Counting Visitors at Markets

By Dar Wolnik, Farmers Market Coalition

Farmers markets across the U.S. use many different methods of counting their visitors. Some of these methods are best used for planning programmatic activities at different points of the day, while others are more reliable ways to estimate an average number per market day.

The current methods most researchers accept as accurate use strategically placed staff (paid or volunteer) to count those entering or everyone within the market at a set time. These methods require defining entrances, the time span to count and who should be counted or not, such as children or groups of people. The entry count method may be difficult at those markets that stretch for blocks or have many entrances; for those there are also new methods such as capturing the number of mobile phone "pings" within a market space or using drones to snap overhead photos to count quadrants that may offer accurate data.

In order to satisfy researchers who need credible data while still acknowledging the collection capability of low-capacity markets, Farmers Market Coalition's materials currently recommend the 20-minute timed entry count offered by the Rapid Market Assessment (RMA) toolkit.

Markets expand the reach of healthy food, stabilize small businesses, and encourage responsible ecological practices. However, without the ability to gather and share accurate data on those impacts, most markets struggle to find sustained support. To address that need, Farmers Market Coalition (FMC) and its partners have begun to collect and test grassroots evaluation resources through its Farmers Market Metrics (FMM) program. These resources respond to the needs of "DIY" farmers markets by offering simple instructions on collecting data for a set of refined metrics, with a website for collecting, managing, and reporting that data.

There is no more obvious example of how difficult data collection can be at markets than the task of counting the number of visitors each attracts. Markets' attendees spill in from all sides, brought by every type of transportation method. Some shoppers re-enter the market multiple times after dropping off items to a cooler in the trunk of their car. Others use the market as a base to shop the surrounding area and then camp out on the grass to soak up the community vibe or to visit with neighbors. Some markets have pedestrians who may use the market only as a shortcut to their final destination. Because of these and other reasons, getting a precise number of unique visitors can be a challenge.

In contrast, festivals can count ticket holders or the number of cars to easily gauge their attendance, and even county fairs have turnstiles to do the work for the organizers.

So how is a market to make an accurate count? Most markets select one of three current methods when conducting a count. All three require staffing and a little planning. All three are only estimates of annual attendance. Those methods are commonly called:

- **Full count**
- **Sample (or Timed Entry) count**
- **Walkthrough (or Walk Around) count**

Each method has its pros, cons, and assumptions. For FMM, counting everyone would be the preferred version, but because of the wide variety in market layouts, that method remains impossible for many of them to complete regularly. Those issues include the size of a market (some stretch for blocks) or the layout (visitors may be using a dozen or more entrances) or because high attendance numbers would require a market to staff a large number of counters that is beyond its temporary staffing capability. Therefore, the FMM materials recommend the 20-minute timed entry count which was tested in a multi-year research project jointly led by the University of Wisconsin-Madison and FMC, where eight pilot markets in three different regions used data collection materials refined by the project team.

One of the collection mandates was to count the number of visitors at each market four times per season, using the interval method. That information was then used along with the dollar amount spent that day collected from visitors to calculate an estimate of total daily spending. University of Wisconsin lead researcher Lauren Suerth explained the choice of this method:

> "If the manager correctly performs the sample strategy, it is an accurate estimate of the number of daily visits. Given the resource constraints of farmers markets (e.g., personnel and time), sample counting is a practical strategy for any market that would like to collect data…"

Other counting methods, like counting cell phone pings within the market, may work even better in the future, once researchers identify a reliable estimate of those likely to carry cell phones with them to market. However, since those methods are rarely used at this point, each market will still need to test them on their own. A few emerging alternatives to head counts are covered at the end of this article.

If the purpose of counting visitors is simply to gain a sense of the average number entering, or to map the busy or lag times during the market day, then short samples or walkthrough counts will usually do the trick. Washington state researcher Colleen Donovan points out:

> "Given the arc of FM seasons, tracking "regular" attendance may not be the right goal. In my mind, the counts are best at providing a snapshot of distinct phases of any season (e.g., shoulder/early, peak, shoulder/late, holiday, winter) and, if one every market, a total count for the season."

If, however, the purpose of counting visitors is to use the attendance for calculations for other data being collected, then a more precise number and counting method is preferred by most researchers. It is always recommended that counting happen as often as possible during the season being measured. The FMM program asks for a minimum of two counts per season, but strongly recommends four. With four counts, you can capture a range that includes both special event days and average market days, thus representing fluctuating attendance within applicable weather variations. That may seem like a lot of work, but markets will realize once the counting team is assembled and trained, that it is much easier than expected to bring them back to count again in that same season.

• **Full count:** This method requires counting everyone deemed a unique market visitor as they enter the market. It is conducted the entire duration of the market on days that represent a good sample of regular visitor attendance. Market organization Market Umbrella advocates for this counting method when markets use their visitor survey/economic impact tool (SEED), in order to know how many surveys they will have to complete. The organization has used the full count method for their own Crescent City Farmers Markets since 2001, as do many other markets with available volunteers and limited entrances. Since this method relies on stationing data collectors at every entrance for the entire market day, it requires the most staff and instruction.

• **Sample (or Timed Entry) Count**: This method is conducted for a defined time each hour counting each person deemed a unique market visitor as they enter; usually this is for a 10 or 20-minute span. Reports generated by markets over the last few decades suggest that this is the most popular counting method used across the country. The Rapid Market Assessment (RMA) toolkit, devised by food system researchers Garry Stephenson and Larry Lev at Oregon State University, is credited with adapting this methodology for markets. In it, markets are instructed to choose

the best sample interval, although using the longest time span possible is always recommended. The RMA instructs markets to avoid counting during bouts of unusual activity, including the opening minutes of the market, during major events, or during the waning minutes of the market day.

Based on these suggestions and typical market flow, the fourth span of 10 minutes in each hour is usually used; for the 20-minute count it is usually the second 20-minute window, unless the market begins at the half-hour mark; in this case, the third 20-minute span would be used. This method requires the same number of collectors as the full count method, but the difference is that counting team can be assigned to other duties for the part of the hour when not counting, including gathering surveys from visitors or vendors.

Washington State's Karen Kinney and Colleen Donovan created this simple how-to for counting by sample and walkthrough methods for their Washington Farmers Market Management Toolkit available in FMC's Resource Library.

For both full and sample counts, the market selects the days during the season that represent "normal" market attendance days and enlists temporary staff or volunteers as counters; these counters receive some spot training on the day of collection along with a hand-held clicker or a tally sheet on which to keep track. It is recommended that someone be assigned to oversee the count (the SEED instructions suggest that this responsibility is not assigned to the busy market manager but instead to an intern or regular volunteer), and that supervisor should check in regularly and even collect the totals each hour. This way, any inconsistencies or need for reassignment of collectors to better manage the count can be done immediately. At the end of the day, totals are entered into a spreadsheet.

• **Walkthrough Count:** This method means walking through and counting everyone who is in the market during a particular interval. This method uses a calculation based on what is an assumed average stay for patrons of that market. If the average stay is assumed to be 10 minutes, then everyone is counted during one 10-minute period each hour and multiplied by 6 to gain the hour's estimate. Many market managers do this count every market day throughout the entire season or year.

Some gather walkthrough data every hour; others every half hour, like the Seattle's Neighborhood Farmers Markets (NFM). NFM founder Chris Curtis explains this process:

> "We have been counting shoppers at our markets the same way for 23 years. We send a staff person through the market every half hour and count adult heads with a hand-held clicker. The half hour was determined by asking shoppers (via survey) how long they stay at the market on a typical shopping trip. Several of our markets are very large now but still very farmer and food focused. As you can see, it is an inexact method of counting at best, but it has been the same for many years and it does give us a baseline to evaluate trends. We have always defined our overall success by sales to farmers. Shopper counts don't mean much if farmers aren't being supported. Having said that, we also know that shopper counts can help determine vendor and product mix so the much elusive "market balance" goal is reached."

Tracy Herner of the Williamsburg, Virginia market inherited the walkthrough method when she took over management of her market in 2013. Herner was trained by her predecessor over a period of weeks to follow the exact same method as had been used for the first years of the market. The two managers did tandem walkthrough counts at the same time, comparing totals once at the other end. Once the counts were similar, she took over the counting for good. Williamsburg shared their data with FMC for this article. Here is a snapshot of their spreadsheet of some of their walkthrough counts from 2008-2013:

2008		2009		2010		2011		2012		2013	
Date	Attendance	Dates	Attendance	Date	Attendance	Date	Attendance	Date	Attendance	Date	Attendance
9-Feb	762	14-Feb	936	13-Feb	378	12-Feb	790	11-Feb	506	9-Feb	608
8-Mar	142	14-Mar	402	13-Mar	775	12-Mar	763	10-Mar	876	9-Mar	830
12-Apr	1373	28-Mar	732	3-Apr	1409	2-Apr	800	31-Mar	850	30-Mar	1043
3-May	1592	11-Apr	1221	10-Apr	1288	9-Apr	806	7-Apr	1050	6-Apr	933
10-May	1378	2-May	1202	17-Apr	951	16-Apr	883	14-Apr	1045	13-Apr	1155
17-May	1327	9-May	1136	24-Apr	990	23-Apr	916	21-Apr	1076	20-Apr	979
24-May	1516	16-May	1309	1-May	1284	30-Apr	953	28-Apr	957	27-Apr	1070
31-May	1244	23-May	1299	8-May	1303	7-May	1001	5-May	942	4-May	887
7-Jun	981	30-May	1200	15-May	1383	14-May	873	12-May	1216	11-May	1223
14-Jun	1124	6-Jun	1001	22-May	1382	21-May	954	19-May	1188	18-May	871
21-Jun	1275	13-Jun	1560	29-May	1357	28-May	1008	26-May	1022	25-May	1214
28-Jun	1166	20-Jun	1043	5-Jun	1037	4-Jun	1009	2-Jun	964	1-Jun	1038
5-Jul	1343	27-Jun	1289	12-Jun	1266	11-Jun	910	9-Jun	1002	8-Jun	880
12-Jul	1169	4-Jul	1415	19-Jun	1100	18-Jun	901	16-Jun	1048	15-Jun	977

For Curtis and Herner, the decision to use this method has allowed their markets to spot trends over time, and plan accordingly. Herner uses her walkthrough data from the Williamsburg Farmers Market to decide when her events should be staged:

> "With adding programming such as PoP Club, we looked at our decrease in customer activity around 10:00 am, and determined that would be the perfect time to add a

customer boost by having the children's programming. It did indeed work, and our counts for 2016 during those weeks we had children's programming was higher than in years previous during that same time frame."

However, architects of the other methods are leery of encouraging it to be used for calculating actual attendance. From RMA co-creator Larry Lev:

> "The walkthrough method depends on developing a total attendance estimate but also on a more difficult assumption which is the number of minutes that shoppers (on average) spend in the market. I don't use the method but I think if you knew that shoppers spend an average of 30 minutes in the market your process would be to do a walkthrough every thirty minutes and add those up to get an average. If shoppers spend an average of 15 minutes you would have to do a walkthrough every 15 minutes for the entire period of the market. So for a four-hour market with a 30-minute average customer period in the market you would walkthrough 8 times and add up those eight numbers. If the stay were 15 minutes you would walk every 15 minutes and add up those 16 numbers. You had better be VERY accurate in how long people on average stay or you will have no confidence in the total you come up with. If you think they stay 15 minutes but they actually stay 30 minutes your attendance estimate will be twice the actual attendance. Also, if the average stay varies over the course of a single market or a market season so should the walkthrough frequency. If for the first hour of the market the average stay is 15 minutes you should do four walkthroughs. If later in the season people spend more time on average in the market, you need to adjust your process."

Counting Case Study 1: Crossroads Farmers Market, Takoma Park, MD

The Crossroads Farmers Market is one of eight markets in the AFRI-funded UW/FMC *Indicators For Impact* pilot. The scheduled collection date, the market's physical layout, and proximity of this market for the DC-based FMC staff made Crossroads ideal as the market for FMC to conduct all three counts on one day. Maryland Farmers Market Association Executive Director Amy Crone joined the team for the part of the market day to view the count and to assist as needed.

Six collectors were used to collect the counts: four assigned to specific entrances and two to offer breaks and to conduct the walkthrough counts each half hour. Another person gathered the data from each sheet after every interval and monitored for issues throughout the day. The sheet was broken down into 10-minute intervals to record every visitor entering the market in that time. A sincere attempt was made to only count each visitor the first time that they entered.

Entry Counts							
Hour	Period	Timeframe	Entry Point 1	Entry Point 2	Entry Point 3	Entry Point 4	Total by Time Period
11:00	1	11:00-11:10					0
	2	11:10-11:20					0
	3	11:20-11:30					0
	4	11:30-11:40					0
	5	11:40-11:50					0
	6	11:50-12:00					0
		Full Count by Entry Point	0	0	0	0	0
		10 min Sample by Entry Point	0	0	0	0	0
		20 min Sample by Entry Point	0	0	0	0	0
12:00	1	12:00-12:10					0
	2	12:10-12:20					0
	3	12:20-12:30					0
	4	12:30-12:40					0
	5	12:40-12:50					0
	6	12:50-1:00					0
		Full Count by Entry Point	0	0	0	0	0
		10 min Sample by Entry Point	0	0	0	0	0
		20 min Sample by Entry Point	0	0	0	0	0

Each person had a "zone of responsibility" for which they were to count. The zones assigned by the counters were double-checked with the Crossroads staff to ensure that they matched previous counts as closely as possible. Even with carefully assigned zones, communication between neighboring clickers was vital for those cases where there was a question– had a shopper traversed more than one zone when entering? Had a visitor entered previously? Is that visitor actually entering the market, or simply walking past it?

The tables show all of the interval counts that were done for the markets listed; all three of the markets profiled in the case studies did a full count and so were able to break that full count into 20-minute intervals. The Crossroads Farmers Market and Crescent City Farmers Market counts were also collected at 10-minute intervals. That breakdown allows the market to test the accuracy of the intervals.

-Note: Ordinarily, only one of the 10 or 20-minute intervals on each graph below would ordinarily be collected on a counting day. The shaded columns in the graphs represent the likely intervals that the markets would have used if they had only done one 10 or 20-minute count on that day.

Count totals for Crossroads Farmers Market July 21, 2016

10-minute count	20-minute count	Full Count	Walkthrough every 30 minutes
1014 total	1089 total	**1237 total**	709 total

Full count totals by entrance Crossroads Farmers Market July 21, 2016

Zone 1: University – tent pole	Zone 2: University tent pole – tree	Zone 3: Tree - Wall	Zone 4: Driveway + back entrances
101 [47]	252 [40]	567 [18]	210 [2]

[Market visitors who entered before opening]

Comparison of 20-minute intervals Crossroads Farmers Market July 21, 2016

Hour	1st 20 min interval	2nd 20 min interval	3rd 20 min interval
11am-12pm	181	127	133
12pm-1pm	131	83	75
1pm-2pm	88	84	36
2pm-3pm	65	69	58
Totals	465 (x3) **1395 for day**	363 (x3) **1089 for day**	302 (x3) **906 for day**
Diff (n)	158	(148)	(331)
Diff (%)	12%	(12.73%)	(30.89%)

Comparison of 10-minute intervals Crossroads Farmers Market July 21, 2016

Hour	1st10 min	2nd 10 min	3rd10 min	4th 10 min	5th 10 min	6th 10 min
11am-12 pm	96	85	67	60	72	61
12pm-1p m	75	56	28	55	39	36
1pm-2pm	43	45	40	44	20	16
2pm-3pm	30	35	34	35	29	29
Totals	244 (x 6) 1464 **for day**	221 (x 6) **1326 for day**	169 (x 6) **1014 for day**	194 (x 6) **1164 for day**	160 (x 6) **960 for day**	142 (x 6) **852 for day**
Diff (n)	227	89	(223)	(73)	(277)	(385)
Diff (%)	12%	6.94%	(19.81%)	(6.08%)	(25.22%)	(36.86%)

Crossroads count conclusion

The minor difference between the full and timed entry counts used for Crossroads suggest that both methods offered relatively accurate calculations for attendance. The 20-minute method was only 148 persons under the full count total (12.73%

lower) and the 10-minute count was only 73 persons off the full count total (6.08% lower). It is interesting to note, however, that the drop off in the middle hours are the steepest, and so which 10 or 20-minute span used on this day mattered a great deal. The walkthrough count had little similarity to the full count total. However, the choice made by the FMC team to conduct the walkthrough every 30 minutes was entirely arbitrary, as the market had never established an average length of time per visitor. It may also be interesting to some that when the market manager was asked at the end of the day for her estimation of the day's full count, it was within ten of the actual count.

Counting Case Study 2: Ruston Farmers Market, Ruston LA

This market is another of the eight markets in the AFRI-funded UW/FMC *Indicators For Impact* pilot. The Ruston Farmers Market tested the sample and full counting methods in 2015 and in 2016. The market asked their data collectors to mark the counts at each 20-minute mark, but did not count 10-minute spans. Here are their counts for a May 2016 market day, for which board members and volunteers conducted the count, with market manager Lauren Jennings available to handle questions. In 2016, the Ruston Farmers Market moved from their previous parking lot to an indoor-outdoor warehouse with its own fenced-in area, making the counting process much simpler, but also meaning they cannot accurately compare to previous counts.

Count totals for Ruston Farmers Market for May 21, 2016

10-minute count	2nd 20-minute count	**Full Count**	Walkthrough every 30 minutes
NA	858 total	**1509 total**	NA

Comparison of 20-minute intervals for Ruston visitor counts for May 21, 2016

Hour	1st 20 min interval	2nd 20 min interval	3rd 20 min interval
8-9	130	101	120
9-10	109	86	89
10-11	100	64	72
11-12	59	35	54
Totals	398 (x 3) **1194 for day**	286 (x 3) **858 for day**	335 (x 3) **1005 for day**
Difference (n)	(315)	(651)	(504)
Difference (%)	-23%	-55%	-40%

Ruston count conclusion

The difference for the 20-minute count from the full count was 651 persons (55% lower), outside of what many researchers would find an acceptable rate of error for counts of this type. It indicates that this market's flow of traffic is entirely too "spikey" to use sample counts successfully or at least it was for on that particular market day. This market is a seasonal market and only operates May through November; therefore, the day chosen may have been too early in the season to offer a representation of regular attendance.

Counting Case Study 3: Crescent City Farmers Market, New Orleans LA

New Orleans' Crescent City Farmers Market counts each person entering for the entire market day at least once per year at all four of their weekly markets. The count coincides with their SEED visitor survey collection day. The organization's summer intern, overseen by the senior staff, has historically managed staffing for the survey and counting day. That internship runs for 6-7 weeks in the summer and has the SEED survey work written into the work plan for the student, including the data entry portion of the data collection. The timing, staffing and methodology of the survey day is planned under the supervision of the Executive Director, Kathryn Parker. Volunteers round out the counting and survey team.

When Parker became the organization's executive director in 2013, she brought experience in data collection on grassroots initiatives, gained while at the Tulane Prevention Research Center measuring the health impact of bicycle ridership across New Orleans, among other data collection projects. As a result, Parker's updated counting methods have been tested and includes more detailed demographic breakdowns not shown here, using a form that adds a new line of data every 10 minutes.

Count totals for Crescent City Farmers Market for July 9, 2016

10-minute count	20-minute count	Full Count	Walkthrough every 30 minutes
1122	1167 total	**1127 total**	NA

Comparison of 20-minute intervals Crescent City Farmers Market July 9, 2016

Hour	1st 20 min interval	2nd 20 min interval	3rd 20 min interval
8am-9am	87 (+ 64 early)	105	87
9am-10am	116	128	101
10am-11am	118	112	93
11am-12pm	62	44	10 **(missing last count)**
Totals	383 x 3 (+64) =447 **1341 for day**	389 x 3 **1167 for day**	291 x 3 **873 for day**
Difference (n)	214	40	(254)
Difference (%)	17.34%	3.48%	-25.4%

Comparison of 10-minute intervals Crescent City Farmers Market July 9, 2016

Hour	1st10 min	2nd 10 min	3rd10 min	4th 10 min	5th 10 min	6th 10 min
8am-9am	39 (64)	48	43	62	30	57
9am-10am	61	55	67	61	49	52
10am-11am	57	61	61	51	34	59
11am-12pm	43	19	31	13	39	No data
Totals	264 x 6 **1584 for day**	183 x 6 **1098 for day**	202 x 6 **1212 for day**	187 x 6 **1122 for day**	152 x 6 **912 for day**	168 x 6 **1008 for day**
Diff (n)	457	(29)	85	(5)	(215)	(119)
Diff (%)	33.71%	(2.61%)	7.27%	(0.44%)	(21.09%)	(11.15%)

Crescent City Farmers Market count conclusion

In CCFM's case, the data from either the selected 10-minute count (40 persons from the full count, a 3.48% difference) or the 20-minute count (only 5 persons from the full count, a 0.44% difference) was extremely accurate. This count was from their Saturday market only, then in its 21st year in that same location. The other counts from the other three market days may not offer the same accuracy for the preferred sample period count as this sample count from their flagship (and longest-running) market.

What about other methods?

Some markets have considered the possibility of using video or photos to count visitors. Those estimating impromptu or ticketless crowds such as political gatherings use this process. Cameras are either installed or flown over the area to record the entire time either with video or with photos (with the emergence of drone technology, this has meant better coverage, including the ability to swoop in to count attendees under trees or in tents).

Once the event is done, the entire area is divided into squares on a map. By counting one square and then multiplying by the number of squares that contain people, one can estimate the total. However, this method requires other calculations, such as adjustments for different densities. This requires some expertise in calculations, which may be done by online networks for a fee or may be offered by university or municipality market partners. This method may be one such way that multi-block markets can reasonably assess their attendance.

In some markets, dedicated parking is offered to its visitors and can be used as a counting method. The Spotsylvania Farmers Market in Virginia is not easily walkable from any nearby area so the assumption can be made that everyone arrives by car. For the *Indicator for Impacts* project, the market enlisted a Boy Scout troop at the entrance to their lot to count cars and the number of passengers in each.

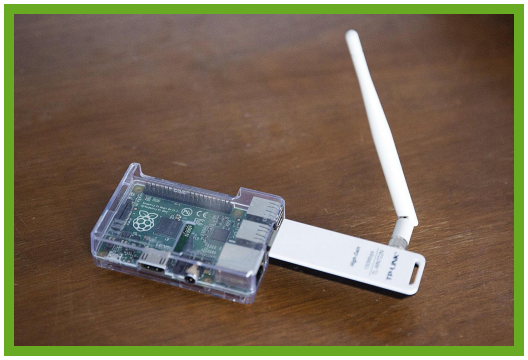
In retail stores, knowing how many people enter can be as easy as installing a counter at the door or under the entry mat. Of course, there are problematic counting situations even in retail, where shoppers enter in from a number of places, or when products are set up outdoors, which make those usual counting methods difficult. In response, some retail anthropologists are using **Wi-Fi Location Analytics.**
From the blog Behavior Analytics in Retail:

> "Wi-Fi is an emerging people tracking technology, which is ideal in unstructured movements and in large venues such as airports and stadiums. The Wi-Fi sensors monitor radio waves from the shoppers' smart phones and tablets, and can cover a range of up to 100,000 square feet. Since the emissions of each device (such as a smart phone) are unique, the system can continuously track the customer from entry to exit, and even beyond the store. Wi-Fi Location Analytics suffers from the challenges of GeoLocation Accuracy because the Cellular Tower Triangulation can be wide as half-mile area. Most vendors who offer Wi-Fi Tracking rely on in-store antennas that identify the location of the smartphone, and therefore the customer's path, inside the store."

D.C. based FRESHFARM has begun to test this methodology and shared their experience for this article:

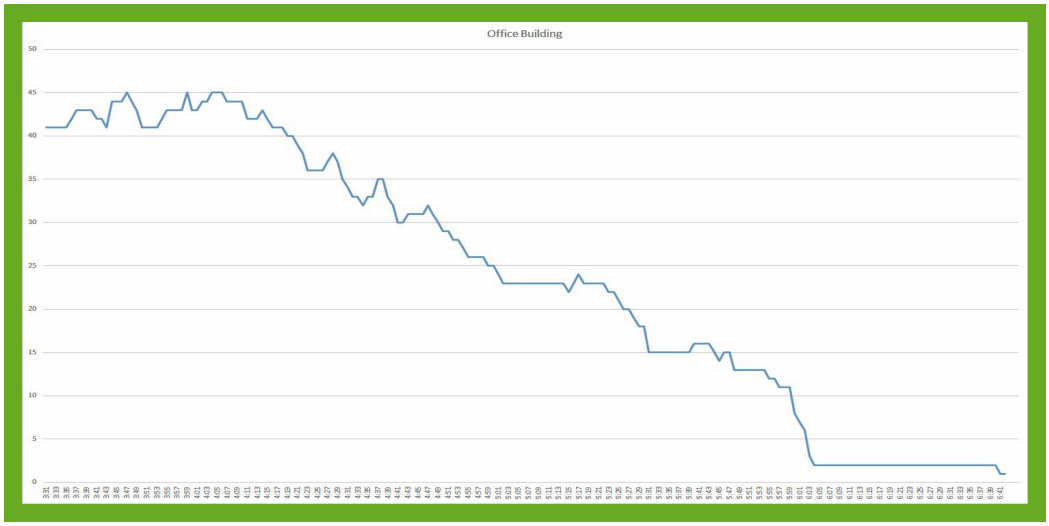
Counting Case Study 4: FRESHFARM Ping Counting Method, Washington, D.C.

Nony Dutton, the Deputy Director of the D.C. based non-profit FRESHFARM has begun to explore the use of this technology to count the attendees at the organization's 14 markets. He explains their pilot: "I learned that large retailers had been using phone tracking devices as a method for counting their customers and understanding traffic flow in and around their stores for years. Those commercial implementations were too expensive for a small non-profit like ours, so I began researching DIY alternatives. I discovered that the necessary equipment could be purchased for around $70, with the key pieces being a Raspberry Pi computer and a USB wireless adapter capable of operating in "monitor" mode."



Dutton explains further:

> "All cellphones with Wi-Fi enabled periodically (every few seconds) transmit "probe requests" which essentially announce their presence in an attempt to connect with nearby networks they are familiar with. Those requests carry with them a unique cellphone ID that can be logged and analyzed. We first tested the system in our office building and could clearly see the decline in nearby cellphones as it got closer to 5PM (quitting time) and dropping to nearly 0 cellphones by 6 PM" (see graph)."

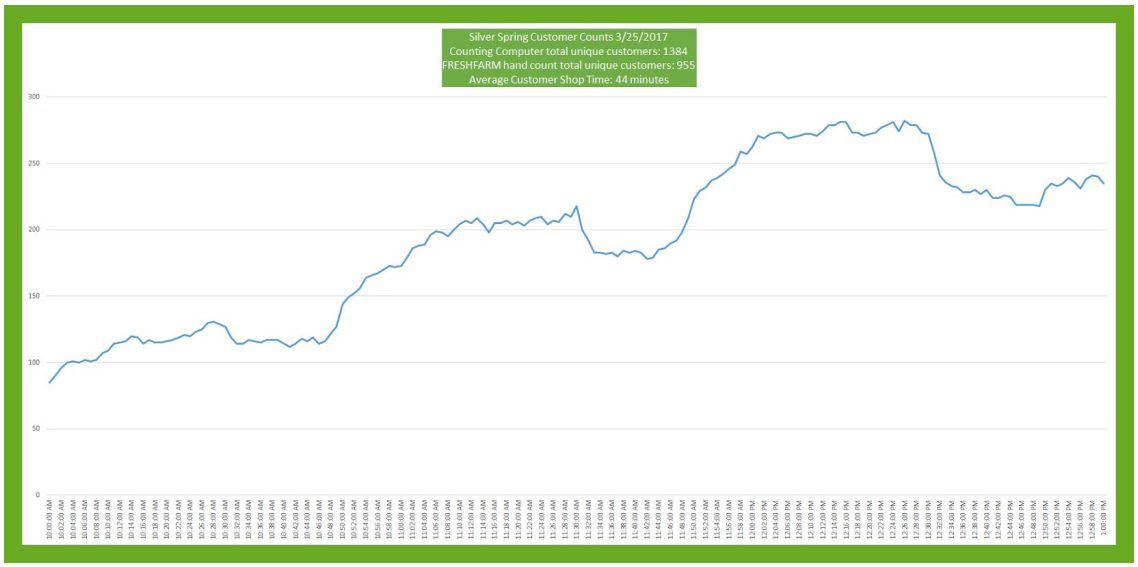


Fresh Farm initial cell phone ping test

"Since our office experiments, we have started a pilot program at one of our markets. This method is not without its flaws, however. A customer has to have a smartphone with Wi-Fi enabled to be picked up by the system. Customers with older phones or no cell phone at all go uncounted with this method. During our pilot program we're comparing Wi-Fi counts to tried-and-true walkthrough counts to determine the statistical accuracy of the Wi-Fi data. Privacy concerns are another issue we've considered during our pilot. Thankfully, modern cellphone manufacturers protect your identity by changing the unique ID transmitted by your cellphone daily or, in some cases, each time you unlock your phone. While this still enables us to get a good estimate for the number of customers at market it prevents us from tracking individual customers on a day-to-day basis."This was introduced by phone manufacturers to help protect consumer's privacy but each phone handles it differently, older phones don't have that feature at all, etc. You still get a count of the number of customers but it makes it slightly harder to track how long customers are staying at market on average."

An update from Fresh Farm's subsequent pilot in March of 2017:

"See below for the output on Saturday-- we believe it's a pretty accurate representation of the market traffic even though the unique customers total was significantly higher than our hand counts (1384 vs 955). However, given our hand method is the 30 minute count the difference vs the computer count seem to align pretty well with FMC's assessment that 30 minute counts were the least accurate (~60% of a full count's total). Each computer will cost us $105.40 for everything, which we think, is more than worth it!"



Fresh Farm's March 2017 Ping tracking at market

Conclusion

For some markets, using 10 or 20-minute sample periods to assess the number of visitors offer results well within acceptable rates of error. Whether a sample count

can be used instead of a full count has much to with how steadily and consistently visitors stream in throughout the day; it may be that seasonal markets are more likely to see large surges at the beginning of the day, especially early in the season. Conducting the counts on truly representative days, as all research partners strongly encourage, may control counting surges. However, the need to choose days far in advance in order to appropriately plan for data collection makes the decision as to what will be the best day difficult. This is true whether using full or sample counting, as both methods may end up being completed on days that are not representative. If the count is meant to assist with other data calculations (such as average shopper sales), it is preferable that the count is done for as long of a period as possible and done as often as possible in that same season.

More research is needed to test sample counting error rates that may be due to characteristics such as weekday versus weekend market days, the age of market (older markets may have a more stable number of weekly shoppers), available dedicated parking and other factors. Other methods of counting cars or cell phone pings may also be viable, depending on the market's layout and geographical positioning, and the need for detailed analysis from research partners.

Markets should think about their market's shopper habits: are there predictable "tides" to plan the counting around? Markets should be clear about their reasons for counting attendance, as well: does the current method serve the purpose? Markets with limited staffing capacity should determine if taking the time for a full count up-front outweighs the time spent on multiple, easier-to-conduct (and possibly less accurate) counts over a longer period of time.

This encouragement from Market Umbrella founder and SEED creator Richard McCarthy may be helpful for markets to consider when attempting establishing the best method for their market-specific counting:

> "Measuring humans is messy. We're unpredictable (or more accurately, it takes so many resources to track why we do things and when) and that's okay. You'll learn things in the process."

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[1] Hara, Tadayuki; Severt, Kimberly S.; and Shapoval, Valeriya (2015) "Estimating Total Number of Attendees to an Open Free Non-Gated Outdoor Cultural Event – A Case of Zora! Festival in Eatonville, Florida, USA," Journal of Tourism Economics, Policy and Hospitality Management: Vol. 3: Iss. 1, Article 1.
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