
<td>lb</td>
<td></td>
</tr>
<tr>
<td>Bok Choi</td>
<td>2.00</td>
<td>each</td>
<td></td>
</tr>
<tr>
<td>Cabbage</td>
<td>1.00</td>
<td>each</td>
<td></td>
</tr>
<tr>
<td>Carrots</td>
<td>1.25</td>
<td>lb</td>
<td></td>
</tr>
<tr>
<td>Chard</td>
<td>2.00</td>
<td>each</td>
<td></td>
</tr>
<tr>
<td>Cilantro</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corn</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dill</td>
<td>2.00</td>
<td>each</td>
<td></td>
</tr>
<tr>
<td>Dinosaur Kale</td>
<td>1.75</td>
<td>each</td>
<td></td>
</tr>
<tr>
<td>Grapefruit - white</td>
<td>0.75</td>
<td>each</td>
<td></td>
</tr>
<tr>
<td>Grapefruit - red</td>
<td>0.75</td>
<td>each</td>
<td></td>
</tr>
<tr>
<td>Jalapenos</td>
<td>3.00</td>
<td>lb</td>
<td></td>
</tr>
<tr>
<td>Kale</td>
<td>1.75</td>
<td>each</td>
<td></td>
</tr>
<tr>
<td>Mushrooms</td>
<td>3.00</td>
<td>pack</td>
<td></td>
</tr>
<tr>
<td>Mustard Greens</td>
<td>1.75</td>
<td>Each</td>
<td></td>
</tr>
<tr>
<td>Onions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Onions/scallions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oranges</td>
<td>1.00</td>
<td>For 2</td>
<td></td>
</tr>
</tbody>
</table>
Appendix: Closing the Winter Gap

APPENDIX F: DETAILED METHODS

Building on the literature review presented in Appendix C, the methods used in our evaluation of the WMFM are detailed below. This section builds on the brief introduction of our methods used in the main body of our report, and can be used by other researchers to replicate our study.

Evaluation Style

Our evaluation of the Somerville Winter Mobile Farmers’ Market (WMFM) was constructed using the Five Tiers of Evaluation Model (Jacobs & Kapuscik 2000). In this evaluation model, a program is evaluated using on one of five tiers, assigned based on the program’s stage of development. The model allows for greater variance among programs, as well as reasons why an evaluation might be conducted. It also assumes that program evolution, and the monitoring of this via evaluation, will be ongoing. Our evaluation is structured using the Tier Two/Three model, which going beyond Tier One activities for newly beginning programs. Activities at these tiers are designed specifically to monitor program performance, assess the consistency of the program in relation to its stated goals, aid in program planning and decision making, and provide a groundwork for later evaluation activities. This level of evaluation offers an assessment of the activities of the WMFM, and review of how well goals are being met, using data gathered via observation, staff and client interviews, and comparison of actual performance to desired performance. Tier two activities in this evaluation include the creation of templates and the collection of data such as transactions, visitors, etc. These are specifically useful for programs such as the WMFM that would like to document what their program is currently accomplishing, and improving the ability to measure and document activities moving forward. Tier three activities, which included ethnographic observations, dot surveys and stakeholder interviews, help to determine whether a program is meeting its stated goals, and often lead to program realignment.
Methodological Frameworks

In performing our evaluation, we employed the Rapid Market Assessment (RMA) methodology (Lev et al., 2008) as our main data collection framework, adapting and expanding it to the particular setting of the WMFM. As discussed in the Literature Review (see Appendix C), the RMA is a simple, interactive, and affordable tool built for time- and resource-stressed managers of multi-vendor summer farmers’ markets to quickly gather limited, but nonetheless essential, information on market attendance and user experience during a single day. For the purpose of evaluating the Somerville WMFM more fully, we carried out multiple such “one day” assessments. RMA methods include both quantitative (market visitor counts and simple surveys), and qualitative (appraisals of market site, products, and atmosphere) components.

To further strengthen the validity and usefulness of our evaluation, we looked to the Five Dimensions of Access (FDA) model to assist in our selection of other relevant techniques to bolster the RMA methods discussed above. As described in the Literature Review (Appendix C), the Five Dimensions of Access model defines access as the degree of “fit” between a particular population and a given system. Originally pertaining to healthcare (Penchansky and Thomas 1981), it is increasingly applied to food environments (Caspi et al 2012), where ‘access dimensions’ include availability (adequate supply of food), accessibility (location of food sources), affordability (food cost), accommodation (food related services to meet needs), and acceptability (perception of the food environment). To capture each of these access dimensions for assessment, we used structured data collection templates to gather information such as produce and price data from various local markets and WMFM transaction data. We additionally gathered GPS/GIS data of the WMFM vicinity, ethnographic observations at the WMFM, performed brief on- and off-site surveys, and conducted in-depth interviews with key stakeholders. The FDA model served particularly as a base for implementing the “dot” survey and on-site interviews as it also conceptualizes human behavior in terms of social and physical contexts, and
evaluates a subject’s satisfaction with the varying ‘access dimensions’. Our survey and interview questions sought to discover if market visitors were satisfied with their experience, if a lack of satisfaction was influencing the general underutilization of the WMFM, and how visitor satisfaction could be increased.

**General Outline of Data Collection**
The evaluation was carried out in two phases, a primary phase at the WMFM and a secondary phase at various locations external to the WMFM.

**Primary Phase at the WMFM**
Data was gathered at each session of the WMFM, which was held from 1:00pm-4:00pm on consecutive Saturdays from January 11, 2014 to March 1, 2014. Data was gathered by at least two researchers per market for six sessions, and by one researcher for two sessions, a change necessitated by client response to shopper feedback.

**Secondary Phase: Outside the WMFM**
Information gained from the WMFM was supplemented by data gathered around the WMFM and at a variety of additional locations such as grocery stores and other winter markets, as well as interviews with a variety of sources.

The data required for evaluation and the corresponding method of collection is tabulated by type in Table F1. Detailed information on why the techniques used to collect and analyze the data gathered were chosen, and how they were employed at the WMFM are described in the following sections.
Table F1: List of Data Needed and Method of Collection

<table>
<thead>
<tr>
<th>Data to be Collected</th>
<th>Method of Collection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of total visitors to market</td>
<td>Market Attendance/visitor counts</td>
</tr>
<tr>
<td>Number of customers, purchases, purchase details</td>
<td>Market Transactions</td>
</tr>
<tr>
<td>Visitor and worker behavior at market</td>
<td>Ethnographic Observations</td>
</tr>
<tr>
<td>Visitor or customer perceptions</td>
<td>Dot and other surveys</td>
</tr>
<tr>
<td>Prices and availability of produce at WMFM</td>
<td>Market Produce</td>
</tr>
<tr>
<td>Market atmosphere and flow</td>
<td>Market Layout</td>
</tr>
<tr>
<td>Locations of food sources around WMFM</td>
<td>GPS/GIS mapping around WMFM location</td>
</tr>
<tr>
<td>Prices and availability of produce at other markets and stores</td>
<td>Comparison of produce and prices</td>
</tr>
<tr>
<td>Information on other farmers’ markets</td>
<td>Interviews with market managers, visits to local winter farmers’ markets</td>
</tr>
<tr>
<td>Information on WMFM background</td>
<td>Interviews with WMFM personnel</td>
</tr>
</tbody>
</table>

**Detailed Outline of Data Collection**

**Market Attendance**

Recording attendance at a market (or “door counts”) is important for estimating potential sales, the produce volumes necessary for optimal market operation, as well as the reach of the market within a community. RMA recommends counting market visitors during specified ten-minute periods and multiplying the result to estimate an hourly attendance rate. However, because the WMFM is small enough in size and scope that visitors could be counted throughout the market day, resulting in much greater accuracy, we chose to keep full detailed counts throughout each three-hour market period. For the same logistical reason, though RMA discounts return visitors and children, we included both in our total attendance counts, as their purchases contributed to the total purchases made on a market day. Workers and volunteers at the market were included in shopper counts when they “visited” to make a purchase.
The threshold of the WMFM front entrance and the readily visible back entry between two counters were used as demarcation lines separating people who entered the WMFM from those who had not. A researcher stationed next to the front door used a mobile phone (regarded as less obtrusive than a click counter) equipped with a counter application to keep a tally of visitors and same day returnees. The structured template used (see ED) captured key information such as individual visitor counts, visitor group counts, visitor group sizes, time of entry, time of exit, relative ages, gender, same day returns, previous attendees, and relevant observations. These elements were analyzed weekly and as a whole using Excel data analysis and graphing to visualize trends.

**Market Transactions**
Information gathered at checkout is useful not only to record sales, but also to determine customer preferences, uptake of produce, and produce volume required for future markets. Again, because of the small scale of the WMFM, full and detailed information could be gathered throughout each market day, resulting in a more accurate picture of customer purchases.

The WMFM had a single purchase checkout point marshaled by one cashier. A researcher stationed next to the cashier used a structured data collection template (See Appendix E) to capture each customer transaction and time it occurred, total value of the transaction, payment method, produce items bought per transaction, customer type (resident of the Mystic Development Complex or not, same day returnee, previous visitor), and relevant observations. These elements were then analyzed weekly, midmarket, and as a whole using data analysis methods such as percentages, t-tests, and ANOVA tests. T-tests and ANOVAs allowed the determination of statistical differences between weekly data to better analyze perceived trends.
**Ethnographic Observations**

Ethnographic observations are useful to encapsulate visitor and customer behaviors and cashier-customer interactions, observable patterns of behavior, and the general functioning and atmosphere of a market.

A researcher stationed behind a market counter with a full view of the WMFM documented activities at the market for two market sessions. Thereafter, the observers gathering attendance counts and transaction data each collected partial ethnographic information, such as key interactions and activities as part of the “relevant observations” section of their respective template. This data was analyzed for patterns, to find shopper preferences and concerns, and to backstop observations made by the research team.

**Dot and Other Surveys**

Qualitative data collection was necessary in order to determine visitor perceptions of the WMFM. The survey especially focused on shoppers’ opinions of the Mystic River Development location as it related to the Five Dimensions of Access model, as well as of the local food environment. As discussed in the Literature Review (see Appendix C), conventional interview and questionnaire practices have low rates of response, especially at farmers’ markets. The RMA has enjoyed success with a simple “instant survey” technique that employs a limited number of close-ended questions on posters that participants answer by applying adhesive circles or “dots” (Lev et al, 2008). Because the questions usually posed by RMA, such as “how much did you spend at the market today?” could be more effectively answered through other methods, we devised more relevant questions with the clients based on their needs. A complete listing of all the questions provided to participants is listed in Appendix E.

Dot surveys were conducted at the WMFM on two separate market days, 2/15/14, 2/22/14, where visitors were asked to mark their answer(s) to approximately eight questions related to the market, each
also translated into French and Spanish (the two main languages spoken in the Mystic Development Complex), on 30”x16” posters affixed with tape to a wall visible on entry through the main market access. Participants who had completed a transaction and were 18 years or older were asked to mark one answer out of a total of sixteen choices for some questions, and mark as many answers as necessary for questions that contained multiple choices. To abide by IRB regulations, those under 18 were given dots of a specific color and not counted or analyzed during research. Based on the responses to the first dot survey, the researchers rephrased some questions slightly for better comprehension or content for the second dot survey. Special coupons offering partial matches ($2) for money spent on future purchases were offered as incentives to participate. On the final market day, 3/1/14, three posters were hung asking visitors to list what they liked and disliked about the WMFM, and how it could be improved in an open-ended question format.

To help implement the dot surveys at the WMFM, members of the Green Team, teenage affiliates of Groundwork Somerville who assist with running the market weekly, provided translation services to those shoppers who did not speak English, or had difficulty reading. Survey results were analyzed using Excel data analysis methods, and visualized using a word cloud to assist in pattern recognition and scaffolding of results.

**Market Produce**

In order to assess the affordability and availability aspects of the WMFM compared to other sources of produce in the area, information about the produce at the market was collected at every market session.

A structured data template (See Appendix E) was used by the researchers to keep an inventory of the assortment and prices (including any changes) of produce, as well a initial and remainder amounts. In addition, the quality of produce, when it ran out (whenever possible), and visitor requests for specific
items were noted. Photographs of produce were also taken at most market sessions. The results were tabulated and crosschecked with transaction data.

**Market Layout**

To determine an optimal configuration that avoided potential bottlenecks for the WMFM, the flow of the market in the provided space was examined.

The floor of the WMFM was covered in 1’x1’ vinyl tiles, making it relatively easy to measure the dimensions of the whole space by counting squares. In addition, obstacles such as columns and furniture such as tables and chairs, as well as their placement, were assessed using a tape measure. The measurements were transferred to Visio software for design and visualization purposes.

**Comparisons of Produce and Prices**

In order to assess the affordability, availability, and accommodation aspects of the WMFM, information about the produce at local grocery stores that WMFM customers might visit, and at area farmers’ markets, was collected at least on one occasion, if not on two.

A structured data template (Appendix E) was used by the researchers to record the assortment and prices of produce at Market Basket and Stop and Shop in Somerville, and Haymarket in Boston, as well as at winter farmers’ markets at the Armory in Somerville, Hyatt Place in Medford, and Dorchester in Boston. In addition, the quality of produce, and any relevant customer services were noted. For farmers’ markets, the general atmosphere was also noted. The results were tabulated for analysis with Excel software.

**GPS GIS Mapping Around WMFM**

Global Positioning System (GPS) Geographic Information System GIS mapping was used to more accurately portray the food resources found in the area around the WMFM. GIS is a computer program that allows for the creation and manipulation of maps. Using GPS to pinpoint certain areas on the
ground, the researchers’ are able to then upload the information to created GIS maps allowing for real-time accurate information. GPS GIS mapping of individual food resource locations as well as of transportation options was carried out within a half-mile of the apartment complex. By mapping individual food resource locations and public transportation possibilities, our team can better analyze all the food options available to the residents of the apartment complex. To enhance the transportation options of the residents in the Mystic Housing Development, data from the 2011 Massachusetts Vehicle Census was be included in analysis. This dataset determined the relative amount and age of cars within the apartment complex, allowing the researchers to gain better insight into the full extent of transportation options.

**Interviews with Other Market Managers**
To explore the options available to the WMFM, extensive Internet searches were conducted to find other mobile farmers’ markets in the Northeast that concentrate on serving low-income inner city populations. Two relevant markets were found. Phone interviews were used to gather information on market scope, operations, and funding from Casey Burns of the Regional Environmental Council, manager of a mobile market in Worcester, Massachusetts, and from Diane Turner, who runs a year round mobile market in Syracuse, New York. The results were tabulated and analyzed as case studies. (See Report, Chapter 4).

**Interviews with WMFM Personnel**
In order to make a rounded assessment of the WMFM, interviews with several people associated with the WMFM were carried out, either in person, or by telephone. These included: WMFM market Manager Kawsar Jahan, with Rachael Plitch, Coordinator and David Hudson, Director, Shape Up Somerville; and Chris Mancini, Executive Director Groundwork Somerville.
APPENDIX G: DETAILED RESULTS

This section details the results of our data collection at the market. Due to the small sample sizes presented by the market, these results are applicable only to the market studied, and cannot be generalized. However, the methods described above in Appendix F may be of use to other researchers studying either the WMFM or other similar farmers’ markets. To help in analyzing the information below a 95% confidence interval will be used with an alpha level of 0.05, which means that the information presented can be found to be statistically significant if it does not represent 95% of the sample.

Customer Perceptions – Survey Analysis

The dot surveys were received enthusiastically by WMFM visitors with participation of eligible customers (those over 18 years of age) around 75% (Table G1.) Participation in the open-ended survey was not as high (around 54%), reflecting perhaps an unwillingness to criticize the WMFM.

Table G1: Participation in Surveys. Eligible visitors are those over 18 years of age.

<table>
<thead>
<tr>
<th></th>
<th>Dot Survey 1</th>
<th>Dot Survey 2</th>
<th>Open-Ended Survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eligible visitors</td>
<td>26</td>
<td>27</td>
<td>39</td>
</tr>
<tr>
<td>Participants</td>
<td>20</td>
<td>20</td>
<td>21</td>
</tr>
<tr>
<td>Average Participation</td>
<td>77%</td>
<td>74%</td>
<td>54%</td>
</tr>
</tbody>
</table>

By the session 6 and 7, most respondents (over 73%) perceived themselves as frequent or regular visitors, as shown by their responses to the questions “How often do you come to this market?” (Figure G1). Almost 50% purported to attend every session, while over a third came once to many times a month. Just a few were new to the market at those final sessions.

Among the reasons given by respondents to the questions “Why do you come to this market?” produce “quality” stood out slightly from other reasons overall Interestingly, the choice “convenience” offered at session 7 elicited a stronger response than “location” offered at session 6, perhaps reflecting an ambiguity in the latter word (Figure G2.)
Fi

gure G1: Frequency of Attendance at WMFM. Average response to dot survey question “How often do you come to this market?” An average of 22 total responses from eligible customers (those over 18 years of age), were elicited from sessions 6 and 7.

Figure G2: Reason for Attendance. Response to dot survey question “Why do you come to this market?” A total of 45 and 39 responses from eligible customers (those over 18 years of age) were elicited at sessions 6 and 7 respectively.

In answer to the question “How did you find out about this market?” most respondents at session 6 chose “friends, neighbors, family,” that is, word of mouth (Table G2.) There appeared to be some
confusion over the word “signs,” so that at session 7, both “signs” meaning outdoor signage, & “flyers”, denoting handouts, were offered as choices. At the latter session, word of mouth, signs and flyers were seen as almost equally important means of market publicity. Online communication was the least important at both sessions, confirming the observations of other market managers (Obadia and Parker 2012).

**Table G2: How Visitors Find Out About WMFM.** *Response to dot survey question “How did you learn about this market?” A total of 24 and 27 eligible customers (those over 18 years of age) responded at sessions 6 and 7 respectively.*

<table>
<thead>
<tr>
<th>Publicity Method</th>
<th>Session 6</th>
<th>Session 7</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saw signs</td>
<td>21%</td>
<td>26%</td>
<td></td>
</tr>
<tr>
<td>Online (email, Facebook)</td>
<td>0%</td>
<td>7%</td>
<td>Email</td>
</tr>
<tr>
<td>Friend, neighbor, family</td>
<td>38%</td>
<td>26%</td>
<td></td>
</tr>
<tr>
<td>Been before</td>
<td>28%</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>Flyer</td>
<td>NA</td>
<td>26%</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>13%</td>
<td>15%</td>
<td>School, Head Start</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

Most importantly to the goals of the WMFM, an average of 80% of respondents over both sessions thought that they were eating more fruit and vegetables because of the WMFM (Table G3.)

**Table G3: Customer Perceptions of Produce Consumption.** *Response to dot survey question “Do you think you are eating more Fruit & Vegetables because of this market?” A total of 20 eligible customers (those over 18 years of age) per session responded.*

<table>
<thead>
<tr>
<th>Response</th>
<th>Session 6</th>
<th>Session 7</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>85%</td>
<td>75%</td>
<td>80%</td>
</tr>
<tr>
<td>No</td>
<td>15%</td>
<td>25%</td>
<td>20%</td>
</tr>
<tr>
<td>I don’t know</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

To clarify this further, respondents were asked “Do you buy fruits and vegetables at other markets or stores” to which 21% reported buying produce only at the WMFM, 16% shopped at other markets once every few weeks, almost 50% shopped at least once a week, and 16% many times a week (Figure G3.)
Figure G3: Shopping for Fruit & Vegetables Elsewhere. Response to dot survey question “Do you buy fruits and vegetables at other markets or stores?” A total of 21 eligible customers (those over 18 years of age) at session 6 responded.

However, when asked how much fruits and vegetables respondents usually purchase elsewhere, only 10% maintained they did not buy produce at other stores, whereas almost equal numbers of respondents reported purchasing just a little produce (47%) or a lot of produce (43%) elsewhere (Table G4.) Thus the WMFM appears to be the sole source of fresh produce for at least 10% of the respondents, and a supplementary source to a greater or lesser extent for 50% or more visitors.

Table G4: How Much Produce is Purchased at Other Markets. Response to dot survey question “How much fruit and vegetables do you buy at other markets?” A total of 19 eligible customers (those over 18 years of age) responded at session 7.

<table>
<thead>
<tr>
<th>Quantity of Produce</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>10%</td>
</tr>
<tr>
<td>Yes, a little Fruit &amp; Vegetables</td>
<td>47%</td>
</tr>
<tr>
<td>Yes, a lot of Fruit &amp; Vegetables</td>
<td>43%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>
The researchers believe that respondents reported overly positively about their consumption of produce from the WMFM because many fear that a more negative response would affect the continuance of the WMFM adversely. This assumption is based on conversations with Shape Up Somerville staff, who described fear among shoppers that the market would change locations again, as it had done in the past. It should be noted that the survey did not differentiate between residents, non-residents, or SNAP/EBT/coupon users, so that the frequency and volume of shopping could not be correlated to residential/low-income status. This would be a good area to explore in future studies.

To look at the access of visitors to food sources, respondents were asked how they travel to other stores. In contrast to information known to SUS (interview, March 6, 2014), few reported using public transportation (9%) or Taxi (5%), whereas walking (41%) and private car (45%) appeared to be the favored modes (Figure G4.) These results are similar to a recent survey on food-focused modes of transportation in low-income communities in Boston (Practical Visionaries Workshop 2014). Walking to shop is understandable, given the long waiting times required between buses, or the multiple connections required to shop at some markets that we found through ethnographic observations and GPS data. The relatively high car use was unexpected, but echoes an extensive study, which found that low-income populations often use private transport to shop (Ploeg et al. 2009). Thus it appears that around 50% of respondents can and do shop readily elsewhere for produce.

That respondents shop at the WMFM despite being able to access other stores may result from their perceptions of the lower prices and higher quality of produce at the WMFM, which customers stated that they appreciated. Asked to compare prices with other markets, the majority of respondents found the WMFM to be more affordable than at Market Basket a (66%) and Haymarket (53%), while around 20% found it similar to other markets. Only 12% found the WMFM more expensive than Market Basket, but 29% though Haymarket was cheaper (Figure G5.)
Appendix: Closing the Winter Gap

Figure G4: Transportation to Other Markets. Response to dot survey question “How do you go to other markets?” A total of 19 eligible customers (those over 18 years of age) responded at session 7. Similarly, over 60% of respondents found the WMFM produce to be of higher quality than that at both Market Basket and Haymarket, while around 25% found it comparable to other markets. Fewer than 15% found the WMFM to have lower quality produce (Figure G6).

As the word cloud (Figure G7) also demonstrates, both quality and price were given as the second highest response to the question “What do you like about this market?” representing 9 or 18% each of 51 responses by a total of 20 respondents.
Figure G5: Customer Perceptions of WMFM Produce Prices. Average response to dot survey question “How do fruit and vegetables prices here compare to other markets?” A total of 15 and 18 eligible customers (those over 18 years of age) responded at sessions 6 and 7 respectively.

Figure G6: Customer Perceptions of WMFM Produce Quality. Average Response to dot survey question “How do fruit and vegetables quality here compare to other markets?” A total of 16 and 20 eligible customers (those over 18 years of age) responded at sessions 6 and 7 respectively.
Figure G7: Word Clouds of Customer Perceptions. In an attempt to display the Open-Ended Survey Results in an interesting way word clouds were created from responses to an open-ended survey of a total of 20 eligible market goers (those over 18 years of age). The larger and the darker color indicate that more people emphasized these answers. The green chart colored cloud represents what people like about the market and the red cloud represents what people did not like or would change about the market. The lowest response was 1 (City Supported, Cold) and the highest was 10 (Location) for likes and 4 (Hard to Find) for did not likes.

Market Attendance Analysis

The Mystic Housing Development includes both the Mystic River Development, a 240 unit state family housing development, and the Mystic View, a 215 unit federal family housing development.\(^2\) 62% of families at the Mystic Housing Development earn less than $20,000 per year according to 2012 data, far below the median income of about $55,000 for the overall census tract based on 2010 census data. 78% of residents are non-white. This is in contrast to the overall population of Somerville, reported as approximately 74% white in the 2010 census. It is also higher than the overall area census tract, reported as 58.03% white. Demographically speaking, 38% of Mystic Housing Development residents are Black, 29% are Hispanic, 22% are White, 9% are Asian, and 2% are another ethnicity.

The Somerville Winter Mobile Market was attended by a total of 381 individuals during January 11 – March 1, 2014, with an average of 39 individuals attending per market session (Table G5.) Visitors

\(^2\) Somerville Housing Authority: http://www.sha-web.org/findhousing/tour/mystic_river.html
arrived in groups of approximately 1.45 visitors per market session, indicating that visitors arrived mostly as individuals.

Table G5: Market Attendance by Market Session. All non-workers who entered the WMFM were counted at each session. Workers, volunteers, and observers were counted only if they shopped at the market, so as to correspond to transaction data.

<table>
<thead>
<tr>
<th>Market Session</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>Total</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visitor counts</td>
<td>34</td>
<td>36</td>
<td>31</td>
<td>39</td>
<td>49</td>
<td>32</td>
<td>37</td>
<td>60</td>
<td>318</td>
<td>39</td>
</tr>
</tbody>
</table>

Attendance at the market appears to slightly increase over the duration of the market, which may indicate that the market requires a period of time to “settle” before more people visit it. The researchers theorize that low produce quality, lack of produce variety, and weather may have impacted attendance throughout the market especially after week 5 when produce quality diminished in the observation of the researchers, market employees, and market visitors. It should also be noted that during weeks 7 and 8 two-dollar coupons were redeemable and therefore may have impacted the attendance seen at the market. As the research team offered the coupons for participation in surveys, the direct correlation between the coupons and attendance cannot be validated; however, the concept should be taken into account when analyzing the attendance and transactional data.

Visitor Analysis
The gender of each visitor was recorded as they entered the WMFM. As hypothesized at the beginning of the market, the researchers found that of the majority of people who attended the market, almost 90%, were women (Table G6.) This tracks with the societal expectation that women perform most shopping tasks, and may also be indicative of the large number of female-led households at the Mystic River Development. This information and the visitor information and analysis below are crucial pieces in marking a retail establishment and can be used to help in marketing the WMFM.
Table G6: Visitor Count by Gender of Adults. *Due to data collection based on observations, all persons who appear to be of a gender are considered that gender for the purposes of this research.*

<table>
<thead>
<tr>
<th></th>
<th>Female</th>
<th>Male</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Visitors</td>
<td>181</td>
<td>22</td>
<td>203</td>
</tr>
<tr>
<td>Percentage of Total</td>
<td>89%</td>
<td>11%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Each person’s relative age was also observed and placed into one of two age categories for analysis: adults and children (Table G7.) For the purposes of this report children are defined as anyone appearing younger than 18 years old. As the researchers could not ask each person entering the market their age, the observation may include substantial errors. However, as visitors were fairly polarized in the age categories, the researchers feel their results are fairly accurate in portraying the percent of each age category observed at the market.

Table G7: Visitor Count by Age. *Due to data collection based on observations, all persons that appeared under the age of 18 are considered children for the purposes of this research.*

<table>
<thead>
<tr>
<th></th>
<th>Adults</th>
<th>Children (&lt; 18 years)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Visitors</td>
<td>244</td>
<td>74</td>
<td>318</td>
</tr>
<tr>
<td>Percentage of Total</td>
<td>77%</td>
<td>23%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Another interesting aspect of the WMFM was the activity of those children who were unaccompanied by an adult as market customers. This is very unique to this market compared with other observed markets; therefore, in an attempt to represent the market as a whole these unaccompanied children buyers are counted as purchasers and not discriminated against during analysis (Table G8.)

Table G8: Visitor Count of Potential Buyers: *For the purposes of this research potential buyers are defined as anyone who enters the market without supervision. The WMFM saw unaccompanied children come in and shop for their families, a feature unique to this market in our observations. Therefore, for the purposes of this study, all children without supervision will be counted as potential buyers.*

<table>
<thead>
<tr>
<th></th>
<th>Adults</th>
<th>Unaccompanied Children</th>
<th>Total</th>
<th>Average Potential Buyers per Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Attendees</td>
<td>208</td>
<td>41</td>
<td>249</td>
<td>36</td>
</tr>
<tr>
<td>Percentage of Total</td>
<td>84%</td>
<td>16%</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>
When analyzing those who visited the market and those who purchased produce at the market one can see that about 80% of people who visited the market purchased produce (Table G9.) The researchers have hypothesized that this lack of 100% purchasers may be due to a lack of variety of produce as well as a diminishing quality and availability of produce (based on researcher, employee, and shopper observations) as each market session progresses, or simply that some visitors made only one purchase per group.

**Table G9: Potential Buyer Counts vs. Total Transactions.** *For the purposes of this research potential buyers are defined as anyone who enters the market without supervision.*

<table>
<thead>
<tr>
<th>Number of People</th>
<th>Potential Buyers</th>
<th>Total Transactions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of People</td>
<td>249</td>
<td>196</td>
</tr>
<tr>
<td>Percentage</td>
<td>100%</td>
<td>79%</td>
</tr>
</tbody>
</table>
Transactional Results and Analysis

To gain a better picture of the sample size of the market as a whole, the number of transactions per market was analyzed. As previously stated in the main report, on average there were approximately 27 transactions per market. An average of 1-2 customers who purchased an item returned in the same day to continue shopping, totaling 12 total customers or 5.33% of total market customers. Number of transactions per week is visualized in Table G10, which demonstrates the variance in transactions week by week, as well as a large peak during week eight, when any coupons accumulated throughout the market needed to be redeemed.

Table G10: Number of Transactions by Market Session.

<table>
<thead>
<tr>
<th>Market Session</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>Total</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transactions</td>
<td>23</td>
<td>24</td>
<td>25</td>
<td>30</td>
<td>31</td>
<td>26</td>
<td>26</td>
<td>41</td>
<td>226</td>
<td>27</td>
</tr>
</tbody>
</table>

While the market was technically open from 1pm to 4pm during the 2014 season, there were a total of ten transactions made prior to opening or after closing (Table G11.)

Table G11: Number of Transactions and Percentage by Time.

<table>
<thead>
<tr>
<th></th>
<th>12 pm</th>
<th>1 pm</th>
<th>2 pm</th>
<th>3 pm</th>
<th>4 pm</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Transactions</td>
<td>8</td>
<td>103</td>
<td>55</td>
<td>47</td>
<td>2</td>
<td>215</td>
</tr>
<tr>
<td>Percentage of Total</td>
<td>4%</td>
<td>48%</td>
<td>25%</td>
<td>22%</td>
<td>1%</td>
<td>100.00%</td>
</tr>
</tbody>
</table>

Although these transactions account for only 4% and, as shown in Table G12, only 2% of money spent during the market, the researchers have chosen not to absorb these transactions to fit the actual time of the market. These transactions represent, and help in defining, the essence of the market and therefore although not significant in terms of percentages are important to document and represent during transactional analysis.
Table G12: Money Spent and Percentages by Time of Transaction.

<table>
<thead>
<tr>
<th>Time of Transaction</th>
<th>Money Spent</th>
<th>Percentage of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 pm</td>
<td>$34.80</td>
<td>2%</td>
</tr>
<tr>
<td>1 pm</td>
<td>$854.87</td>
<td>55%</td>
</tr>
<tr>
<td>2 pm</td>
<td>$350.55</td>
<td>22%</td>
</tr>
<tr>
<td>3 pm</td>
<td>$309.05</td>
<td>20%</td>
</tr>
<tr>
<td>4 pm</td>
<td>$15.00</td>
<td>1%</td>
</tr>
<tr>
<td>Total</td>
<td>$1,564.27</td>
<td>100.00%</td>
</tr>
</tbody>
</table>

Figure G9: Money Spent and Percentages by Time of Transaction.

The analysis in Table G11 and Figure G9 demonstrate that the majority of shoppers visit the MWFM within the first hour of the market opening. The researchers theorize that this may be due to the freshness of the produce at the beginning of the market, as there is no refrigeration available as at a supermarket. Several shoppers were heard discussing the lack of freshness of produce during the market’s later hours. Another potential factor is the availability of produce at the beginning of the market, as the produce is limited to what is brought by Enterprise Farm and therefore could not be replenished during the market session. Lack of produce, especially highly desired produce such as avocados, later in the day was also a complaint registered by shoppers. It was documented that more
desirable foods regularly sold out within the first hour. Please note that these potential factors are based on observations, and cannot be confirmed based on available data.

As Table G12 and Figure G9 demonstrate, most money spent at the market came in the first hour after opening. A statistical difference of 0.0289 was found when analyzing the average amount spent during each hour from week to week of the market. This demonstrates the finding that shoppers spent more per transaction during the first hour of the market ($8.30) than any other time ($4.35, $6.37, $6.58, and $7.50) is a significant difference.

Additionally, analysis of all transactions, visualized in Figure G10, found an average of $7 per transaction. As this graph demonstrates, there are few transactions above $15, and many transactions below $5. We believe this is likely due to the high number of residents shopping at the market who receive a subsidy of half-price on all items.

**Figure G10: Average Price per Transaction**
To better understand the clientele the market serves, the payment method of each transaction was assessed. Figure G11 demonstrates that regardless of hour, cash is the preferred payment method of market customers. It was found that on average 76% of transactions are made in cash, approximately 20% were made using an EBT card, and approximately 5% used debit/credit cards. It should be noted that in this transactional analysis, ten transactions are not added, as these were items given without payment to market volunteers and have little use when analyzing payment method among shoppers. To maintain integrity any transactions made by the researchers (who participated in shopping at the market after an in-depth discussion of ethics) or volunteers who chose to pay for produce are counted and recorded as any other transaction.

![Payment Method by Hour](image)

**Figure G11: Payment Method by Hour.**
As the WMFM aims to serve low-income residents of the Mystic River Development, the findings above are surprising. Upon beginning observation the researchers hypothesized that as the market served more residents than non-residents, the amount of EBT used to purchase produce would be greater than the amount of cash used, a prediction not validated by our findings. We propose that this finding may be due to recent Federally-mandated cutbacks to food assistance programs (Dean and Rosenbaum, 2013) forcing more shoppers to use cash to purchase goods where they would have been able to use EBT in the past. It is also possible that EBT utilization is lower than predicted due to a lack of customer knowledge that it was accepted by the market, a fact that was not heavily advertised. Lastly, the researchers wonder if residential customers may feel embarrassed or have other negative connotations about using EBT as the market is run by an outside organization and open to non-residents. It is also possible that low transaction amounts, as seen above, made cash the easier and therefore preferred method of payment.

**Food Analysis**
Over the 2014 MWFM season, the researchers found a statistical significance (p<0.0001) in the makeup of the average transaction consisting of 74% vegetables and 27% fruits. This analysis fits the variation of average market offerings of 85% vegetables and 15% fruits.

Figure G12 shows that although the transactions fit the overall trend the market provides, there is a slight preference among shoppers for fruits. While it is slight, this preference might be taken into consideration during future markets.

Table G13 demonstrates that the average WMFM customer purchases 3.79 different *food items* per transaction. For the purpose of this report the term ‘food item’ refers to a category of food, not the quantity. Figure G13 shows the average of 3.79 food items across each transaction. One can see from
both that a spike was observed during the second market.

**Figure G12: Comparison of Available and Purchased Fruit and Vegetables.** For the purpose of this report, the term fruit is inclusive of more commonly known fruits at the market.⁴

![Comparison of Available and Purchased Fruits and Vegetables](chart)

**Table G13: Average Number of Food Items per Transaction.** For the purpose of this report the term ‘food item’ refers to a category of food, not the quantity.

<table>
<thead>
<tr>
<th>Market Session</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>Total Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Items per Transaction</td>
<td>3.70</td>
<td>5.04</td>
<td>3.96</td>
<td>3.83</td>
<td>3.58</td>
<td>3.73</td>
<td>3.08</td>
<td>3.41</td>
<td>3.79</td>
</tr>
</tbody>
</table>

⁴ Although the scientific definition of fruits would deem anything with seeds (tomatoes, jalapenos, and avocados) a fruit, these are included in the analysis as vegetables due to perceptions among the general public and observations of the perceptions of market customers.
Figure G13: Average Items per Transaction. For the purpose of this report the term ‘food item’ refers to a category of food, not the quantity.

In an attempt to explain why this peak occurred the researchers combined the average number of food items purchased per transaction with the amount of food items offered at each market. The results are shown in Figure G14, which demonstrates that as the amount of food items offered increases appears to be correlated with the amount of food purchased.
Figure G14: Food Item Analysis. *The amount of food items offered was compared with the average of items purchased per transaction.*

Although there is little variation week to week, it is notable that offering more food items led to the purchase of more food items per transaction. It should also be taken into account that an average of 25.5% of the types of produce offered was represented in the average transaction. This is to say that if 100 food items were offered at a market, and if shoppers followed the trend shown, the average food items per transaction would be approximately 25 food items.

Figure G15 analyzes the preferences of customers at the market, showing the 15 food items customers most prefer, regardless of how often each food item was offered at the WMFM.
Figure G15: Total Quantity Purchased by Item. The top 15 most bought produce items at WMFM are sown in ascending order.

In an attempt to better visualize the difference between the quantity of food items purchased and their preference by customers, a ranking based on produce quantity was created to scale down the figure. The ranking is as follows: 1 (1-50), 2 (51-100), 3 (101-150), 4 (151-200), 5 (201-250), 6 (251-300), 7 (301-350), and 8 (351-400). Figure G16 depicts the quantity of food items purchased using this ranking system.
Figure G16: Weeks Offered and Scaled Ranking by Food Item. Food items purchased were ranked according to quantities bought, and compared to how frequently they were offered at WMFM.

The graph demonstrates that although some food items are only offered during a couple of markets sessions, they are highly coveted by those who shop at the market. An example of preference for certain items is carrots. One can see that based on the quantity purchased throughout the entirety of the market, carrots are highly ranked in terms of quantity sold despite the fact that they were only offered during three of the eight weeks.

Transactions in Detail
Figure G17 describes customer demographics by week. It shows that as the market progressed an increasing percentage of each week’s customers had previously visited the market. It also shows that
no new non-residents attended the last market, and the patronage of new non-residents declined greatly after the fifth market. The researchers believe that the peak during week five can be attributed to the presence of three previous winter market workers who came in to shop, as attendance was observed to increase as news of their visit spread. Potential explanations for new-non-resident shoppers include a lack of advertisement outside of the Mystic Housing Development Complex, as most non-resident shoppers were observed to have some kind of pre-existing relationship with the residents of the Mystic Housing Development.

**Figure G17: Transactional Analysis.** *Number of transactions per week by customer type.*
Price Comparison Analysis

To verify the perception of WMFM customers that produce at the market was more affordable than at other markets, researchers compared prices at WMFM with those at grocery stores customers usually shop at, as well as at other winter farmers’ markets.

Prices at the WMFM are wholesale (Rachael Plitch, SUS, interview, March 6, 2014). The WMFM and other farmers’ markets visited use dollar for dollar SNAP/EBT matching programs. Both Market Basket and Stop & Shop accept SNAP/EBT, whereas Haymarket does not. However, produce prices at the latter can be up to $1.24 cheaper than at the other grocery stores. This may be due to the fact that Haymarket does not appear to offer organic produce, whereas both of the other grocery stores offer both organic and conventional options.

To better compare the affordability of produce the various markets were categorized: Market Basket, Stop & Shop and Haymarket into “Markets,” while Armory, Medford, and Dorchester were put into “Farmers’ Markets.” The basis for comparison was the 5 most-purchased items at WMFM that were also available at both types of markets (apples, beets, carrots, lettuce, and tomatoes). For each produce item, prices per unit produce item were averaged within each market category (Figure G14).

Table G14: Determining Average Unit Price of Produce for Category “Market.” MB= Market Basket, SS=Stop & Shop, HM=Haymarket. Carrots are used to illustrate the process.

<table>
<thead>
<tr>
<th>Item</th>
<th>Markets</th>
<th></th>
<th></th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MB</td>
<td>SS</td>
<td>HM</td>
<td></td>
</tr>
<tr>
<td>Carrots</td>
<td>Organic</td>
<td>0.99</td>
<td>1.29</td>
<td>1.14</td>
</tr>
<tr>
<td></td>
<td>Conventional</td>
<td>0.99</td>
<td>1.00</td>
<td>1.00</td>
</tr>
</tbody>
</table>

The average prices per unit for both organic and conventional produce were then used to determine the total cost for equivalent quantities of the 5 top-selling items. This total cost was also averaged and used for comparing WMFM with other market categories (Table G15.)
Table G15: Price Comparison of Top-selling 5 Produce Items at WMFM and Other Markets.  
*Market Basket, Stop & Shop, and Haymarket are represented by “Markets,” and Armory, Medford, and Dorchester represented by “Farmers’ Markets.*

<table>
<thead>
<tr>
<th>Item</th>
<th>WMFM Organic</th>
<th>Markets Organic</th>
<th>Markets Conventional</th>
<th>Farmers’ Markets Organic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apple</td>
<td>1.50</td>
<td>1.99</td>
<td>1.16</td>
<td>2.00</td>
</tr>
<tr>
<td>Beets</td>
<td>1.25</td>
<td>3.99</td>
<td>2.99</td>
<td>1.58</td>
</tr>
<tr>
<td>Carrots</td>
<td>1.25</td>
<td>1.14</td>
<td>1.00</td>
<td>1.50</td>
</tr>
<tr>
<td>Lettuce &amp; Greens</td>
<td>2.00</td>
<td>2.74</td>
<td>0.99</td>
<td>3.00</td>
</tr>
<tr>
<td>Tomatoes</td>
<td>2.25</td>
<td>3.99</td>
<td>1.58</td>
<td>1.67</td>
</tr>
<tr>
<td><strong>Total ($)</strong></td>
<td><strong>8.25</strong></td>
<td><strong>13.85</strong></td>
<td><strong>7.72</strong></td>
<td><strong>9.75</strong></td>
</tr>
<tr>
<td><strong>Average ($)</strong></td>
<td><strong>1.65</strong></td>
<td><strong>2.77</strong></td>
<td><strong>1.54</strong></td>
<td><strong>1.95</strong></td>
</tr>
</tbody>
</table>

Table G15 also shows that when the average of equivalent quantities of the top selling items were compared, prices at WMFM were found to be generally lower than at other farmers’ markets and for organic produce at both markets and farmers’ markets, and comparable to markets for conventionally grown produce.

**Market Layout**

The 2014 WMFM space had drawbacks with respect to the movement of customers (Figure G18). The market consisted of an open square of tables, which was stacked with boxes/baskets of produce, creating small sub-areas that often became cramped during busy periods of the market. The checkout was at the rear corner of a square, a set up that often caused bottlenecks for customers. Behind the shopping area there was a much open space, stacked with chairs. There was no dedicated sitting area for customers. The market is oriented toward the main outside door, accessed through the front stairs. However, many customers used a second back “fire door” because of the often slippery front steps, and had difficulty reaching the shopping area.
Figure G18: WMFM Layout. Arrangement of produce tables showing bottlenecks in customer flow.

The layout of the market space may be updated to enhance customer flow, provide seating, and thus make the space more inviting, as illustrated in Figure G19.

Figure G19: WMFM Proposed Layout. Rearranged produce tables allow smoother customer flow.
Appendix: Closing the Winter Gap

**GPS GIS Mapping**

GPS GIS Mapping was conducted to assess the availability of food and transportation to the residents of the Mystic Housing Development. The use of GPS allowed for real-time accurate information that revealed 10 food options within 0.5 miles, as shown in Figure G20 below.

**Figure G20: Food Options.** *GPS GIS maps of Mystic Housing Development locality showing options for food access.*

This crucial step was taken as the Mystic Housing Development is framed by some Somerville residents as a food desert (Rachael Plitch, SUS, interview, March 6, 2014). The area is not however
defined as a food desert according to the USDA definition. To address this difference in opinion, Global Positioning System (GPS) Geographic Information Systems (GIS) mapping was conducted to more accurately depict the food and transportation environment within 0.5 miles around the Mystic Housing Development. To accomplish this aim, the researchers plotted a 0.5 mile radius around the Mystic Housing Development using GIS mapping. Once plotted the researchers started at the most western point and rode a bike up and down streets, making sure to cover the entire 0.5 mile radius. Upon encountering a store that sells food, or a transportation stop, the GPS device was activated creating a

**Figure G21: Transportation Options.** GPS GIS maps of Mystic Housing Development locality showing options for transportation access.
point with a longitude and latitude. Once this task was completed the points were then uploaded to GIS mapping software and plotted on the resulting maps (Figures G20 and G21). Upon analysis it was found that 10 food options are within the 0.5 mile radius of the Mystic Housing Development. However, of the 10 food options nine are considered convenience stores and one could be defined as an alternative convenience store selling ethnic spices and commodities.

It is the conclusion of the researchers that although the USDA would not consider the Mystic Housing Development a food desert based on their criteria, further research should be conducted to confirm or deny food availability proximate to the Mystic Housing Development. Due to the reported infrequent and unreliable transportation options as well as the inadequate food options found, the researchers agree with those that classify the Mystic Housing Development as a food desert, as the area is at minimum food insecure, as demonstrated by our findings.
APPENDIX H: LIST OF DOCUMENTS

The following documentation is supplied on the following pages.

1. Memorandum of Understanding

2. Internal Review Board Application
MEMORANDUM OF UNDERSTANDING
BETWEEN
TUFTS UNIVERSITY FIELD PROJECTS TEAM NO. 6, JAN, CAITLIN AND SARAH
AND
GROUNDWORK SOMERVILLE WITH SHAPE UP SOMERVILLE

I. Introduction

Project (i.e., team) number: 6
Project title: Evaluation of Somerville’s Mobile Winter Farmers Market
Client: Groundwork Somerville with Shape up Somerville

This Memorandum of Understanding (the “MOU”) summarizes the scope of work, work product(s) and deliverables, timeline, work processes and methods, and lines of authority, supervision and communication relating to the Field Project identified above (the “Project”), as agreed to between (i) the UEP graduate students enrolled in the Field Projects and Planning course (UEP-255) (the “Course”) offered by the Tufts University Department of Urban and Environmental Policy and Planning (“UEP”) who are identified in Paragraph II(1) below (the “Field Projects Team”); (ii) Caitlin, Jan and Sarah, further identified in Paragraph II(2) below (the “Client”); and (iii) UEP, as represented by a Tufts faculty member directly involved in teaching the Course during the spring 2013 semester.

II. Specific Provisions

(1) The Field Projects Team working on the Project consists of the following individuals:
   1. Caitlin Bettisworth
   2. Janaki Blum
   3. Sarah Sherman

(2) The Client’s contact information is as follows:
   Client name: Groundwork Somerville and Shape Up Somerville
   Key contact/supervisor: Chris Mancini, Executive Director, Groundwork Somerville
   Email address: [redacted]
   Telephone/cell: [redacted]
   Address: 24 Park St. #7 Somerville, MA 02143
   Website: www.groundworksomerville.org
The goals of the Project are:

I. Conduct an evaluation of the Somerville Mobile Winter Farmer’s Market (SMWFM), focusing specifically on whether the market is increasing customer’s fruit and vegetable intake, customers perception of the market (including complaints), and what steps can be taken to increase attendance.

II. Perform a count of attendees at each session of the SMWFM.

III. Assess overall distribution of produce at the market, and estimate cost savings over local supermarkets.

IV. Provide a final report and presentation on evaluation findings, recommendations for areas of change/growth, and areas for future study.

V. Provide a program description/policy brief that can be shared with potential funders.

The methods and processes -- including the methodologies -- through which the Field Projects Team intends to achieve these goals are:

I. A Tier Two/Three evaluation (see: Jacobs, F., & Kapuscik, J. (2000). Making it count), designed specifically to monitor program performance, assess the consistency of the program in relation to its stated goals, aid in program planning and decision making, and provide a groundwork for later evaluation activities.

This will be achieved through the use of data collection methods including ethnographic observation, detailed analysis of items for sale and purchase histories, focus groups, informal interviews, and non-written survey instruments such as a dot survey.

The work products and deliverables of the Project are (this includes any additional presentations for the client, and may list project elements in order of priority):

I. A final report and presentation, detailing evaluation findings, recommendations for areas of change/growth, and areas for future study.

II. Templates for future data collection.

III. A brief program description/policy brief outlining the evaluation findings that can be shared with potential funders.
(6) The anticipated Project timeline (with dates anticipated for key deliverables) is:

**January 11, 2014** – Begin attending SMWFM. At least one team member will attend each session. **Deliverable:** Templates for data collection.

**February 1, 2014** – Dot survey complete and ready to implement. Implementation pending IRB approval of study design. **Deliverable:** Dot Survey Questions/Template

**April 4, 2014** – Draft of final report available. **Deliverable:** Draft Final report

**Late April, 2014** – Final report, presentation, and program description completed. **Deliverable:** Final report, presentation, and program description.

(7) The lines of authority, supervision and communication between the Client and the Field Projects Team are (or will be determined as follows):

Though Groundwork Somerville and Shape Up Somerville are partners in the Mobile Market Project, Chris Mancini, Groundwork’s Executive Director, will be the primary contact on behalf of both clients for the Field Projects Team. Depending on the nature of the communication, Chris may cc Rachael Plitch or David Hudson from Shape Up Somerville as a resource for specific questions. At most times, Chris will communicate as needed with Rachael and David, passing on information as necessary.

(8) The understanding with regard to payment/reimbursement by the client to the Field Projects Team of any Project-related expenses is:

Groundwork Somerville will provide a payment of $100 to the Tufts UEP Field Project’s Fund after completion of the project outlined above. No additional payments/reimbursements are anticipated. Any that may arise will be agreed upon on a case by case basis between the Client and the Field Projects Team.

III. Additional Representations and Understandings

A. The Field Projects Team is undertaking the Course and the Project for academic credit and therefore compensation (other than reimbursement of Project-related expenses) may not be provided to team members.

B. Because the Course and the Project itself are part of an academic program, it is understood that the final work product and deliverables of the Project
(the “Work Product”) - either in whole or in part - may and most likely will be shared with others inside and beyond the Tufts community. This may include, without limitation, the distribution of the Work Product to other students, faculty and staff, release to community groups or public agencies, general publication, and posting on the Web. Tufts University and the Field Projects Team may seek and secure grant funds or similar payment to defray the cost of any such distribution or publication. It is expected that any issues involving Client confidentiality or proprietary information that may arise in connection with a Project will be narrow ones that can be resolved as early in the semester as possible by discussion among the Client, the Field Projects Team and a Tufts instructor directly responsible for the Course (or his or her designee).

C. Ownership and use of data and research materials used in drafting the report, as well as the final report, presentation, and program description, is shared between Tufts University, the Field Projects Team, Groundwork Somerville and Shape Up Somerville. Groundwork Somerville and Shape Up Somerville may review all research data and notes. Groundwork Somerville and Shape Up Somerville may alter the final program description in order to meet programmatic and funder needs, but may not alter the final report or presentation, which are considered final research findings. When referring to the final report and its authors,

D. The Client may refer to the Field Projects Team as either the UEP Field Project Team, Field Projects Team, or Tufts UEP Winter Market Evaluation Team.

Any sensitive information shared with the Field Projects Team by our partners will be kept confidential. Additionally, while it is not anticipated that identifying information such as names will be collected about any SMWFM attendees, all such information will be kept confidential by the Field Projects Team. If other sensitive information is identified in the course of IRB review, this information will also be kept confidential by the Field Projects Team.

E. It is understood that this Project may require the approval (either through full review or by exemption) of the Tufts University Institutional Review Board (IRB). This process is not expected to interfere with timely completion of the project.
IV. Signatures

For Groundwork Somerville
By: Chris Marini
Date: January 10, 2014

Representative of the Field Projects Team
By: Sarah Sherman
Date: January 15th, 2014

Tufts UEP Faculty Representative
By: Penn Loh
Date: January 21st, 2014
Title: Evaluation of Shape Up Somerville Mobile Winter Market

February 7, 2014 | Notice of Action

IRB Study # 1401031 | Status: EXEMPT

PI: Sarah Sherman
Co-Investigator(s): Janaki Blum, Caitlin Bettisworth
Faculty Advisor: Penn Loh
Review Date: 2/7/2014

The above referenced study has been granted the status of Exempt Category 2 as defined in 45 CFR 46.101 (b). For details please visit the Office for Human Research Protections (OHRP) website at: http://www.hhs.gov/ohrp/humansubjects/guidance/45cfr46.html#46.101(b)

- The Exempt Status does not relieve the investigator of any responsibilities relating to the research participants. Research should be conducted in accordance with the ethical principles, (i) Respect for Persons, (ii) Beneficence, and (iii) Justice, as outlined in the Belmont Report.
- Any changes to the protocol or study materials that might affect the Exempt Status must be referred to the Office of the IRB for guidance. Depending on the changes, you may be required to apply for either expedited or full review.

IRB Administrative Representative Initials: [Signature]