



# Economic Impact Analysis: Highland County Maple Festival

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Generations University For ACER 2020 September 2022

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## **Introduction**

The Highland County Maple Festival has served as a way to promote local businesses and bring visitors to the area for over 60 years. Founded in 1959 as a way to increase demand for local maple syrup, the festival brings thousands of visitors to Highland County over two weekends every March. Over the past half-century, the festival has evolved from just a way to learn about maple syrup into a cultural celebration with live performances from local dance groups, viewings of a silent movie filmed in the area during the 1920's, and an arts and crafts show with over one hundred juried craftspeople. In 1999 the festival was designated as a "Local Legacy" by the Library of Congress, and in 2014 it was designated as the "official maple festival of Virginia" by the state legislature (Virginia Legislative Information System, 2014).

In 2022, ten different sugar camps (maple syrup processing sites) were open for tours, pancake breakfasts were offered in four different locations across the county, and vendors were setup in the towns of Monterey and McDowell. This annual event brings in visitors from across the country and fills up all overnight accommodations in the county. The Highland County Maple Festival serves as a way to help businesses in the area, and also educate visitors about the history and relevance of agriculture in rural Appalachian communities. In March of 2022, a research team from Virginia Tech and Future Generations University surveyed festival visitors and vendors to quantify the impact that this festival has in Highland County. Analysis of the 420 surveys collected during the 2022 festival indicates that the event generated a direct economic impact between \$1.36 million and \$2.01 million in Highland County. The purpose of this report is to document the methods and results of the survey for the Highland County Chamber of Commerce and Future Generations University, the funder of this work through a USDA ACER

grant “Accessing South Atlantic markets for US Maple Syrup: educating consumers and enhancing distribution networks”.

Key findings from this report include:

- Visitors spent between \$73.18 and \$105.76 per day on average.
- Attendance measurements at the 2022 festival indicate that approximately 19,925 visitors spent 26,536 days at the festival.
- Visitors traveled an average of 97.69 miles to attend the festival.
- Visitors came from fourteen different States. Slightly over 85% of visitors were from Virginia.
- Just over 70% of visitors to the festival had attended the event in a previous year. The average number of years these visitors had attended the festival for was 13 years.
- Over 90% of respondents plan to attend the festival again in the future.
- More than 73% of respondents said they are interested in visiting Highland County during another time of year after attending the festival.
- To 42.3% of respondents, their favorite part of the festival was getting to eat maple syrup and other maple foods, the second most popular aspect of the festival was the arts and crafts vendors (23%).
- The most common way visitors had heard of the festival was through word of mouth (58.9%).
- The Highland County Maple Festival raised awareness about maple syrup production. 77.68% of respondents reported they had learned at least a “moderate amount” about maple syrup during their visit. In addition, 20.34% of visitors learned about difference between real and artificial maple syrup at the 2022 Highland County Maple Festival.
- Only 67.51% of respondents had purchased maple syrup in the year leading up to the festival, and 88.37% of respondents said they would maybe or definitely plan to purchase maple syrup after visiting the festival.

## **Methodology**

The main purpose of this report was to estimate the number of visitors who attended the 2022 Highland County Maple Festival and how much money they spent in Highland County during their visit. In order to do this, both vendors and visitors to the festival were surveyed. Visitors were surveyed using an intercept method during each day of the festival which took place on March 12<sup>th</sup>, 13<sup>th</sup>, 19<sup>th</sup>, and 20<sup>th</sup>. Vendors were emailed a survey after the conclusion of

the festival. Vendors and visitors were both asked to estimate how much money they had spent during their time in Highland County. The surveys given to visitors also included questions intended to determine what aspect of the event drew people to the area, and what non-financial impacts the festival has. Vendor surveys included questions asking about how sales and crowd sizes at the event compared to the vendor's expectations. To help encourage visitors to complete the survey, five gift baskets were created to be raffled off to randomly selected completers. These gift baskets were comprised of items from the Highland County Chamber of Commerce and products from Highland County producers. Each gift basket had a retail value of approximately \$50. Only visitors who appeared to be over the age of 18 were asked to complete the survey. In total, 398 surveys were at least partially completed. Four respondents were under the age of 18 and fourteen surveys were completed by permanent residents of Highland County. None of these eighteen surveys were included in the analysis. The results of the four surveys completed by minors were not included in the analysis, while the surveys completed by local residents were set to the side. This left a total of 380 visitor surveys for analysis. There were 40 responses to the vendor survey. Not every respondent answered every question on the survey, and questions had slightly different numbers of responses. Nonresponse bias was not analyzed as a part of this research.

## **Findings**

### **Visitor Travel Behavior**

One of the early questions in the visitor survey asked visitors to indicate the zip code of their home residence. These zip codes were then analyzed to identify what state visitors had traveled from, and how far they had traveled to attend the festival. A large majority of visitors came from inside Virginia, with over 85% of respondents indicating they lived within the state.

The next most represented state among respondents was West Virginia, with 4.49% of respondents. Maryland was the home state of 2.11% of respondents, and no other state represented more than 2% of respondents. Overall, thirteen states plus the District of Columbia and Saudi Arabia were represented by survey respondents. For the two respondents from Saudi Arabia, it is likely that they are studying or working in the region and did not travel that distance to attend the festival. Within Virginia, many visitors came from the western region of the state. However, there were also clusters of visitors who attended from the metropolitan areas surrounding- Richmond, Washington DC, and Virginia Beach. There were very few visitors from Southwestern Virginia.

Home Residence of Respondents		
Location	Count	Percent
VA	324	85.49%
WV	17	4.49%
MD	8	2.11%
NC	7	1.85%
PA	5	1.32%
OH	3	0.79%
SC	3	0.79%
DC	2	0.53%
OK	2	0.53%
Saudi Arabia	2	0.53%
TX	2	0.53%
CO	1	0.26%
MO	1	0.26%
NY	1	0.26%
TN	1	0.26%
<b>Total</b>	<b>379</b>	

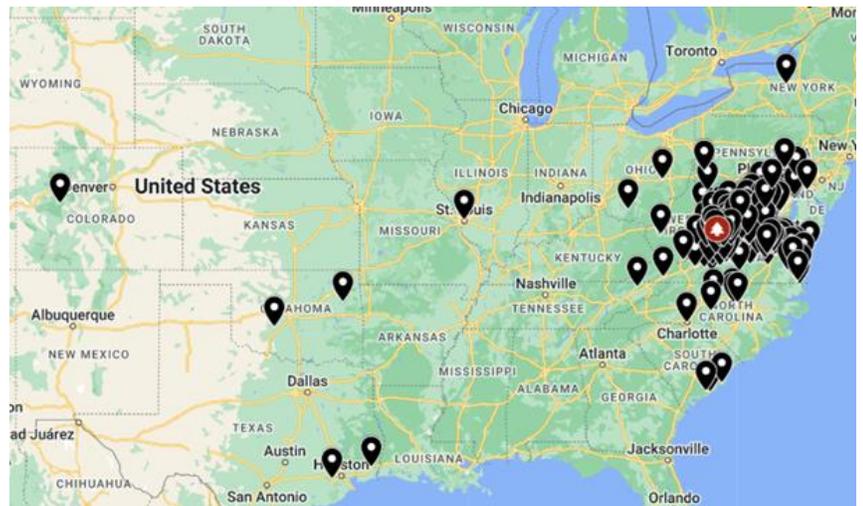
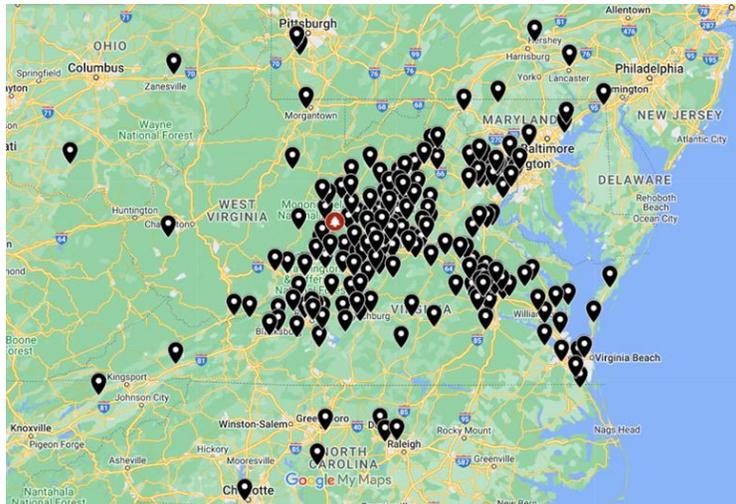


Figure 2: A map showing geographic distribution of respondents

Figure 1: A table showing the geographic distribution of respondents



*Figure 3: A map showing the distribution of visitors who live in Virginia and neighboring states*

In order to find how far visitors traveled to visit the 2022 festival, the Haversine Formula was applied to information provided in visitor surveys. Zip codes provided by visitors were converted into latitude and longitudinal coordinates using Geocodio software. This software converts zip codes into coordinates using data provided by the US Census Bureau. Once the zip code entries were converted into latitude and longitude coordinates, the Haversine Formula was used to calculate distance traveled to the festival.

First implemented in the early 1800's, the Haversine Formula can be used to calculate the distance between two points on a spherical object (Brummelen, 2013). Originally used for navigational purposes, this method is now commonly used to estimate the distance between locations on earth using latitude and longitude coordinates. The Haversine Formula uses spherical trigonometry to triangulate distances between two locations (Prasetya, 2013). Although the earth is not perfectly spherical, haversine estimates still provide an accurate approximation of distances. Haversine calculations do not factor in the topography of the distance between two points. Although the values found using this method represent real distance and not driving

distances between locations, the information collected still provides useful insights into how far visitors are willing to travel for the Highland County Maple Festival.

To estimate the distance between visitors' home locations and the festival, a central point within Highland County was needed. The central point selected was the town of Monterey, which has the coordinates latitude: 38.4123° N and longitude: 79.5806° W. Since this analysis was designed to measure travel distances of visitors coming to the area for the festival, all respondents who lived in Highland County were removed from this analysis. In addition, all respondents who indicated that the Highland County Maple Festival was not the primary reason for their visit to Highland County were removed. The remaining 334 zip codes represented all respondents who provided their zip codes, lived outside of Highland County, and had traveled to Highland County primarily to attend the festival.

The average distance traveled to attend the festival for these respondents was 97.69 miles. This figure was skewed by a few visitors who traveled very far distances, with four respondents indicating their home addresses were over 1,000 miles away from Monterey. The median travel distance was 61.64 miles. When the interquartile range was analyzed, it was found that 50% of respondents had traveled between 38.13 miles and 114.82 miles. The minimum distance a respondent from outside of Highland County traveled was 13.61 miles from neighboring Bath County, and the maximum distance traveled was 1,483.01 miles from Garfield County, Colorado.

Travel distances were also separated into bins with a range of 25 miles each for group analysis. Only 2.69% of respondents had traveled from within 25 miles to the festival. The most commonly traveled distance was between 25 and 50 miles, with 38.62% of respondents indicating they fell within this range. The second most common range was between 50 and 75

miles with 16.17% of respondents. 34.14% of respondents indicated that they traveled over 100 miles to attend the festival.



Figure 4: A boxplot displaying the distribution of travel distances in miles. Outliers were removed so that the distribution within the interquartile range could be seen.

Miles Traveled	
Minimum	13.61
1st Quartile	38.13
Median	61.64
3rd Quartile	114.54
Maximum	1483.01

Figure 5: IQR of visitor travel distances



Figure 6: Histogram displaying how far visitors traveled to attend the Highland County Maple Festival. The upper bound of each bin represents values less than or equal to that amount.

## Visitor Age

Visitors were provided with five age-range brackets. These options were Under 18, 18-29, 30-45, 46-64, and 65 or older. While this question does provide helpful insights into the average ages of visitors to the Highland County Maple Festival, it is important to remember that these statistics only include adults who visited the festival. Children were not asked to take the survey, and respondents were only asked for their age and not the ages of those in their travel

party. The results of this question indicate that the adults who visit the festival generally are older, with 61.4% of respondents indicating they were 46 years old or older. Only 13.5% of respondents were between the ages of 18 and 29 years old.

Age of Respondents		
Age	Count	Percent
18-29	50	13.5%
30-45	93	25.1%
46-64	145	39.2%
65 or older	82	22.2%

Figure 7: Distribution of respondent's ages

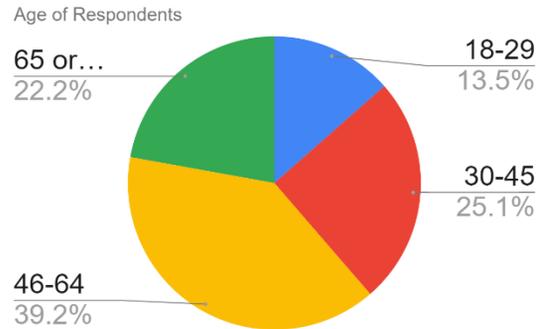


Figure 8: Pie chart showing age distribution of respondents

### New Visitors and Retention

When asked if they had attended the festival prior to 2022, 70.73% of respondents said that they had. Only 29.27% of respondents were first time visitors. The next survey question asked those attended previous festivals how many years they had attended. Responses showed that the Highland County Maple Festival has many long-term visitors. The average number of years the respondents had attended the festival for was 13.18 years. The median number of years was 7. The data was skewed by a few respondents who have been coming for many years such as the respondent who has attended the Highland County Maple Festival for 62 years. The mode, or most common response, was that respondents had attended the festival three times prior to 2022. When the IQR was calculated, it was found that 50% of respondents had come to the festival for between 3 and 20 years, and 25% had been attending for more than 20 years.

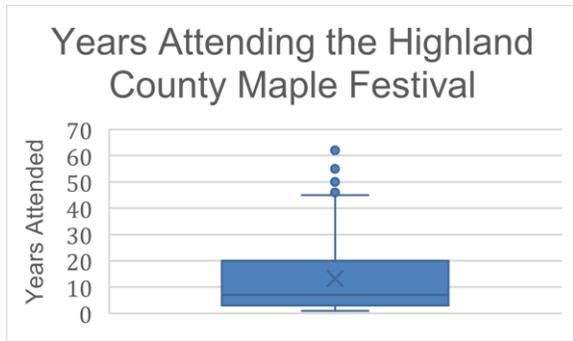


Figure 9: Boxplot displaying the distribution of years visitors have attended the festival.

Years Attended	
Minimum	1
1st Quartile	3
Median	7
3rd Quartile	20
Maximum	62

Figure 10: IQR of years visitors have attended the festival.

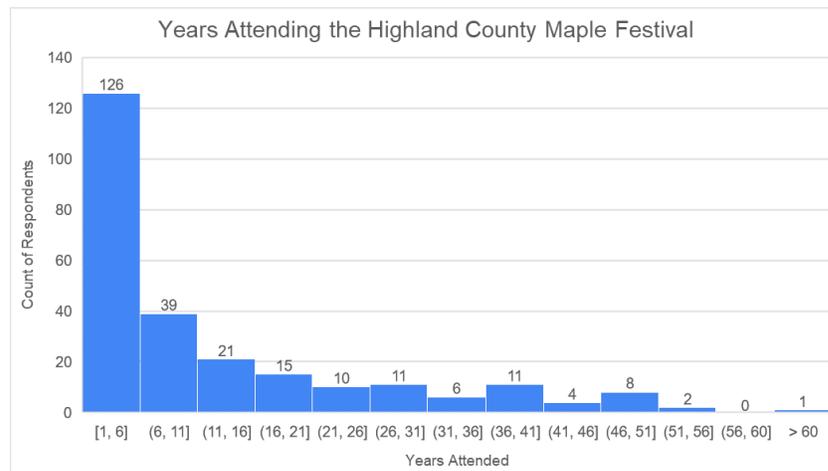


Figure 11: Histogram displaying how many years visitors have attended the Highland County Maple Festival. The upper bound of each bin represents values less than or equal to that amount.

Later on in the survey, respondents were asked if they planned to attend the Highland County Maple Festival in the future. In total, 91.95% of respondents said that they would either definitely or probably attend the Highland County Maple again. Only 5 respondents said they would not or probably not attend again. When looking at the response to this question from only first-time visitors, 81.44% said they would definitely or probably attend again. It is also worth noting that all five respondents who may not attend again were first time visitors.

Do You Plan to Attend Again?		
Response	Count	Percent
Yes	262	75.29%
Probably Yes	58	16.67%
Maybe	23	6.61%
Probably Not	3	0.86%
No	2	0.57%
Total	348	

Figure 12: Number of respondents who plan to attend festival again in the future

Do You Plan to Attend Again? (First Time Visitors)		
Response	Count	Percent
Yes	42	43.30%
Probably Yes	37	38.14%
Maybe	13	13.40%
Probably Not	3	3.09%
No	2	2.06%
Total	97	

Figure 13: First time visitors' response to the question of whether they will attend the festival again in the future

Another question used to gauge visitor retention at the festival asked visitors if they are interested in visiting Highland County during another time of year. The purpose of this question was to investigate the impact that this festival has in Highland County outside of when it is occurring. Overall, of the 350 respondents to this question 73.85% said they are definitely or probably interested in visiting during another time of year. Of the 98 first-time visitors who responded to this question, 62.25% were interested in visiting the area during another time of year.

Are You Interested in Visiting During Another Time of Year?		
Response	Count	Percent
Yes	190	54.60%
Probably Yes	67	19.25%
Maybe	69	19.83%
Probably Not	16	4.60%
No	8	2.30%
Total	350	

Figure 14: The number of respondents interested in visiting Highland County during another time of year

Are You Interested in Visiting During Another Time of Year? (First Time Visitors)		
Response	Count	Percent
Yes	41	41.84%
Probably Yes	20	20.41%
Maybe	26	26.53%
Probably Not	8	8.16%
No	3	3.06%
Total	98	

Figure 15: First-time visitor respondents interested in visiting Highland County during another time of year

### What Attracted Visitors to the Highland County Maple Festival?

Visitors were asked if the Highland County Maple Festival was the main reason for their visit to the county. The reason this question was included in the survey was to avoid an issue commonly found in economic impact analyses. Often, these types of analysis will include all

visitors to an event when estimating the economic impact. However, visitors to the area who are visiting for reasons other than the festival are known as “casual visitors” who would have come to Highland County regardless even if the festival was not taking place. It was found that 7.42% of people who responded to this question were not in Highland County primarily because of the Highland County Maple Festival.

Visitors whose main reason for being in Highland County was the festival were then asked what about the festival attracted them to the area. Visitors were given the options of “Opportunity to learn about maple syrup”, “History and cultural heritage”, “Arts and crafts vendors”, “Live Performances”, “Tasty maple treats”, “Entertainment for the family”, and “Other”, Respondents were asked to select as many of these options as were relevant to their decision. Responses to this question showed that getting to eat maple syrup and value-added products like maple donuts is the main attraction. The arts and crafts vendors set up throughout the county also attracted many visitors. The opportunity to learn about the maple syrup production process and the cultural heritage that the event celebrates are also big attractions. The 51 respondents who selected the “Other” option were given the opportunity to write-in additional things that attracted them to visit the area. Many of these responses focused on things like the scenic beauty of the area, the charm of the community, the opportunity to purchase trout, and earning a girl scout badge for learning about forests. There were 330 respondents to this question, and only 27 of them said that the live performances hosted during the festival were part of the reason they attended.

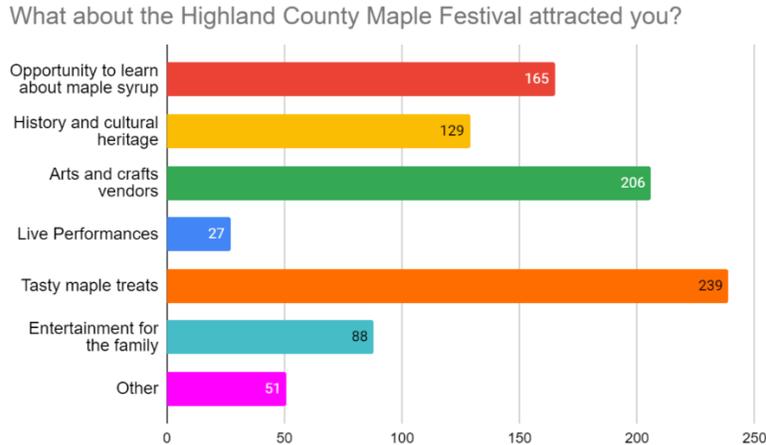


Figure 16: What attracted respondents to visit the festival? There were 330 respondents to this question, and this question asked them to select all relevant choices

Visitors were then asked to select their one favorite thing about the Highland County Maple Festival. This question had a much lower response rate than other questions in the survey because many respondents selected multiple answer choices, and those entries were removed from analysis. Responses to this question did follow a similar trend to the question where visitors could select every aspect of the festival they enjoyed. Eating tasty maple treats was the most popular aspect of the festival, with 42.31% of respondents saying that was their favorite. Visiting arts and crafts vendors was the favorite activity of 23% of respondents and learning about maple syrup was the favorite of 20.56% of respondents. For the 36 respondents who selected “Other”, the answers were mostly focused on getting to spend time outdoors in such a scenic area, pancake breakfasts, square dancing, and getting to meet interesting people at the festival.

Favorite Part of the Festival		
Category	Count	Percent
Tasty Maple Treats	124	43.21%
Arts and crafts	66	23.00%
Live performances	2	0.70%
Learning about maple syrup	59	20.56%
Other	36	12.54%
Total	287	

Figure 17: Table showing respondent's favorite part of the Highland County Maple Festival

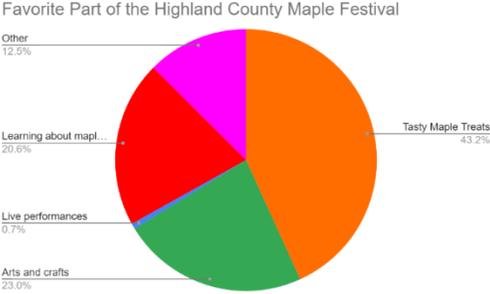


Figure 18: A pie chart displaying respondent's favorite part of the Highland County Maple Festival

**Marketing the Highland County Maple Festival**

Festival visitors were asked to indicate how they had learned about the Highland County Maple Festival. Respondents were given seven options and asked to indicate all that applied. Since many respondents had attended the festival for multiple years, it was not surprising that the most popular selection for this question was “Word of mouth”. Of the 365 respondents to this question, 215 (58.9%) said this is how they had heard of the festival. The second most common selection was “Other” which was selected by 82 (22.47%) respondents. When the “Other” responses were reviewed, the responses provided almost all belonged in the “Word of mouth” category. These responses included things like hearing about the event from friends, family, and many people saying they cannot remember because they have been coming for so many years. A few of the “Other” responses also included from TV coverage aired on channels like PBS 23 and a local news channel in Richmond. The next most common way people had learned of the event was from social media with 67 (18.36%) of respondents selecting this option.

How Did You Hear About the Highland County Maple Festival?		
Category	Count	Percent
Maple Festival Brochure	31	8.49%
Maple Festival Website	49	13.42%
Social Media	67	18.36%
Newspaper or other print media	31	8.49%
Radio	14	3.84%
Word of mouth	215	58.90%
Other	82	22.47%
Total Respondents	365	

Figure 19: How respondents learned of the Highland County Maple Festival

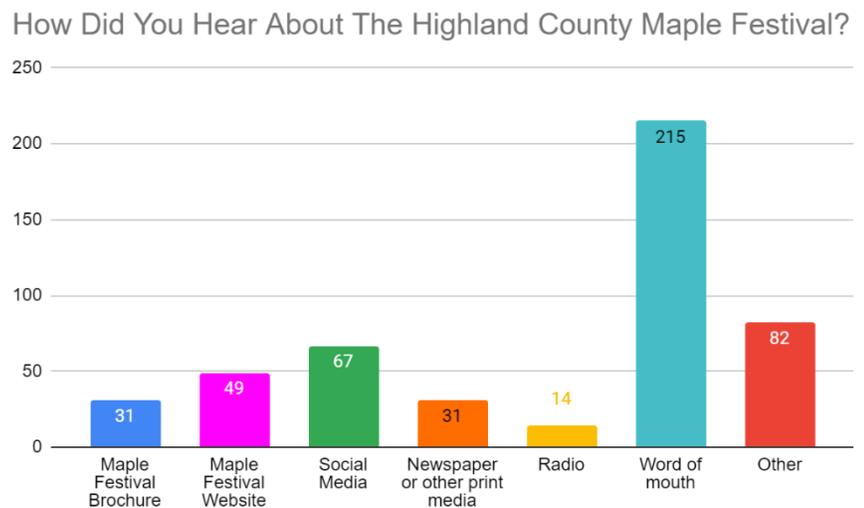


Figure 20: How respondents learned of the Highland County Maple Festival

## Maple Syrup Education and Purchasing Behavior

In order to quantify the educational value of the festival, visitors were asked questions to try to identify how much they learned about maple syrup production, if they were aware of the difference between real and artificial syrup products, and if they were more likely to purchase maple syrup after having attended the festival. Visitors were asked directly how much they learned about maple syrup during their time at the festival. The majority of respondents indicated they had learned “A lot” about maple syrup production, with 39.13% of the 345 respondents selecting this option. The second most selected option was “A moderate amount” with 38.55% of respondents choosing this option. Only 3.19% of respondents said they had learned “Nothing at all” about maple syrup production during the festival.

<b>How much have you learned about maple syrup production during your visit to Highland County?</b>		
<b>Category</b>	<b>Count</b>	<b>Percent</b>
A Lot	135	39.13%
A Moderate Amount	133	38.55%
A Little	66	19.13%
Nothing At All	11	3.19%
<b>Total</b>	<b>345</b>	

*Figure 21: How much respondents learned about maple syrup production*

Visitors were also asked if they were aware of the difference between real maple syrup and imitation products like corn-based table syrup. Respondents to this question had three answer choices: That they were aware of the difference and knew before the 2022 Highland County Maple Festival, that they were aware of the difference and had learned during this year’s event, or that they were not aware. This question showed that 91.69% of the 349 respondents were aware of the difference between real maple syrup and artificial syrup. The majority of respondents were aware of this difference prior to the 2022 Highland County Maple Festival, but 20.34% of respondents indicated they had learned about the difference during this year’s festival. When only first-time visitors were considered in this question, the results were very similar. One hundred (100) first-time visitors responded to this question, and 89 of them were aware of the difference. Twenty-one (21) of these visitors had learned about the difference during their visit to the Highland County Maple Festival.

Are you aware of the difference between real maple syrup and imitation products?		
Category	Count	Percent
Yes, I was aware prior to this visit to the Highland County Maple Festival	249	71.35%
Yes, I learned during this visit to the Highland County Maple Festival	71	20.34%
No, I am not aware	29	8.31%
Total	349	

Figure 22: The number of respondents who knew the difference between real and artificial syrup.

Are you aware of the difference between real maple syrup and imitation products? (First Time Visitors)		
Category	Count	Percent
Yes, I was aware prior to this visit to the Highland County Maple Festival	68	68%
Yes, I learned during this visit to the Highland County Maple Festival	21	21%
No, I am not aware	11	11%
Total	100	

Figure 23: First time visitors' knowledge of the difference between real and artificial syrup

The next question focused on learning more about the educational value of the Highland County Maple Festival asked visitors if they had purchased maple syrup in the twelve months leading up to the Highland County Maple Festival. This question was followed by a question asking visitors if they planned to purchase maple syrup in the twelve months after the festival. The purpose of these questions was to identify a shift in purchasing patterns of maple syrup because of the Highland County Maple Festival. In the twelve months before the festival, 67.51% of respondents had purchased maple syrup. In the twelve months after the festival, 70.06% of respondents indicated they would purchase maple syrup and 18.31% of respondents said they may purchase maple syrup. These responses indicate the key role that the Highland County Maple Festival plays in educating consumers about pure maple syrup and how it is made, and its importance in creating new maple syrup consumers.

Did you purchase pure maple syrup, in the 12 months prior to this year's Highland County Maple Festival?		
Category	County	Percent
Yes	241	67.51%
No	107	29.97%
I am unsure	9	2.52%
Total	357	

Figure 24: The number of visitors that had purchased maple syrup in the year before the festival

In the twelve months after your visit to the Highland County Maple Festival, do you plan to purchase pure maple syrup?		
Category	County	Percent
Yes	241	70.06%
Maybe	63	18.31%
No	27	7.85%
I am unsure	13	3.78%
Total	344	

Figure 25: How many respondents plan to purchase maple syrup after attending the festival

## Visitor Behavior

In a festival with as many different things to do and see as the Highland County Maple Festival, there is no one way to enjoy the event. Visitor behaviors including the number of days people attended the festival, number of sugar camps they visited, and whether or not visitors stayed overnight in Highland County during the event were analyzed. Only 21.99% of respondents were staying overnight in Highland County during the festival. Anecdotally, the research team heard from many visitors that they were staying overnight in neighboring counties as they could not find places to stay in Highland County.

Are You Staying Overnight in Highland County?		
Category	Count	Percent
Yes	75	21.99%
No	266	78.01%
Total	341	

Figure 26: Breakdown of respondents staying overnight in Highland County during the festival

Respondents who stayed overnight in Highland County were then asked where they lodged. Exactly one-third (33.33%) of respondents were staying at a friend or family member's home. The next highest percentage of respondents were staying at a rental property (18.84%), followed closely after by respondents staying at Bed and Breakfasts (17.39%).

Where are You Staying Overnight in Highland County?		
Category	Count	Percent
Hotel	10	14.49%
Bed and Breakfast	12	17.39%
Rental Property	13	18.84%
A friend or family member's residence	23	33.33%
At my home (secondary residence)	11	15.94%
Total	69	

Figure 27: Overnight lodging for visitors to Highland County during the festival

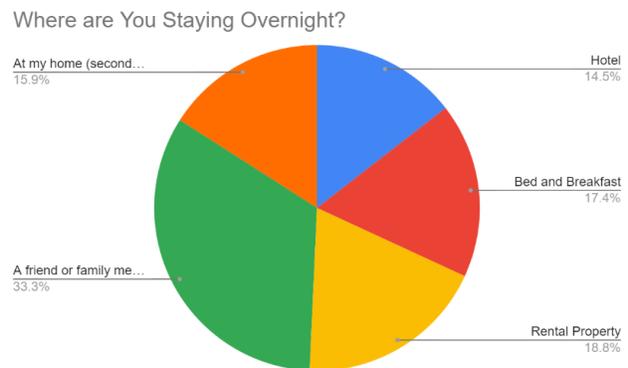


Figure 28: Lodging for overnight visitors to Highland County during the festival

Visitors were also asked what days they planned to attend the festival. This data was then used to estimate how many days respondents attended the festival. The majority of respondents (72.73%) were only planning to attend the festival for one day. There were 23.03% of respondents who planned to attend for two days. Six (1.82%) respondents planned to attend for three days and 8 (2.42%) out of the 330 respondents were planning to attend the festival for all four days.

<b>How Many Days Are You Attending the Festival?</b>		
<b>Category</b>	<b>Count</b>	<b>Percent</b>
One Day	240	72.73%
Two Days	76	23.03%
Three Days	6	1.82%
Four Days	8	2.42%
<b>Total</b>	<b>330</b>	

Figure 29: Number of days respondents attended the festival

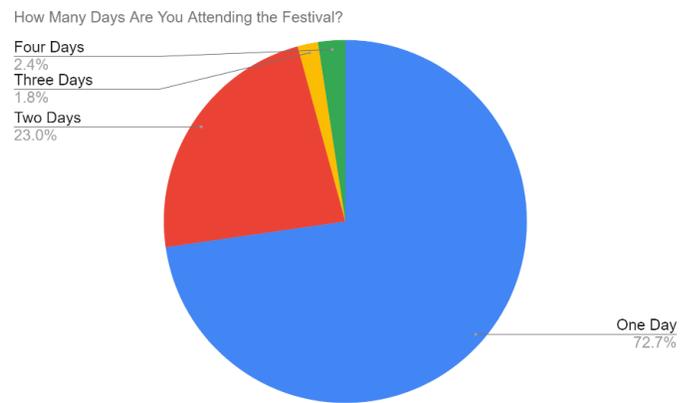


Figure 30: Number of days respondents attended the festival

The survey also asked visitors how many sugar camps they planned to visit during the festival. There were 311 respondents to this question. The largest number of respondents visited only one sugar camp (22.19%), however very similar numbers of respondents visited one (22.19%), two (21.22%), and three (19.61%) sugar camps. There were 7 respondents who planned to visit all 10 sugar camps during the festival.

How Many Sugar Camps Do You Plan to Visit?		
Category	Count	Percent
0 camps	35	11.25%
1 Camp	69	22.19%
2 Camps	66	21.22%
3 Camps	61	19.61%
4 Camps	32	10.29%
5 Camps	19	6.11%
6 Camps	12	3.86%
7 Camps	7	2.25%
8 Camps	3	0.96%
9 Camps	0	0.00%
10 Camps	7	2.25%
Total	311	

Figure 31: Number of sugar camps each respondent planned to visit.

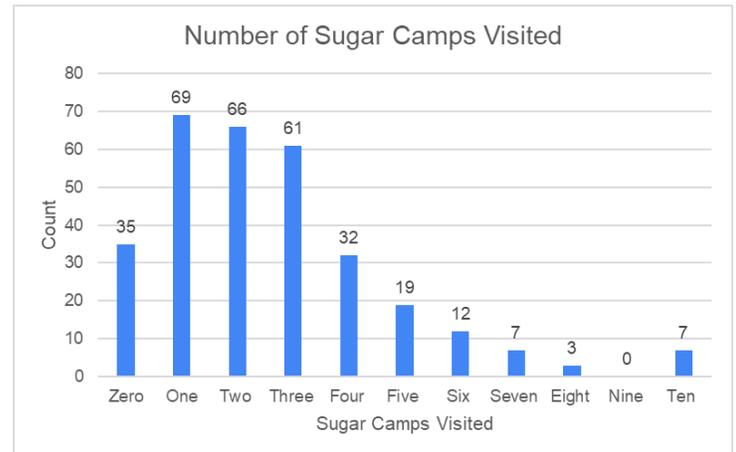


Figure 32: Number of sugar camps respondents planned to visit.

### How Could the Highland County Maple Festival be Improved?

The final thing that visitors were asked in the survey was feedback about how the Highland County Maple Festival could be improved in future years. In total, there were 191 responses to this question. All responses were reviewed, and a few common themes were identified. Eighty-five (85) of the responses indicated that they like the event as it is currently, or that they could not think of anything to be changed. The most common topics that respondents said could be improved upon were the quality/variety of vendors (20 mentions), management of traffic flow (12 mentions), roadside signage identifying sugar camps from roads (10 mentions), parking in Monterey and McDowell (10 mentions), size and quality of the brochure map (6 mentions), and a lack of places to stay overnight (6 mentions). In particular, the feedback about the vendors included 8 mentions about either an overall lack of food options, a lack of healthy food options, or a lack of vegetarian food options. The other comments about the vendors focused on there being fewer vendors this year than in the past and the low quality of the

products being sold by some vendors. One respondent also requested that the festival add more textile artists. The full list of comments made by respondents in this section of the survey can be found in Appendix B.

### **Economic Impact of the Highland County Maple Festival**

To calculate the spending by visitors and vendors at the 2022 Highland County Maple Festival, it was first necessary to estimate the number of visitors who attended the festival. To estimate attendance, a method was developed based off practices used by the National Park Service to measure how many visitors enter its parks (Ziesler and Pettebone, 2018). The full attendance counting methodology is available in Appendix C. The overall estimate of visitors at the 2022 Highland County Maple Festival was 19,925 visitors. However, the Highland County Maple Festival takes place over four days and visitors could attend the festival on multiple occasions. This study estimates that the 19,925 visitors made the equivalent of 26,536 one-day visits to the festival over the four days the event took place. Additionally, it is estimated that 263 vendors made the equivalent of 1,052 one-day visits.

It was necessary to determine how many one-day visits to the festival took place, as all spending data collected from visitors and vendors was broken down to measure how much money one person spent during one day at the event. There were 253 visitor surveys with complete spending information and 35 vendor surveys with complete spending information. Both the vendor and visitor surveys asked for respondents to estimate how much money they spent in Highland County in eight categories. These categories were “Lodging”, “Restaurants”, “Grocery and convenience Stores”, “Transportation/Gas”, “Food and crafts from vendors in Monterey and McDowell”, “Merchandise from brick-and-mortar stores”, “Food and Crafts from sugar camps”,

and “Other” spending. Due to a transcription error, “Lodging” was left off of the visitor’s survey. An alternative method of estimating lodging spending is addressed in Appendix E. Categories were included in order to help visitors organize their spending and best remember what they may have spent money on. These categories also provide helpful insights to the research team on what types of things visitors are spending money on.

Visitors and vendors were also asked to indicate how many people their spending estimates covered. In addition, visitors were asked how many days they planned to attend the festival for. It was assumed all vendors attended the festival for all four days. For each survey’s spending data, the responses were then divided by both the number of people that the spending estimate covered, and the number of days that the respondent attended the festival. The resulting figures represent the daily spending for one person for one day at the festival. The average spending within each category was then calculated.

Within each spending category boxplots were created to investigate the distribution of spending by respondents. It was found that every category had heavily skewed data, with many respondents not spending any money in some categories, while other respondents spent large sums. This skew in the data led the research team to believe that applying mean spending for each category to all visitors at the festival may create an overestimation of spending. In order to address this a separate analysis of spending within each category was conducted with outliers removed from the data set. A full discussion of how outliers were identified and removed is available in Appendix D.

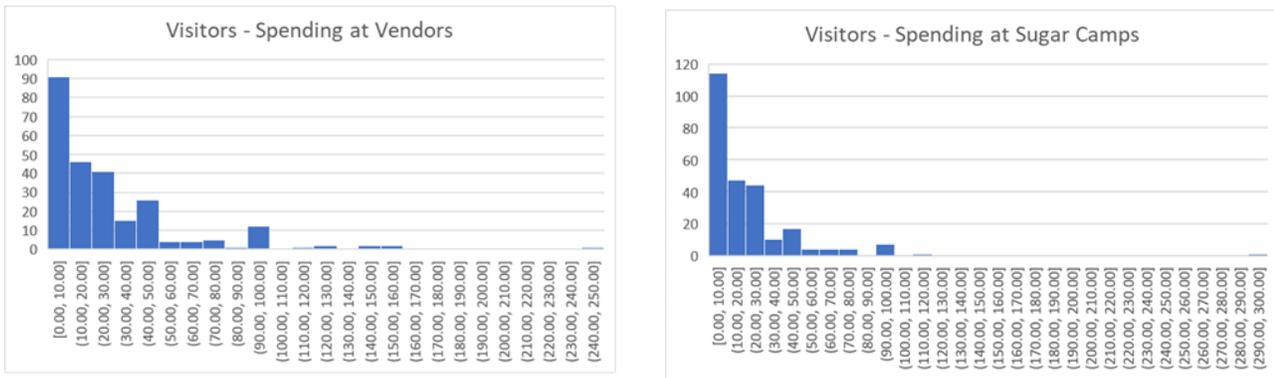


Figure 33: Histograms displaying the distribution of visitor spending in two categories. All categories for both visitor and vendor spending displayed similar levels of skew.

### Spending Estimates for Visitors and Vendors

Once the data had been analyzed both with and without outliers included spending estimates were created for both visitors and vendors. These estimates are for one person visiting the festival for one day. The spending estimates including the outlier spenders is being treated as an upper bound, and the estimates created with the high-spending outliers removed is being treated as a lower bound estimate. It is assumed that some visitors who did not complete the survey also spent much more than the average visitor, and without surveying every visitor at the festival it is impossible to determine the true spending of every person. These two estimates represent a range that it is believed true spending falls within.

It is estimated that the average visitor spent between \$73.18 and \$105.76 each day they were at the festival. The average vendor spent between \$31.60 and \$59.08 each day they attended the festival. For visitors, the category the most money was spent in was food and crafts from vendors. Somewhere between \$21.60 and \$29.51 was spent in this category by each visitor every day according to the survey results. The second largest spending category was food and crafts purchased from maple syrup producers. Visitors spent between \$15.45 and \$21.60 in this category. Visitors spent the least amount of money on “other” spending in Highland County. The second least amount of money was spent on lodging, which is logical as only 21.99% of

respondents stayed overnight in Highland County. Additionally, only 50.72% of respondents who did stay overnight stayed in a hotel, bed and breakfast, or rental property and the rest stayed with friends, family, or in a second home in the county.

For vendors, lodging was the second largest spending category only behind transportation and gas. Many more vendors stayed overnight in Highland County as they had to be there from opening to closing. Vendors also spent more on transportation and gas than visitors as many of the vendors brought trailers and larger vehicles into the Highland County for the festival. Vendors spent on average less than a dollar at sugar camps and at brick-and-mortar stores. Visitors also spent relatively little at brick-and-mortar stores, with spending ranging from \$1.83 to \$6.18 per day. This reflects the relatively few brick-and-mortar stores in Highland County. This lack of brick-and-mortar presence means that more money is spent at vendor’s stalls. This decreases the economic impact of the event for Highland County as about 90.6% of vendors come from outside of Highland County which means their income also leaves the county.

Average Spending by Category					
Category	Visitors		Vendors		
	All Data	Outliers Removed	All Data	Outliers Removed	
Lodging	\$ 8.03	\$ 8.03	\$ 17.89	\$ 1.56	
Restaurants	\$ 15.01	\$ 11.26	\$ 8.50	\$ 7.46	
Grocery and convenience stores	\$ 5.34	\$ 2.20	\$ 2.34	\$ 1.40	
Transportation/Gas	\$ 14.58	\$ 12.66	\$ 21.31	\$ 13.16	
Food and crafts from vendors in Monterey and McDowell	\$ 29.51	\$ 21.60	\$ 6.94	\$ 6.94	
Merchandise from brick-and-mortar stores	\$ 6.18	\$ 1.83	\$ 0.90	\$ 0.29	
Food and Crafts from Sugar Camps (maple syrup producers)	\$ 21.76	\$ 15.45	\$ 0.88	\$ 0.46	
Other spending in Highland County	\$ 5.36	\$ 0.15	\$ 0.33	\$ 0.33	
<b>Total Spending</b>	<b>\$ 105.76</b>	<b>\$ 73.18</b>	<b>\$ 59.08</b>	<b>\$ 31.60</b>	

Figure 34: Daily spending estimates of visitors and vendors during the Highland County Maple Festival

Although many of the vendors working the festival are based outside of Highland County, their presence at the festival still does contribute to the economic impact of the festival.

The vendors pay a fee to the Highland County Chamber of Commerce for the right to set up their stalls at the event. These fees range based on time of registration and stall location. Due to the variability in vendor payments, it was necessary to create an estimate of the amount of money each vendors pays to attend the festival. The same method of creating an upper and lower bound was applied to this data as was applied to all other spending data. The only difference is that these fees were a flat rate payment and were not divided down to calculate spending on a per day basis. It was found that vendors spent an average of between \$253.81 and \$288 on vendors fees to participate in the festival.

<b>Vendor Fee Spending</b>	
Outliers Removed	\$ 253.81
All Data	\$ 288.00

*Figure 35: Estimate of overall vendor fee spending per vendor*

### **Direct Economic Impact**

The estimated economic impact of the Highland County Maple Festival on Highland County is between \$1,366,961 and \$2,015,165 in direct spending. These estimates were created by applying the average daily spending figures to the estimated number of visitors and vendors who attended the festival. Additional steps had to be taken to account for casual visitors to the festival and money spent at vendors who do not live in Highland County.

Some visitors to the Highland County Maple Festival would have been in Highland County regardless of the festival taking place. These visitors could have been visiting friends, family, or just taking in the natural beauty of the area. Since the festival was not the primary reason for these visitor’s presence in the county, their dollars spent do not count toward the economic impact of the festival (Crompton, 1995). In order to address this, survey respondents

were asked if the festival was the main reason for their visit to Highland County. The responses to this question indicated that 92.58% of visitors were in Highland County for the festival, while the other 7.38% were in the area for other reasons. To ensure these 7.38% of visitor's spending was not factored in, all visitor spending estimates were applied to only 92.58% of the estimated visitors who attended the festival.

The attendance estimate indicated that there were 26,536 one-day visitors to the festival. This figure was then multiplied by 92.58% to find that approximately 24,566 one-day visits were made by visitors who were in the county specifically for the festival. The spending estimates of \$51.58 and \$76.25 were both multiplied by 24,567 to estimate that visitor spending in all categories except for with vendors accounted for between \$1,267,167.35 and \$1,873,247.60 in direct spending in Highland County.

Spending at vendor stalls had to be estimated separately, because only 9% of vendors live in Highland County, meaning that only 9% of money spent at vendor stalls stays in the county. The lower and upper estimates of visitor spending at vendor stalls were \$21.60 and \$29.51. These estimates were multiplied by 24,566 to find that overall spending at vendor stalls was estimated to be between \$530,647.82 and \$724,892.42. The lower and upper bounds of spending at vendors was then multiplied by 9% to estimate that between \$47,758.30 and \$65,240.32 was spent at vendor's who are local to Highland County. The total estimate of visitor spending at that stayed in Highland County is therefore between \$1,314,925.65 and \$1,938,487.92.

The vendor spending lower and upper bound estimates were multiplied by the 1,052 one-day visits made by out-of-town vendors. Before this multiplication was done, vendor spending at other vendor's stalls was factored out so that it can be filtered to remove money spent at out-of-town vendor's stalls. The lower bound vendor spending estimate is \$19,398.88 and the upper

bound estimate is \$39,732.36. Vendor spending at other vendor's stalls did not have any outliers, so there is not an upper and lower bound for that estimate. Vendors spent \$6.94 at other vendor's stalls per day. This average was multiplied by 1,052 and then by 9% to find that vendors contributed \$657.08 to vendors based in Highland County during the festival. Vendors spending other than on fees is then estimated to be between \$20,055.96 and \$40,389.

In addition to this daily spending from vendors, they also paid vendor fees to the Highland County Chamber of Commerce. The lower and upper bounds of \$253.81 and \$288 were multiplied by the 126 vendor stalls that were from outside of Highland County. This means that vendor fee spending that contributed to the economic impact is between \$31,980.06 and \$36,288.00. This means the total vendor economic impact is between \$52,036.02 and \$76,677.44. When vendor spending is added together with the visitor spending estimates, the total direct economic impact of the Highland County Maple Festival is found to be between \$1,366,961.67 and \$2,015,165.36.

## **Conclusion**

Since its inception in the 1950s, the Highland County Maple Festival has transformed from a simple maple syrup showcase into a cultural event that celebrates Highland County. However, maple syrup is still the main attraction at the event. Visitors traveled an average of nearly one hundred miles to learn about and sample maple syrup and other maple products. While these visitors were in the area, they spent an average of between \$73 and \$105 daily. This money went to maple syrup producers, and also to local businesses, arts and crafts vendors, and to the Highland County Chamber of Commerce.

Over 70% of visitors to the festival have been coming to the event for multiple years, and over 80% of first-time visitors are planning to attend again in the future. This event not only attracts many repeat visitors to the festival, it also brings people to Highland County during other times of year. Over 73% of visitors are interested in coming to visit Highland County during another season after attending the festival. These visitors are also more likely to purchase maple syrup after attending the event than they were beforehand.

The educational, cultural, and economic value of this event makes it a vital part of the maple-syrup industry in Western Virginia. The festival serves as a way to foster new interest in maple syrup production and using forests in responsible ways that help people while still protecting the land. The Highland County Maple Festival showcases the value of agritourism as a way to create new long-term customers for farmers, as an educational experience for visitors, and as an economic boost for the surrounding community.

# Appendices

## Appendix A: Highland County Maple Festival Survey

Virginia Tech, Future Generations University, and the Highland County Chamber of Commerce are partnering to conduct an economic impact assessment of the Highland County Maple Festival.

Your responses to this survey will help us to better understand the economic impact that this festival has on Highland County. Responses to this survey will be confidential. All data will be combined before being viewed, and only aggregate data will be reported.

This survey is voluntary, and you can stop the survey at any time. If you complete the survey, you will have the opportunity to register for a raffle to win one of five maple themed gift packages with a value of \$50. In order to register for this raffle, we will ask for your email address. This will not be associated with your other responses.

We are so grateful for your time, and your feedback is invaluable to the success of this project!

If you have any questions, please contact Daniel Grizzard at [danielg2@vt.edu](mailto:danielg2@vt.edu).

**1. Please indicate which age range you fall into.** *(Please cross one)*

- Under 18     18-29     30-45     46-64     65 or older

**2. Please provide the zip code (postal code) of your home residence.**

**3. Have you attended the Highland County Maple Festival before?** *(Please cross one)*

- Yes     No

**4. If yes, how many years have you attended the Highland County Maple Festival?**

**5. Was the Highland County Maple Festival the main reason for your visit to Highland County?** *(Please cross one)*

- Yes     No     Unsure

**6. If yes, what about the Highland County Maple Festival attracted you to visit the area?** *(Please cross all that apply)*

- Opportunity to learn about maple syrup     History and cultural heritage     Arts and crafts vendors  
 Live Performances     Tasty maple treats     Entertainment for the family

Other

**7. How did you find out about the Highland County Maple Festival** *(Please cross all that apply)*

- Maple Festival Brochure     Maple Festival Website     Social Media  
 Newspaper or other print media     Radio     Word of mouth

Other



To respond  or

[papersurvey.io](http://papersurvey.io)



**8. What was your favorite part of the Highland County Maple Festival?** *(Please cross one)*

- The tasty maple treats       Arts and crafts       Live performances  
 Learning about maple syrup      Other

**9. Do you plan to attend the Highland County Maple Festival again in the future?** *(Please cross one)*

- Yes       Probably yes       Maybe       Probably not       No

**10. Are you interested in visiting Highland County during another time of year (i.e. Summer, Spring, or Fall)?** *(Please cross one)*

- Yes       Probably yes       Maybe       Probably not       No

**11. How much have you learned about maple syrup production during your visit to Highland County?** *(Please cross one)*

- Nothing at all       A little       A moderate amount       A lot

**12. Are you aware of the difference between real maple syrup and imitation products like corn-based syrups?** *(Please cross one)*

- Yes, I was aware prior to this visit to the Highland County Maple Festival       Yes, I learned during this visit to the Highland County Maple Festival       No, I am not aware

**13. Did you purchase pure maple syrup, in the 12 months prior to this year's Highland County Maple Festival?** *(Please cross one)*

- Yes       No       I am unsure

**14. In the twelve months after your visit to the Highland County Maple Festival, do you plan to purchase pure maple syrup?** *(Please cross one)*

- Yes       Maybe       No       I am unsure

**15. Have you heard of the Virginia Maple Syrup Trail?** *(Please cross one)*

- Yes       No

**16. If so, how did you find out about the Virginia Maple Trail?** *(Please cross all that apply)*

- Maple Festival Brochure       Maple Festival Website       Social Media  
 Newspaper or other print media       Radio       Word of mouth

Other

**17. How well are you able to navigate the Highland County Maple Festival using available brochures, maps, and signs?** *(Please cross all that apply)*

- Not well at all       Slightly well       Moderately well       Very Well



To respond  or

[papersurvey.io](https://papersurvey.io)



18. How many sugar camps (maple syrup producers) do you plan to visit during your time in Highland County?

19. What days do you plan to attend the Highland County Maple Festival? *(Please cross all that apply)*

- Saturday, March 12th  Sunday, March 13th  
 Saturday, March 19th  Sunday, March 20th

20. Are you staying overnight in Highland County while attending the Highland County Maple Festival? *(Please cross one)*

- Yes  No

If yes, where are you staying overnight in Highland County? *(Please cross one)*

- Hotel  Bed and breakfast  Rental property  Campground  
 A friend or family member's residence  At my home (primary residence)  At my home (secondary residence) Other

22. What was the size of your travel party?   *(i.e. how many people did you drive to the festival with, including yourself)*

23. Please provide your best estimates of your travel party's spending for the entire duration of your visit to Highland County within each of the following spending categories.

Please enter a dollar amount (\$) for each category. If you do not plan to spend any money in a category, please leave that space blank.

As a reminder, your responses will remain confidential. This information will be very helpful in determining the economic impact this festival has on Highland County, so we greatly appreciate your response to this question.

Restaurants

Grocery and convenience stores

Transportation/Gas

Food and crafts from vendors in Monterey and McDowell

Merchandise from brick-and-mortar stores

Food and Crafts from Sugar Camps (maple syrup producers)

Other spending in Highland County

24. How many people do these expenses cover?



To respond  or

[papersurvey.io](http://papersurvey.io)



25. Is there anything that you would like to see improved or changed about the Highland County Maple Festival?

If you would like to be entered into the drawing to win one of the five maple themed gift packages with a value of \$50, please provide your email address. Winners will be contacted to determine a pickup or shipping plan. Gift packages can be shipped to winners free of charge.

Are you interested in receiving email updates about the Highland County Maple Festival and other events in the area? Answering "Yes" to this question will subscribe your email address to the Highland County Chamber of Commerce newsletter. *(Please cross one)*

Yes

No



To respond  or

[papersurvey.io](http://papersurvey.io)



## Appendix B: Feedback from Respondents

25. Is there anything that you would like to see improved or changed about the Highland County Maple Festival?
No
better parking. store with local goods (could be put in a vacant store)
Larger Map, include surrounding counties roadways
None
Maybe a recommended route in order of interests
Better maps to sugar shacks.
MORE Music
Better Traffic management
NA
No
it's a great time ~ We are enjoying the addition of maple sugar camps & sugar products. Better/more "permanent & , looking / professional signage on roads
Nope
No
Not one thing
More advertising
More vendors - have noticed a decrease in the number Camping sites for campers and RVs
Nothing
GPS Accuracy
larger Signs at Sites Next to Road w/ Flying Balloons maybe
More places to stay in town. More vegetarian options to eat lunch/dinner
NO
Warmer ha ha
nothing. we love
NOT sure
cell phone towers, more fire pits, more camping spot & cabins
no- Beautiful & informative as is!
No
No
Better maps with roads marked going from one camp to another.
No! I like it
No
It was great!
would like to see some The old vendors back from years ago - leather, wood, felt. Also more /alt dinner options.
Were happy to be here
more times to See music

Warmer temperatures
nothing. it was great
No
No
MORE PLACES TO STAY Locally
N/A
Everything is great! closer lodging would be sweet. Pun intended
NO
Lovely!
No
First time here!
Not a thing
Nope
More vendors - they are missing from the firehouse
Parking & restrooms
more places to stay in the Town of Monterey
PARKING
Not at this time
Healthier food options
Love THE LOWER TRAFFIC. Get rid of crafts that are not handcrafted
NO
(taller) larger signs - low Signs for making turns can be hard to see behind other cars
Traffic was terrible, maybe advertise alternate routes ~ Out of McDowell and Monterey
No
More hotels or places to stay overnight
Improvement: maybe some traffic control!
Keep the sugar camps well-labeled. .
Perfect!!
I enjoy the aspects of Nature
perfect!
More directional signs to sugar camps would be helpful
more things at night / after 5
Publish hours of operation for maple camps on brochure
friday Evening Options
NO
Love it
Add Fridays to both weekends if possible to lessen crowds on Saturday and Sunday. Add names of owners of Sugar camp to map/brochure
No

can't think of anything
More rock candy More alerts about lack of data Larger font map
No, I think it is lots of fun as is. Maybe add temporary ATMs as many vendors are cash only
No
No
No
We love that its two weekends. Some roads could use more signs.
No
Wonderful
I loved it!!
No
Mc Dowell needs better signage at the location to indicate pancake line versus arts crafts
Music During/In craft area
Have a camp serving the sugar water
Maybe more vendors of maple products and crafts Monterey. We did not visit any other towns
This is our 1st stop so its really hard to say
Traffic / Parking
Nope
more food venders . more desserts made with maple syrup
Make survey 1 page more crafts more reasonable prices
More music / performances traditional indigenous Maple sugar/syrup production
go into fair room should be free
n/a
different foods
NA
more History AND Interpretation, OTHER APPLATHAN foods, Lifeways, Etc.
Sugar water!
No it was great!
Live demos (if possible)
nothing love the festival
3 weekends
traffic flow
offer one Buckwheat and on Buttermilk pancake
Love it All
ADD Camp #s To ROAD SIGN
handicap access
Local Guides at points of interest other than farm
Shorter Lines
Repair the road between McDowell and West Augusta

Handicap access - Add another weekend?
More info about the maple passport before the festival starts
Better crowd control in the downtown
Parking.
It's great!
A map of everything in Monterey would be great!
No
No.
Better brochures/ online into of whats here
Nothing
Bring back Maple BBQ chicken!
Better parking areas, Better traffic pattern, more donuts
N/A
maybe more signs directing to camps
Better traffic flow
ADD Another weekend
Nothing really, I think it's great but "Warm-up' spots possibly
More food
Nope
I've never been here before
Not really I love the small town feel and how things are set up
want textile artists
Great
No it great!
No, we are 100% satisfied!
Parking at school managed better w/more monitoring of cars coming & going (we were sent to park on the road when there were clearly spaces in the lot- one leaves and another should be allowed to enter)
Love it! Thankful it's starting again.
More parking space
Signs for camps need to be better
Friday's
credit card payment / Venmo / PayPal.
Beard & Mustache Contest
More vendors
Nothing, you got it all, and the people are great
walk way from school to town
No
Easier to get around, not nice for people
No love it as it is

This is our first experience and it has been wonderful
N/A
nope- it is amazing! 1st visit 1975-
First time, so I cannot give a good response.
Don't think so
To long of a survey
No
DON'T CHANGE A thing
It is hard when you have snow all weekend, but parking
so. many. people. But fun!
No
More signs at county lines
More food vendors, more variety of vendors, better traffic control.
No. Everything was great
More direction on parking, more food truck options for lunch.
work on getting traffic from South moving Better
Nope
NO
No
I love this festival. I think you do a GREAT Job!!!
LIKE AS is
N/A
Weather
weather, ha ha
N/A
Cell phone towers
More artists :)
NO
Hours posted for Sugar camp tours
No
Nope! Excited to be here finally!
More Vendors
More vendors
nope! I love the festival!!
This weather Good food, good signs, nice, friendly people
you all do great !!
No
move indoor less outdoors
Good

More Crafts

I think it's perfect!

## Appendix C: Estimating Attendance at the Highland County Maple Festival

Measuring attendance at the Highland County Maple Festival poses many unique challenges. The event takes place for four days over two weekends, and activities are spread throughout the entirety of Highland County. In 2022, ten different sugar camps were open for tours, vendors were setup in the towns of Monterey and McDowell, and pancake breakfasts were hosted in the towns of Monterey, McDowell, Blue Grass, and Bolar. While there is an admission cost to enter a few of the venues where vendors are setup, there is no entry fee to tour the sugar camps or to visit vendors who setup along the streets in each town. Another factor to consider when measuring attendance is the many different ways in which a visitor can attend the festival. A visitor may drive into Highland County to visit their favorite maple syrup producer and then leave, others may visit all ten sugar camps over a two-day period, some visitors may only attend a pancake breakfast, while another visitor may drive into Monterey just to view the arts and crafts vendors for a few hours before departing.

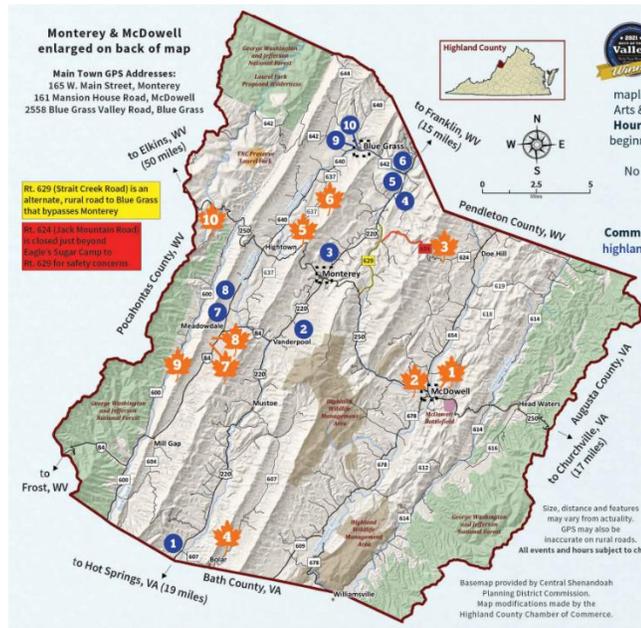


Figure 36: A map included in the 2022 Highland County Maple Festival brochure showing points of interest

In order to address these challenges, many methods of measuring attendance at an open gate event were investigated. However, due to the unique decentralized nature of this event none were feasible. The methods that were investigated include measuring attendance through aerial photography, counting visitors flowing through main entrance gates for short intervals and extrapolating, measuring crowd density through counting visitors in a predesigned grid pattern on festival grounds, using a tag-and-recapture approach, and counting the number of vehicles in parking lots at the event.

To measure crowd attendance through aerial photography, an event must take place in an open-air venue (Tyrell and Ismail, 2005). As the Highland County Maple Festival has essentially fourteen different locations where it is occurring simultaneously, and some of these are indoors or heavily obscured by tree cover, this method was not feasible. The tag-and-recapture method involves giving a set number of visitors an easily identifiable object such as a button to wear, and then at a later time during the event counting the ratio of “tagged” visitors counted coming through a pre-determined gate versus “non-tagged” visitors (Biaett and Hultsman, 2015). This method could have been used to measure the number of visitors within one of the central locations of the festival, such as Monterey or McDowell, however it was deemed inappropriate due to its inability to account for the many different venues within which the Highland County Maple Festival takes place. Designing a grid pattern and then measuring density within each segment was also ruled out due to the infeasibility of applying this method at each of the fourteen locations comprising the festival.

Identifying key gates and then counting the number of visitors entering for 15-minute intervals has been identified as an accurate low-cost method of counting attendance at open-gate festivals (Hara et al, 2016; Tyrell and Ismail, 2005). In this method, these counts are then

multiplied by four to account for the entire hour in which the count took place. This method was also not feasible due to the need to perform these counts at all fourteen locations and the inability to determine when guests have already been counted at another location at the festival. The final attendance measurement method for open gate festivals investigated was parking lot counts. This method requires counting the number of vehicles that enter the assigned parking areas for an event, and then using this number as a proxy count for the number of visitors at the event. This method would also not work at the Highland County Maple Festival due to the lack of a central parking area and the inability to account for festivalgoers who drive to multiple locations during the festival. While a traditional parking lot count method does not address the complex attendance-counting needs of the Highland County Maple Festival, the concepts underlying this method are applied by the United States National Park Service in a way that can help to measure attendance at the festival.

Since 1904, the National Park Service has been developing methods to track visitor attendance at the many federal lands it administers (Ziesler and Pettebone, 2018). These efforts span many different parks and land units. Some of these areas sell entry tickets, however many do not. In order to measure attendance within these large land units that do not sell tickets, proxy counts of vehicles using automated vehicle counters are employed. These vehicle counters measure the number of vehicles entering an area and what time they crossed into the area. When deployed at all key gateways into an area, the number of vehicles entering the area can be used as a proxy count for how many people entered that area. In order to use vehicles as a proxy count for visitors, it is necessary to have a persons-per-vehicle (PPV) multiplier to estimate how many visitors were in each vehicle. The National Park Service develops these PPV multipliers for each

park by having employees record observations of the number of passengers in vehicles at different predetermined times throughout the year.

### **Applying Traffic Counting to the Highland County Maple Festival**

Within Highland County, the Maple Festival is highly decentralized event spanning essentially the entirety of the county. However, the entrances to Highland County are very structured. There are four main gateways into Highland County with U.S. Routes 220 and 250 forming a cross through the county. There is also one additional entrance from Virginia State Route 84 that receives less traffic than the main gateways. **In order to measure attendance at the Highland County Maple Festival, this study assumes that all traffic entering Highland County during the hours of the festival represent visitors to the festival.** The Virginia Department of Transportation (VDOT) placed pneumatic tube vehicle counters at each of the four main gateways into Highland County to measure traffic during the second weekend of the festival. Unfortunately, due to inclement weather it was not possible to place the vehicle counters on the roads during the first weekend of the festival. Budgetary constraints did not allow for the placement of a pneumatic tube vehicle counter on Virginia State Route 84. The data from these vehicle counters was then collected, and this information, along with data collected from festival visitors from a random intercept survey was used to create an estimate of both unique visitors and the total number of visitor days at the 2022 Highland County Maple Festival. Unique visitors are defined as the number of different people who attended the Highland County Maple Festival, while visitor days include multiple visits on different days made by the same unique visitor to measure the total number of day visits made to the Highland County Maple Festival.



*Figure 37: A map of Highland County showing where pneumatic tube vehicle counters were placed*

## **Vehicle Counting on March 19<sup>th</sup> and 20<sup>th</sup>**

The first step of estimating attendance at the 2022 Highland County Maple Festival was to measure how many vehicles entered Highland County during the second weekend of the event. The 2022 Highland County Maple Festival took place on March 12<sup>th</sup>, March 13<sup>th</sup>, March 19<sup>th</sup>, and March 20<sup>th</sup>. On Saturday March 13<sup>th</sup> and Saturday March 19<sup>th</sup>, the festival began at 7:00 am when pancake breakfasts began, and the last visitors could have been coming into the county until 7:00 PM when the final live performance of the day began. On the two Sundays, March 13<sup>th</sup> and March 20<sup>th</sup>, the festival took place from approximately 7:00 am to 4:00 pm. In order to measure how many visitors entered Highland County for the festival, the number of vehicles that entered the county between 6:00 am and 7:00 pm was counted for Saturday March 19<sup>th</sup>, and between 6:00 am and 4:00 pm for March 20<sup>th</sup>. Between 6:00 am and 7:00 PM on Saturday March 20<sup>th</sup> 2,073 vehicles entered Highland County from the four main entrances to the county.

Between 6:00 am and 4:00 pm on March 20<sup>th</sup> 1,249 vehicles entered Highland County from these entrances.

### **Estimating Vehicle Entries for the First Weekend of the Festival**

Unfortunately, inclement weather during the first weekend of the 2022 Highland County Maple Festival made it impossible to use pneumatic tube vehicle counters. In order to overcome this, the research team employed a version of the 15-minute gate-counting method discussed earlier in this paper. There were two teams surveying visitors for the entirety of each day of the festival. These teams were located at the Laurel Fork Sapsuckers sugar camp and at the entrance to the Highland High School Gym. Members of both of these teams took 15 minutes of every hour to count how many visitors entered the facility they were based in. These counts were then multiplied by four to estimate how many visitors entered the facility during that hour. An additional two sugar camps took their own attendance counts during each day of the festival and shared these with the research team. In total, there are attendance counts for each day of the festival from Laurel Fork Sapsuckers, Tonoloway Farm, Back Creek Farms, and the Highland County High School Gym. These counts were used to estimate the difference in crowd size between the first and second weekend of the festival.

<b>Crowd Size Measurement</b>				
<b>Location</b>	<b>12-Mar</b>	<b>13-Mar</b>	<b>19-Mar</b>	<b>20-Mar</b>
Laurel Fork Sapsuckers	147	133	824	145
Highland High School Gym	1732	2356	5456	2588
Back Creek Farms	258	272	834	280
Tonoloway Farm	200	300	610	230
<b>Total</b>	<b>2337</b>	<b>3061</b>	<b>7724</b>	<b>3243</b>

*Figure 38: Attendance Counts from locations around Highland County during the 2022 festival*



## **Vendor Attendance**

Approximately 139 different commercial vendor stalls were setup at the 2022 Highland County Maple Festival. These include vendors who sold various arts, crafts, and food items. In addition to visitors to the festival being surveyed through a random intercept method, every vendor was emailed a survey at the conclusion of the festival. Vendors were asked in this survey where their home residence was, and if they had stayed overnight in Highland County during the festival or driven each day. In total, 42 vendors responded to the survey. Only four of these vendors were residents of Highland County, and thirty-eight were from outside of the county. This ratio of 90.48% of vendors being from outside of the county was applied to the total population of 139 vendors to estimate approximately 126 vendors were from outside of Highland County and 13 vendors lived inside the county. Vendors were also asked if they stayed overnight in Highland County during each weekend of the festival, or if they drove into the county each morning. Only vendors who did not live in Highland County's responses were looked at for this question. The majority of respondents drove into Highland County each morning of the festival, with 58.33% of respondents selecting this choice. Only 5.56% of respondents stayed overnight in Highland County one weekend and drove in the other. The remaining 36.11% of vendors stayed overnight in Highland County both weekends of the festival. When these ratios are applied to the 126 vendors from outside of Highland County, it is estimate that approximately 73 vendors drove into the festival all four days and 14 vendors drove into the festival on two days. These numbers were then multiplied by the number of entrances that each group made to account for how many total vehicles vendors drove into Highland County during the festival. Using this method, it was found that vendors drove 306 vehicles into Highland County during the festival. As vendors and visitors must be accounted for differently, this number of vehicles was then

subtracted from the 5,127 vehicles that are estimated to have entered Highland County during the 2022 Maple Festival. The remaining 4,821 vehicles were visitors driving into the festival.

Estimating the total number of vendors who attended the festival is much more straightforward than estimating the number of visitors. This is because the number of vendor stalls setup at the event is known to be 139. In the survey given to vendors, they were asked to provide the size of their travel party, and these responses were used to develop a PPV multiplier for vendors. The average PPV traveling into Highland County to work as vendors was 2.09. This number can be applied to the 139 vendors to estimate that approximately 290 vendors attended the festival. Because only 126 vendors were from outside of Highland County, it is estimated that the number of vendors brought into the area because of the festival was approximately 261. It is assumed that all vendors attended all four days of the festival, which means that these 261 vendors accounted for 1,044 visitor days, or “vendor days”.

### **How Many Visitors Drove into Highland County?**

Based off of the counts provided by the pneumatic tube vehicle counters and the crowd density measurements taken during the Highland County Maple Festival, it is estimated that 5,127 vehicles entered Highland County during the festival. Of these vehicles, it is estimated that 306 belonged to vendors attending the festival. Assuming that all vehicles entering the county during the festival also visited the festival, this leaves 4,821 vehicles entering the festival.

In the random intercept survey given to visitors during the festival, 78.01% of respondents indicated that they did not stay overnight at all while attending the Highland County Maple Festival. The other 20.99% of respondents did stay overnight. **Unfortunately, respondents did not indicate what nights they stayed overnight, so we are assuming that**

**festivalgoers spent the evening prior to attending their first day of the festival overnight in Highland County and arrived after the festival had concluded on their day of arrival.** This means they would not appear in the vehicle counts for any of the days of the festival. Because of this, these festivalgoers must be added into the total count of vehicles entering Highland County for the festival. If every overnight visitor attended the festival the next day, then the respondents who stayed overnight and attended the festival for one day would each have to be added into the count of vehicles entering Highland County once. The festivalgoers who stayed overnight and attended two days would have to be added in twice, as they would have driven into the county twice if not for staying overnight, and the festivalgoers who stayed overnight and attended all four days would have to be added in four times. No respondents stayed overnight and attended the festival for three days.

To determine how many festivalgoers stayed overnight in Highland County, it must first be determined how many individual vehicles account for the 4,821 vehicles that entered during the festival. In order to identify how many individual vehicles entered Highland County during the festival, the number of days that survey respondents who did not stay overnight in Highland County attended the festival for was analyzed. The survey responses indicate that 82.99% of visitors who did not stay overnight came to the festival on only one day, that 13.28% came to the festival on two different days, that 2.07% came on three different days, and that 1.66% attended the Highland County Maple Festival on all four days. To identify how many unique vehicles entered the county, these percentages had to be weighted by how many times each group entered the county during the festival. In order to do this, each percentage was multiplied by the number of days that that group of visitors had attended the festival, and it was found that visitors who attended for one day accounted for 67.80% of vehicles entering the festival, visitors who

attended for two days accounted for 21.69% of vehicles, that visitors who attended for three days accounted for 5.08% of vehicles, and that visitors who attended all four days accounted for 5.42% of vehicles entering the festival. When these proportions are multiplied by the 4,821 visitor's vehicles that entered the county during the festival, it is found that one-day visitors accounted for 3,268 entrances, two-day visitors accounted for 1,045 entrances, three-day visitors accounted for 245 entrances, and four-day visitors accounted for 261 entrances. These totals were then divided by the number of days each group attended the festival to determine how many different visiting vehicles there were. In total, there were approximately 3,936 vehicles that accounted for the 4,821 entrances. There were the 3,268 one-time entries, 522 vehicles that entered on two days, 81 vehicles that entered three days, and 65 vehicles that entered the festival on all four days. The 3,936 vehicles represent 78.01% of festival visitors according to the survey responses.

### **How Many Visitors Stayed Overnight in Highland County?**

Since the 3,936 vehicles that entered the county during the festival represent 78.01% of festival visitors, the total number of vehicles that attended the festival can be assumed to be 5,044. This means that the other 21.99% of visitors would be equal to approximately 1,109 vehicles. These 1,109 vehicles that represent visitor groups also did not all enter the festival the same number of times. According to the random intercept survey given to visitors, 37.14% of respondents who stayed overnight attended the festival for one day, 58.57% of overnight visitors attended for two days, 0% attended for three days, and 4.29% attended all four days of the festival. These ratios were applied to the 1,109 vehicles that represent the overnight visitors to find that 411 vehicles from this groups attended the festival for one day, 649 vehicles attended for two days, 0 vehicles attended for three days, and 47 vehicles attended for four days. These

counts were then multiplied by the number of days each group attended for to find the equivalent number of daily visits. The one-day overnight visitors accounted for 411 visits, the two-day overnight visitors accounted for 1,298 visits, the three-day visitors accounted for 0 visits, and the four-day visitors accounted for 188 visits. In total, the 1,088 vehicle equivalents that stayed overnight in Highland County accounted for 1,897 daily visits to the festival.

### **How Many Visitors Came to the Highland County Maple Festival?**

These 1,897 entrances added to the 4,821 entrances estimated by the pneumatic tube vehicle counters and crowd density measures mean that there was the equivalent of 6,718 vehicles entering Highland County during the Highland County Maple Festival. As vehicles are a proxy count for human visitors, it was necessary to determine how many people one vehicle represents. This is done through developing a persons-per-vehicle (PPV) multiplier by asking survey respondents how many people they traveled to the Highland County Maple Festival with. There were 346 responses to this question, and the average number of persons-per-vehicle was determined to be 3.95. This number was then applied as the PPV multiplier to determine that the 6,718 vehicles that entered Highland County for the festival is equivalent to about 26,536 daily visits to the Highland County Maple Festival. If the 3.95 PPV multiplier is applied to the 4,947 different vehicles that entered the county during the festival, it is estimated that 19,925 unique visitors attended the Highland County Maple Festival to account for the 26,536 one-day visits to the festival.

## **Key Assumptions**

- All vehicles entering Highland County between 6:00 am and 7:00 pm on March 19<sup>th</sup> and between 6:00 am and 4:00 pm on March 20<sup>th</sup> represent either visitors or vendors coming to attend the Highland County Maple Festival.
- The crowd size measurements collected at Laurel Fork Sapsuckers sugar camp, Tonoloway Farm, Back Creek Farms, and the Highland High School Gym are accurate and an appropriate representation of crowd size throughout the entire Highland County Maple Festival.
- Overnight visitors to the Highland County Maple Festival arrived the evening before attending their first day of the festival. For visitors who attended the festival on Sunday, it is assumed they arrived after the vehicle count had concluded on Saturday at 7:00 pm.
- Visitors and vendors did not leave and re-enter Highland County during the hours of the festival.
- Vendor and visitor survey responses are accurate and an appropriate representation of the behavior of both populations.
- The pneumatic tube vehicle counters reported accurate numbers of vehicles entering Highland County.

## **Sensitivity Analysis of Key Assumptions**

To identify how assumptions impacted the final attendance estimate a sensitivity analysis was conducted on three key assumptions. These assumptions were:

1. All vehicles entering Highland County between 6:00 am and 7:00 pm on March 19<sup>th</sup> and between 6:00 am and 4:00 pm on March 20<sup>th</sup> represent either visitors or vendors coming to attend the Highland County Maple Festival.
2. The crowd size measurements collected at Laurel Fork Sapsuckers sugar camp, Tonoloway Farm, Back Creek Farms, and the Highland High School Gym are accurate and an appropriate representation of crowd size throughout the entire Highland County Maple Festival.
3. Overnight visitors to the Highland County Maple Festival arrived the evening before attending their first day of the festival. For visitors who attended the festival on Sunday, it is assumed they arrived after the vehicle count had concluded on Saturday at 7:00 pm.

The final attendance estimate's "sensitivity" to each of these assumptions was evaluated by finding how changes to these assumptions altered the final attendance estimate. Each of the assumptions was assessed by altering variables related to the assumption and multiplying them by 95%, 85%, 80%, and 75%. The corresponding change in the overall attendance estimate was then recorded. Using this method, it was found that the most consequential assumption was that all vehicles entering Highland County during festival hours represented visitors attending the festival. If only 75% of vehicles that entered the county represented visitors attending the festival, then this would decrease the attendance estimate by 12.36% to 23,255 visitors. The next most consequential assumption was that all overnight visitors arrived in Highland County outside of the operational hours of the festival when vehicle counting took place. If only 75% of overnight visitors arrived outside of the festival hours this would decrease the attendance estimate by 7.06% to 24,753 visitors. The assumption that attendance during the first weekend of the festival was accurately estimated by the crowd

density counts taken throughout Highland County was slightly less impactful than the overnight visitors’ assumption. If these crowd density counts underestimated attendance during the first weekend of the festival by 25%, it would decrease overall attendance by 6.72%.

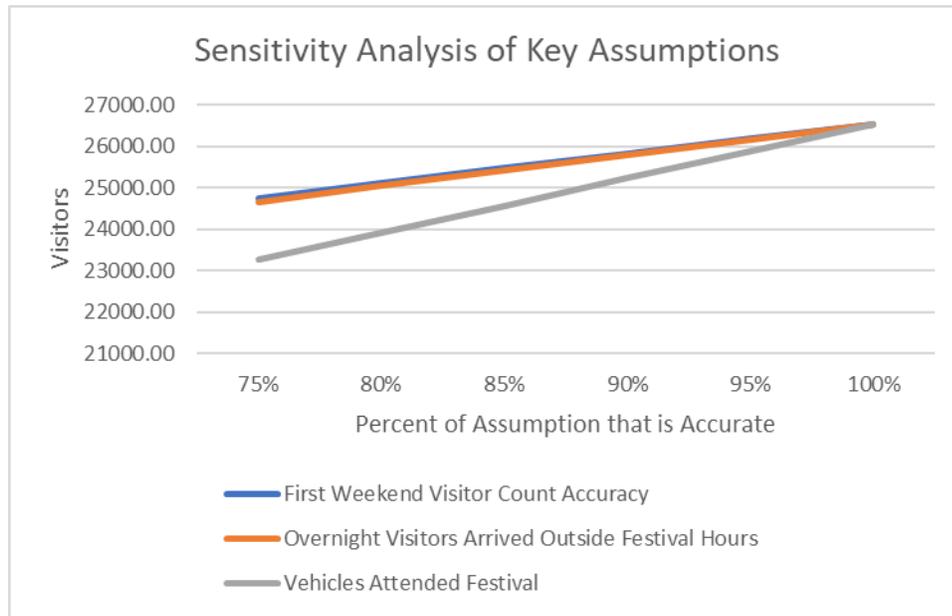


Figure 40: Sensitivity Analysis of key assumptions made in the attendance estimate

Sensitivity Analysis of Key Assumptions						
	75%	80%	85%	90%	95%	100%
<b>Vehicles Attended Festival</b>	23255.63	23911.72	24567.82	25223.91	25880.01	26536.10
<b>First Weekend Visitor Count Accuracy</b>	24753.66	25110.15	25466.64	25823.13	26179.61	26536.10
<b>Overnight Visitors Arrived Outside Festival Hours</b>	24662.81	25037.47	25412.13	25786.79	26161.44	26536.10

Figure 41: Sensitivity Analysis of key assumptions made in the attendance estimate

### Potential Sources of Error

As previously stated, creating an accurate attendance estimate for the Highland County Maple Festival poses many challenges. The decentralized nature of the event makes it necessary to consider the entire county a “parking lot” for the purposes of this estimate. It is almost

certainly true that some vehicles entering the county during festival hours do not represent visitors to the festival. However, determining what rate of vehicles do not represent visitors is outside the scope of this study. This assumption will lead to a slight overcount of visitors to the 2022 Highland County Maple Festival. In addition to this, the inability to place a pneumatic tube vehicle counter on Virginia State Route 84 will lead to a slight undercount of how many vehicles actually entered Highland County during festival hours. In discussions with festival organizers, it was acknowledged that some visitors certainly enter the county from this road, but this study lacked the capacity to identify what ratio of vehicles enter the county from that route.

#### **Appendix D: Removing Outliers from Spending Data**

In order to create a lower-bound estimate of spending at the Highland County Maple Festival outliers were removed from spending data. These outliers represent visitors who spent significantly more than other respondents to the survey. They were removed in order to create an estimate more reflective of the “average” spender. Outliers were identified as any spending amounts that were more than 1.5 times the IQR away from the IQR range that represents the range that 50% of “middle ground” spenders fell into.

Removing data points that fell further than 1.5 times outside of the IQR led to the removal of 189 out of the 2339 total data points. There were 167 visitor spending data points removed, and 22 vendor spending data points removed. For visitor spending, there were 13 data points removed from “Restaurant” spending, 24 from “Grocery and Convenience Stores”, 8 from “Transportation and Gas”, 20 from “Food and crafts from vendors in Monterey and McDowell”, 28 from “Merchandise from brick-and-mortar stores”, 21 from “Food and Crafts from Sugar Camps”, and 53 from “Other” spending. For vendors there were 7 removed from “Lodging”, 1

removed from “Restaurants”, 2 removed from “Grocery and Convenience Stores”, 3 from “Transportation and Gas”, 2 from “Merchandise from brick-and-mortar stores”, 1 from “Food and Crafts from sugar camps”, and 6 from “Vendor Fees”.

Column	Lower Prob	Upper Prob	Lower Quantile	Upper Quantile	Low Threshold	High Threshold	Number of Outliers	Outliers (Count)
Lodging	0.25	0.9375	0	69.9	-104.85	174.75	0	
Restaurants	0.25	0.75	0	21.25	-31.875	53.125	13	60(2) 75(3) 80(2) 90 100(4) 101.5
Grocery and convenience stores	0.25	0.75	0	5	-7.5	12.5	24	15 15.5 16.7(2) 20 25(10) 30 33.3 35 50(4) 100 115
Transportation/Gas	0.25	0.75	0	20	-30	50	8	55 60(2) 67 70 75 100(2)
Food and crafts from vendors in Monterey and McDowell	0.25	0.75	6.3	40	-44.25	90.55	20	100(12) 112.5 125(2) 150(2) 160(2) 250
Merchandise from brick-and-mortar stores	0.25	0.75	0	5	-7.5	12.5	28	15 16.7(4) 20 25(8) 30 33.3 37.5 40 50(5) 75 83.3 100(3)
Food and Crafts from Sugar Camps (maple syrup producers)	0.25	0.75	5	25	-25	55	21	56.3 60(3) 62.5(2) 66.7(2) 75(2) 76 80 100(7) 120 300
Other spending in Highland County	0.25	0.75	0	1.85	-2.775	4.625	53	5(7) 5.8 6.3(2) 6.7(2) 8 8.3(4) 8.6 10(8) 12.5(4) 15 16 16.7(2) 20(2) 22 25(4) 30 32.5 33.3 37.5 49

Figure 42: Outliers removed from visitor spending analysis in order to create a lower-bound estimate

Column	Lower Prob	Upper Prob	Lower Quantile	Upper Quantile	Low Threshold	High Threshold	Number of Outliers	Outliers (Count)
Lodging	0.25	0.75	0	12.5	-18.75	31.25	7	50 60 72.5 75 87.5(2) 150
Restaurants	0.25	0.75	0	15	-22.5	37.5	1	43.75
Grocery and Convenience Stores	0.25	0.75	0	3.125	-4.6875	7.8125	2	16.666667 18.75
Transportation/Gas	0.25	0.75	3.75	25	-28.125	56.875	3	62.5 75 187.5
Food and Crafts from vendors in Monterey and/or McDowell	0.25	0.75	0	12.5	-18.75	31.25	0	
Merchandise from brick-and-mortar stores	0.25	0.875	0	2.34375	-3.5156	5.85938	2	7 15
Food and Crafts from Sugar Camps (maple syrup producers)	0.25	0.875	0	3.125	-4.6875	7.8125	1	15
Other	0.25	0.9375	0	3.1875	-4.7813	7.96875	0	
Fees	0.25	0.75	225	325	75	475	6	50 500(3) 550 650

Figure 43: Outliers removed from vendor spending analysis in order to create a lower-bound estimate

## Appendix E: Visitor Lodging Spending: Lodging Expenditures by Visitors

Unfortunately, a transcription error between the draft survey and final survey given to attendees of the festival removed the question asking visitors how much money they spent on lodging. Seventy-five (75) respondents indicated that they did stay overnight in Highland County while attending the Highland County Maple Festival. Of those respondents, 11 stayed in properties that they owned as secondary residences and 23 stayed with a friend or family member. The remaining 35 respondents stayed at a hotel, bed and breakfast, or rental property. Of those 35 respondents, 11 included the cost of their lodging in the “other” spending section, 17 left the “other” spending section blank, and 7 did not provide any spending information whatsoever and have been removed from the spending analysis. In order to ensure that the total economic impact of the event was not understated due to this error, a method was developed to create an “average daily lodging cost” to be applied to the 17 attendees who did not record their

expense. In order to create the “average daily lodging cost”, the average daily expenditure on lodging per person was recorded from the 11 respondents who included it in the “other” section and the average was taken. The average daily lodging cost for those 11 respondents was \$70.23. In addition to this data, vendors who responded to the vendor survey were asked to record their lodging expenses if they stayed in Highland County. Nine (9) vendors who responded to the survey did stay in Highland County and provided their lodging expenses. These 9 vendors average daily lodging cost was \$69.58. These two groups of data were combined, and the average daily lodging cost of the overall group was \$69.94. This value was determined as the “average daily lodging cost” and was assigned to each of the 17 respondents who stayed overnight in paid lodging in Highland County during the festival. The money spent on lodging by the 11 people who stayed overnight and included the expenditure info in the “other” section was moved into a new spending category called “Lodging”. This category also includes the “average daily lodging cost” for all respondents who stayed overnight in paid lodging and did not include their spending in any category. The “Lodging” category added \$8.03 to overall daily average spending per person.

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