Analyzing Baltimore G.R.O.W. Center Attendees

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Abstract

Like many urban areas in the United States, Baltimore City's structural forms of prejudice and segregation have led to inequality in its geography of greenspace. Additionally, city government has particular interest in addressing its substantial vacant lot issue (an understatement of the complexity that has spurred it) as well as improving stormwater management through greater pervious surfaces (i.e. greenspace). As a result, city officials developed a Greening Resources and Outreach for Watersheds (GROW) Center concept in order to collectively address city initiatives related to greening, stormwater management, increasing urban tree canopy and reuse of materials. At GROW Centers, residents of Baltimore City are able to access free or low cost materials, education, information and training to perform vacant lot revitalization, stormwater management and other greening activities. This paper uses data collected from pilot GROW Center events to characterize program participants from the Spring 2019 series of GROW Center pop-ups, and finds that the model is simple and effective at reaching a large and diverse audience of users. Furthermore, the audience reached come from areas of lower tree canopy; lower median household income; higher percentages of vacant properties; and higher percentages of community managed open spaces. This exploratory program thus serves as a potential avenue to not only tackle city priorities, but also engage historically underserved communities in greenspace development and work. Other similar programs are mentioned that may provide further insight for future greenspace planning work.

Keywords

Baltimore, greenspace, unequal geography, reuse, community greening;

Introduction

Around 2015, Baltimore City officials brainstormed a Greening Resources and Outreach for Watersheds (GROW) Center concept that would address four intersecting city initiatives: 1) Waste-To-Wealth Initiative, promoting a reuse economy to mitigate urban wood, food and construction waste streams; 2) increasing the urban tree canopy to 40%; 3) meeting MS4 Permit goals to encourage stormwater management on private property and to reduce polluted runoff; and 4) the Growing Green Initiative to promote the revitalization and greening of Baltimore's many vacant lots. The Baltimore Office of Sustainability would take up the initial charge, and organize a pilot GROW Center schedule in April of 2016. This project would be deemed a success after providing city residents with five weekends of free workshops, some material giveaways (i.e. trees, plants), and networking opportunities with greening organizations. As a result, this GROW Center concept was identified as a viable option to pursue and meet the aforementioned city goals.

Therefore, in 2017 Baltimore City Department of Public Works (DPW) took the reins and received a grant from United States Department of Agriculture/Forest Service to develop the GROW Center concept into a permanent entity. This funding, matched by DPW, supports a number of items. One, is to fund additional GROW Center (pop-up) events to further test the concept via different delivery models. Two, is the recruitment of a University of Maryland, Baltimore County Peaceworker Fellow to serve as the GROW Center Coordinator and organize additional GROW Center events. Three, is the hiring of a professional consultant team to perform an alternatives analysis and subsequent business plan for a permanent GROW Center model.

GROW Centers are envisioned as "greening resource hubs" or places where residents and communities access low or no cost greening resources to help meet previously mentioned city goals. Resources include the physical: mulch, trees, native plants, and deconstruction materials; and the educational: training and information on stormwater management (i.e. rain gardens) and community greening (i.e. gardening) topics. DPW has also recognized the need to address the historical inequality that Baltimore City has experienced, resulting in a number of social justice issues. In the case of this paper, the relevant injustice is structural procedures that have produced an unequal geography of greenspaces throughout the city.

Greenspace

Most individuals have encountered and/or interacted with greenspaces in urban areas in the form of a park, garden, or recreational field, for example. Scholars and institutions have varied definitions of what constitutes a greenspace, but Boulton et al provides a comprehensive definition (2018). They define

> … urban greenspace as constituting vegetated urban land that is public or semi-private (not private) such as parks, sports fields, cemeteries, vegetated areas of street and road corridors (including squares), natural and built corridors adjacent to waterways and wetlands, and external areas to public buildings (for example libraries, galleries, community centres, sports and aquatic centres/swimming pools).

These many varied forms of vegetated land are found in Baltimore whether considering the large signature parks such as Druid Hill Park in Central Baltimore, Greenmount Cemetery in East Baltimore or the myriad small community managed open spaces interspersed throughout Baltimore's neighborhoods. These smaller spaces include community gardens, pocket parks and

grass-covered vacant lots. What is of particular interest to GROW Center activities are greenspaces that local government does not have direct access to: private property including the private yards of homeowners, churches, or other private holdings.

Well-maintained and appropriately planned greenspaces provide a number of diverse benefits. They may include ecosystem services such as cooling effects, improvements in air and water quality through stormwater infiltration and air filtration, and urban biodiversity support (Boulton et al, 2018; Wolch et al, 2014; Pham et al, 2012). Studies have also shown that greenspaces provide opportunities for food security, physical exercise, and reprieve from the "urban jungle" to a more natural one (Byrne & Wolch, 2009; Pham et al, 2012; Wolch et al, 2014) among many other mental and physical health benefits. It is also important to acknowledge the economic benefits, such as the associated increase in property values with proximity to greenspaces (Boone et al, 2009). These benefits are not an exhaustive list, but shed light on the incredible value that *quality* greenspaces can play in the urban landscape for the environment and its people.

If quality of greenspace varies, so will its benefits. Therefore, poorly maintained greenspaces logically will be poor providers (and potentially hazards) of any benefits described in the previous paragraph. Baltimore is home to myriad vacant lots (Duncan, 2018), which are often used for dumping or other "undesirable" activity. These lots result from demolished vacant houses characteristic of even more "undesirable" activity. When these greenspaces are used in deleterious ways and lack proper oversight, they can become aesthetically and environmentally harmful (Branas et al, 2018; Sadler & Pruett, 2017). A trash-filled lot is surely not a reprieve from the "urban jungle" or a good provider of stormwater infiltration, for example. The Baltimore Neighborhood Indicators Alliance – Jacobs France Institute website collects data on a

number of indicators for Baltimore and has a map of percent vacant properties in Baltimore showing a concentration in East and West Baltimore (Baltimore Neighborhood Indicators Alliance, n.d.), majority African-American areas. Thus, Baltimore GROW Centers are potential mechanisms to *begin* addressing the poor quality of these vacant lots while also helping maintain and improve existing *quality* greenspaces. In doing so, program officials envision benefits to city goals like stormwater management and increasing urban tree canopy, which simultaneously provide environmental health benefits to city residents.

Greenspace Inequality

Many urban areas across the U.S. have a history of segregation and racialized structures that have contributed to an uneven geography of greenspaces (Boone et al, 2009; Boulton et al, 2018; Byrne, 2012; Byrne & Wolch, 2009). Baltimore City is no exception to this claim. These structural causes of inequality have been social, economic, and political in nature. While there are numerous examples of these actions, a few are worth mentioning.

One such example is the white-centric ideology of nature, parks and greenspace that has dominated the landscape for centuries. Whether it was early notions of parks reflecting the private gardens/parks for royal elite in 18th century Europe (Byrne & Wolch, 2009) or the 19th and 20th century parks designed for white middle and white-ethnic working classes (Loughran, 2017), a disrespect for varied cultures' uses of nature and recreation (Gentin, 2011; Ordóñez-Barona, 2017) is apparent. This structure has continued to permeate the way park/greenspace planning and oversight is carried out.

Another example is action taken by the federal government, including the Home Owners Loans Corporation's (HOLC) "Residential Security Maps" that classified African-American neighborhoods as "High Investment Risk" (Sinn, 2017) and federal tax code breaks that were

preferentially afforded to white suburban homeowners over African-American renters (Rothstein, 2017). The resultant loss of financial capital in these neighborhoods meant less money for maintenance of properties and therefore decay, demolition and production of vacant lots in the simplest of terms.

One last example is the lack of political representation that poorer and minority neighborhoods have received in Baltimore. Wilkerson points out that differences in greenspace (both public and private) are often correlated to socio-economic status due to the unequal power relationships among neighborhoods (2018). The same can be found in Baltimore, with past Mt. Royal and Peabody Heights neighborhood associations that used their political clout to accumulate resources for park and greenspace maintenance in their own neighborhoods (Pietila, 2012). Simultaneously, this structure built by political clout of the wealthier, white class is difficult (to say the least) for other classes/groups to overcome in the struggle for quality and appropriate greenspace in their communities.

GROW Center planning has taken an approach to attempt confronting these historical legacies of inequality. For example, a primary component of GROW Center programming is providing materials at free or low cost to address the economic barriers that low-income neighborhoods may face with greenspace planning and maintenance. Another is GROW Center planners' interaction with various communities throughout Baltimore during the planning of GROW Center events. In this way, community voices and preferences are heard that help define GROW Center programming in terms of information, education and materials. GROW Center staff have also made strides to spread programming throughout Baltimore City in order to reach a variety of neighborhoods and communities that might not normally experience similar programming. While these are by no means solutions to the substantial historical legacies of

racism and segregation that have allowed continued production of greenspace inequity, they are small steps forward.

Research Methods

As of December 2018, Baltimore City DPW has held two rounds of GROW Center pop-up events. In both the Spring and Fall of 2018, four GROW Center events were held in various locations in the city (see Table 1). At these pop-ups, residents attended to obtain material resources, attend various educational workshops, and/or network with greening experts. By holding these events, lessons learned and data collected will guide efforts to create a permanent, replicable GROW Center model. One of the main questions in performing these pop-ups is to understand which residents are accessing these centers and resources, and where they are coming from in relation to the centers.

Table 1: Pop-up Locations, Dates, Times

#	Spring 2018	Fall 2018
1	Easterwood/Sandtown Park & Playground April 14th, 2018 10am-12pm	Pigtown Bloom the Boulevard Sept. 15th, 2018 9am-12pm
2	Baltimore Community ToolBank April 21st, 2018 10am-2pm	32nd St Farmers Market Waverly Commons Sept. 22nd, 2018 9am-12pm
3	400 Block N. Duncan St. C.A.R.E. Community April 28th, 2018 10am-2pm	Oliver Community Baltimore Food Hub Oct. 6th, 2018 9am-12pm
4	Langston Hughes Community Center May 5th, 2018 10am-2pm	Parks & People Foundation Plant/Seed Swap Oct. 13th, 2018 10am-1pm

Data was collected from open data sources and at GROW Center pop-up events (Spring 2019 only) in order to answer the above question. The following primary data was collected at GROW Center events: Participant Name, Address, Age, Years of Community Greening

Experience, Community/Neighborhood Association Involvement, and Email Address. Additionally, the type, amount and intended use of material given away was collected. Secondary data was retrieved from United States Census Bureau TIGER/Lines Shapefiles/Geodatabases including: Baltimore City Census Tracts, Number of Total Residential Properties, Number of Vacant Properties, and Median Household Income. The Number of Community Managed Open Spaces was retrieved from Baltimore Neighborhood Indicator's Alliance "Green Registry Map", and Tree Canopy Coverage was retrieved from the USDA/Forest Service. The percentage of vacant properties for each census tract was calculated simply by dividing the number of vacant properties by the total residential properties. The number of community managed open spaces in each census tract was also counted. Tree canopy cover was calculated by dividing the total area of tree cover in a given census tract by the total area of that census tract (excluding water bodies).

Participant addresses were geocoded using ArcGIS World Gecoding Locator to obtain Latitude and Longitude coordinates for each participant. Any address located outside of Baltimore City limits was removed due to the Baltimore City specific nature of GROW Center goals. Geocoded results were cleaned by removing unnecessary fields (i.e. Name) and checking for matching errors, resulting in 156 data points. All other data and results were organized, analyzed, and produced in ArcMap, QGIS and Microsoft Excel. Before analysis, each shapefile was projected to the same projected coordinate system: NAD 1983 State Plane Maryland FIPS 1900 Feet. Three primary analyses were performed in this study: (1) Characteristics of distance traveled to GROW Centers (2) A Kernel Density analysis of GROW Center participants (3) A comparison of High, Medium and Low Density participant areas.

(1) Distance Traveled to GROW Centers

To determine characteristics of distance traveled to GROW Centers by participants, geocoded data was assigned a unique identifier based on which pop-up GROW Center it belonged to. For example, the location point of pop-up #1 and all associated participant locations that attended pop-up #1 were assigned a value of 1 in the created field, PopUpNum. The "Point Distance" tool was used on each set of pop-up data to determine the distance of each participant to the respective pop-up location. The same analysis was performed on a set of 100 randomly generated points for comparison. This data was exported to Excel, where the average, minimum, maximum, and standard deviation values were calculated using excel functions.

(2) Kernel Density Analysis

A kernel density map of GROW Center participants from all four pop-ups was produced using the QGIS Heatmap (Kernel Density Estimation) tool with a radius of one mile and quartic kernel shape. Natural Jenks Classification was selected for displaying five breaks in the data to identify any underlying trends. The raster was reclassified into four categories: High, Medium, Low, and Zero Density. The first break was Zero (where no participants came from), the second break was Low, middle two breaks were Medium and last two breaks were High. This raster was overlaid with Baltimore City to show census tracts of high, medium and low GROW Center Participant density.

(3) High, Medium & Low

Comparison of High, Medium, Low and Zero-density areas was performed using ArcMap's "Zonal Statistics" tool on the reclassified kernel density raster. In order to perform the zonal statistics, rasters were created from each indicator of interest provided

by Census, BNIA, and Forest Service data. After creating rasters, average values of each indicator raster (Vacant properties, Tree Canopy, Median Income, and Community Spaces) could be calculated and recorded for each zone using the previously produced density zone map in (2).

Table 1: Distance Traveled to GROW Centers (*All numbers in miles)*

Pop-up Number	**1**	**2**	**3**	**4**
Average Distance (Actual)	2.04	2.87	2.12	2.76
Max Distance	5.68	6.05	5.96	9.26
Min Distance	0.06	0.00	0.06	0.05
Standard Deviation	1.51	1.78	1.55	2.70
Average Distance (Random)	3.71	4.05	3.70	5.13
Max Distance	7.91	7.78	7.63	11.00
Min Distance	0.24	0.14	0.22	1.10
Standard Deviation	1.95	1.79	1.72	2.09

Results

If we examine Figure 1 (in Appendix), it would appear that GROW Center participants tended to originate from points nearer each Center but some still traveled a distance to reach the pop-up events (see max distances). Analysis showed that many GROW Center participants attended from somewhat closer, more local areas in relation to each pop-up event. This can be inferred from the average distance traveled being~1.7 miles less than that calculated for random points. Additionally, standard deviations for each measured pop-up sample were relatively small, indicating less variability in distance traveled. The exception was Pop-up #4 where some outliers most likely skewed the

calculation of standard deviation (See Figure 1). Results from the distance analyses can be found in Table 1.

Upon classifying GROW Center Participants into High, Medium and Low-Density areas, characteristics of most GROW Center participants were illuminated. Classification areas can be seen in Figure 2. Zonal statistics on each area revealed that High and Medium Density areas of GROW Center users had lower median household incomes, higher percentages of vacant properties, higher numbers of community managed open spaces and less tree canopy cover as compared to less dense areas. It should be noted that a significant portion of zero-density zones in this analysis are heavy industrial areas, such as Curtis Bay, Fairfield, Hawkins Point, and Dundalk. This likely explains the somewhat higher median household income, lower percentage of vacant properties, fewer community managed open spaces, and less tree canopy as indicated in Table 2.

Table 2: Density Zone Comparison

Year	Indicator	High	Med	Low	Zero
2015	Median Household Income ($)	39,035	47,095	53,439	47,316
2015	% Vacant Properties	23.92	17.71	15.51	15.20
2015	Number of Community Managed Open Spaces	8.54	5.43	3.33	3.43
2015	% Tree Canopy Cover	16.82	19.19	20.27	15.50

Discussion

Results indicate that GROW Centers attracted a notable local population of participants that also included more distant travelers (Figure 1). For example, analysis showed that some participants came from just across the street to up to nearly ten miles away. However, considering the average distance traveled as well as Figure 1 suggests that GROW Centers in different locales are effective at reaching local greeners. Additionally, analysis showed most residents using GROW Center resources came from areas of lower income, fewer trees, greater percentages of vacant properties and more community open spaces than the rest of the city. This is reassuring for GROW Center objectives.

Resources provided through GROW Centers are targeted towards community greening activities that promote vacant lot revitalization, maintenance of greenspaces and to increase tree canopy. It is logical to think that providing resources to areas with greater numbers of vacant properties (as opposed to less) will therefore encourage vacant lot revitalization projects. This line of thought is transferable to planting more trees where less already exist, and providing resources for maintenance in areas where greater numbers of community managed open spaces exist to use those resources.

Furthermore, by providing materials for free and low cost, residents with little disposable income are afforded greater access to materials that can be used for stormwater management and greening projects. Looking at Figure 2, areas of high participant density occur in East and West Baltimore, historically underserved neighborhoods with high numbers of vacancies and lower income (Baltimore Neighborhood Indicators Alliance, n.d.). Therefore, this pop-up model can provide

resources in areas where they can be used to support city goals, but also to residents that have been historically excluded resources. Although, it should be noted that the analyzed data has no means of indicating the length of residency for a given participant. Therefore, it is possible that some participants of GROW Centers from these historically underserved areas may in fact be new inhabitants looking for cheaper properties expecting future rising of property values. These transplants could then contribute to green gentrification by making use of GROW Center resources.

Conclusion

While this analysis provides promising for GROW Center programming to provide resources for greening and stormwater management projects in areas that need it most, it is by no means viewed as a solution to the massive inequities created by many years of racism and segregation purported by structures and institutions. This analysis of participants from one iteration of GROW Center programming (Spring 2018) shows promise to be a relatively cost-effective and additional step towards promoting community greening and stormwater management that provides benefits to both city residents and officials.

Baltimore City has also been implementing additional greening programs to tackle vacant lots and disparities in greenspaces, such as the recently adopted "Green Network Plan" meant to link communities to already existing and newly created greenspaces through vacant lot revitalization projects (Baltimore Office of Sustainability, n.d.). This plan has started by focusing on historically underserved areas (East and West Baltimore) as well, and will roll out projects every year (depending on capital available) towards their vision of a network of connected greenspaces that promote public health and quality of life.

Additional lessons may be learned by examining the efforts of other urban centers in the U.S., and could be applied to GROW Center programming in Baltimore. For example, Toledo GROWs in Toledo, OH serves 125+ community gardens with resources such as technical assistance, tools, materials, and training through a single, permanent location (About Toledo GROWs, n.d.). San Francisco Recreation & Parks organizes seasonal Urban Agriculture Resource Centers where residents can access physical materials and gardening experts at a rotating location (San Francisco Recreation and Parks, n.d.). These and other examples may suggest that in order to truly address the inequities of greenspace geography, a suite of approaches that aim higher will be necessary to make significant progress. These approaches cannot simply repair past injustices while meeting government goals, but should also challenge legacy structures that continue to promote racism and implement restorative experiences that involve those wronged.

Appendix **Figure 1**

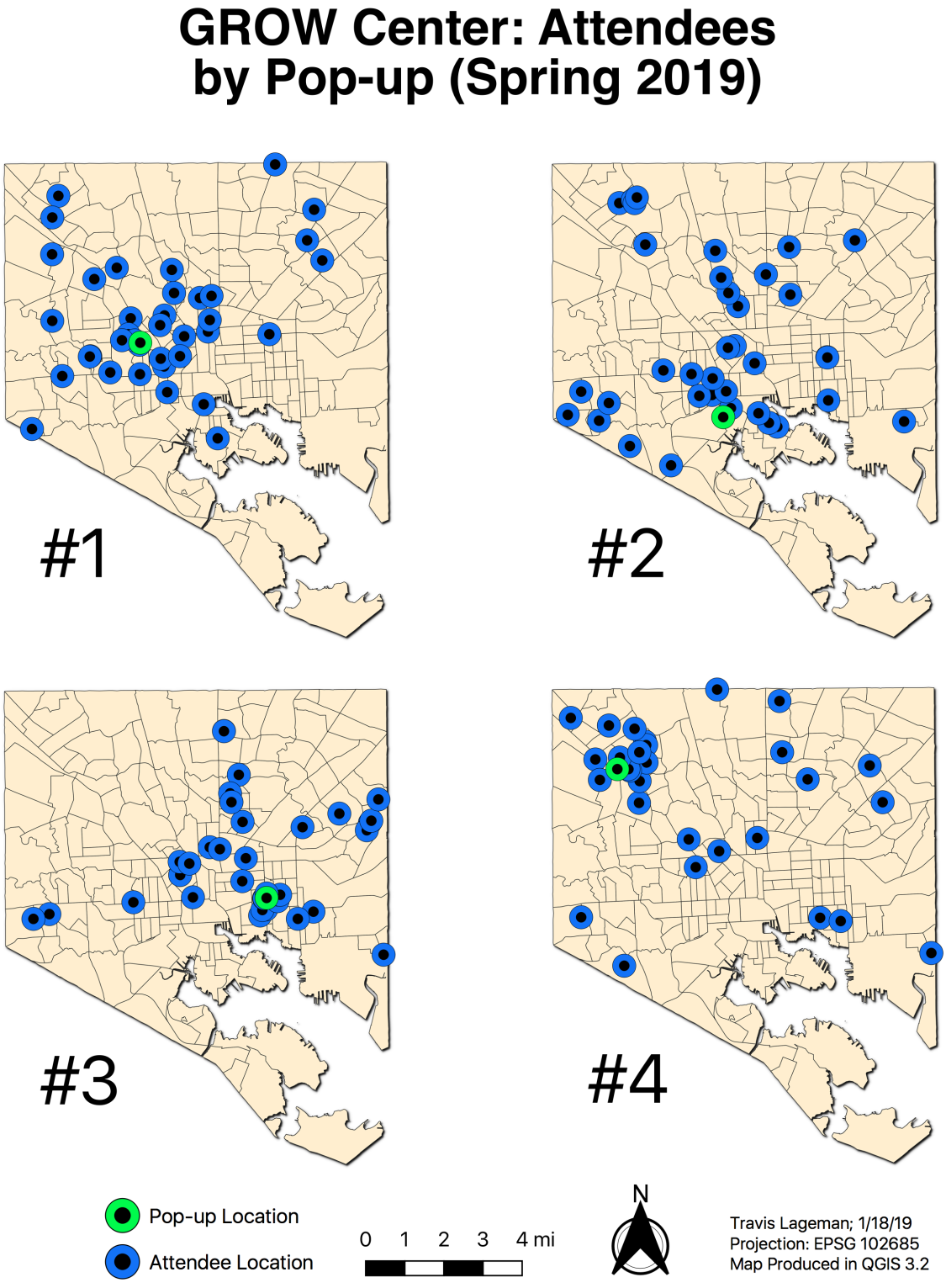
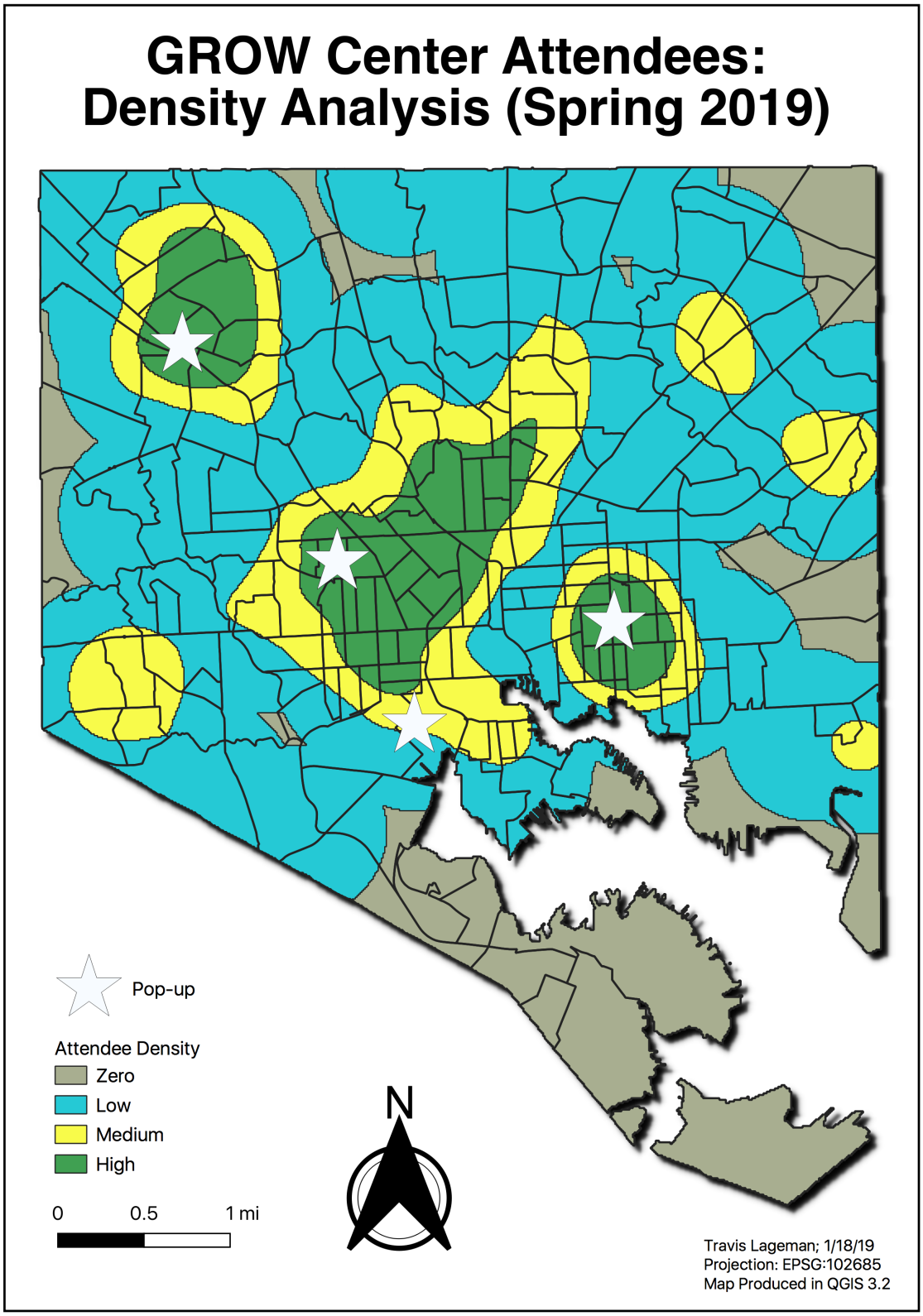


Figure 2


GROW Center Attendees:
Density Analysis (Spring 2019)
Pop-up
Attendee Density
Zero
Low
Medium
High
0
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Travis Lageman; 1/18/19
Projection: EPSG:102685
Map Produced in QGIS 3.2

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