

Maple Syrup in Appalachia: A Sustainable Economic Development Opportunity

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ABSTRACT

Many parts of Appalachia, including areas of Virginia, West Virginia, and Maryland, lag behind much of the country in key socioeconomic indicators. There is a need for economic development opportunities that leverage the region's natural resources in a sustainable manner. This study investigates the feasibility of using maple syrup production as an economic development strategy. This study is broken into three sections, the first is a survey of current maple syrup producers to investigate how syrup is produced and sold in this region. This survey is followed by a pricing analysis that was conducted to ascertain the feasibility of small-scale producers competing with often larger and well-established Northeastern maple syrup producers. The final chapter is an economic impact analysis of the Highland County Maple Festival. This analysis was conducted to learn about the current impacts of maple syrup agritourism for producers and the communities they operate in. Findings from this study indicate that the maple syrup industry in Maryland, Virginia, and West Virginia is smaller and more localized than the industry in the Northeastern United States and Canada. However, the difference in how maple syrup is sold can provide many potential benefits for Appalachian communities. A localized approach to selling maple syrup that relies on attracting visitors to farms has the potential to create an economic stimulus for not only maple syrup producers, but also the communities in which they operate.

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GENERAL AUDIENCE ABSTRACT

The Appalachian region of the United States has higher rates of poverty than the rest of the country. Many rural communities in Appalachia are also losing population. Due to these factors, there is a need for the development of new ways to bring money and jobs into Appalachian communities. This study investigates the potential to use maple syrup production to help stimulate economic development into central Appalachian communities in Maryland, Virginia, and West Virginia. This study is broken into three sections, the first is a survey of maple syrup producers to see how syrup is currently produced and sold in this region. This survey is followed by a pricing analysis that was conducted to see if it is possible for small-scale producers to sell their products in grocery stores. The final chapter is an economic impact analysis of the Highland County Maple Festival. This analysis was conducted to see how tourism that is focused on maple syrup impacts the communities that it takes place in. Findings from this study indicate that the maple syrup industry in Maryland, Virginia, and West Virginia is smaller and more local than the industry in the Northeastern United States and Canada. However, the difference in how maple syrup is sold can provide many potential benefits for Appalachian. A localized approach to selling maple syrup that relies on attracting visitors to farms through tourism has the potential to create an economic stimulus for not only maple syrup producers, but also the communities in which they operate.

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Contents

1	Introduction.....	1
1.1	Research Objectives	1
1.2	Research Questions	1
2	Literature Review.....	2
2.1	What is Appalachia?.....	2
2.2	Economic and Sustainable Development.....	4
2.3.1	Maple Syrup: an opportunity for sustainable economic development?.....	6
2.3.2	Maple Syrup: Economic Opportunity	7
2.3.3.1	Maple Syrup: Social and Cultural Impact.....	10
2.3.3.2	Non-Timber Forest Products.....	11
2.3.4	Maple Syrup: Environmental Impact	12
2.4	Agritourism	13
2.4.1	Agritourism: Introduction	13
2.4.2	Agritourism: Environmental Impact	14
2.4.3	Agritourism: Social and Cultural Impact	15
2.5	Conclusion.....	17
2.6	References	19
3	Maple Syrup Producer Survey: An investigation of the production and sales practices of producers in Maryland, Virginia, and West Virginia	28
3.1	Abstract	29
3.2	Introduction	29
3.3	Objectives.....	31
3.4	Methods.....	31
3.5	Findings.....	34
3.5.1	Maple Syrup Production Levels.....	34
3.5.2	Distributing Maple Syrup Produced by Others	36
3.5.3	How Producers Sell Their Syrup.....	37
3.5.4	Where Producers Sold Syrup	39
3.5.5	Value-Added Products	41
3.5.6	Percentage of Syrup Used to Produce Value-Added Products	43
3.5.7	Sales from Value-Added Products	44

3.5.8 Year-Round and Seasonal Tourism.....	45
3.6 Discussion	46
3.6.1 Summary	46
3.6.2 Comparison of Data to Vermont Survey.....	47
3.6.3 Limitations	49
3.6.4 Conclusions	50
3.7 References	52
4 Maple Syrup Pricing Analysis: Factors impacting the price of maple syrup in grocery and retail outlets.....	53
4.1 Abstract	54
4.2 Introduction	54
4.3 Objectives.....	56
4.4 Methods.....	56
4.4.1 Overview	56
4.4.2 Identifying Store Brand Syrup	58
4.5 Findings.....	58
4.5.1 Overview of Characteristics.....	58
4.5.2 Pricing	60
4.5.3 Price-Per-Ounce	61
4.5.4 Other Pricing Variables.....	66
4.6 Discussion	68
4.6.1 Limitations	68
4.6.2 Conclusions	68
4.7 References	70
5 Highland County Maple Festival: Investigating the economic and educational impacts of a rural agritourism event	71
5.1 Abstract	72
5.2 Introduction.....	72
5.3 Objectives.....	75
5.4 Methods.....	75
5.4.1 Economic Impact Analysis Framework.....	75
5.4.2 Data Collection.....	76
5.4.3 Survey Design	77

5.4.4 Attendance Estimate.....	78
5.4.4.1 Festival Setup	78
5.4.4.2 Attendance Methodologies Review	79
5.4.4.3 Attendance Counting Method Overview.....	81
5.4.4.4 Applying Traffic Counting to the Highland County Maple Festival	82
5.4.4.5 Vehicle Counting on March 19 th and 20 th	83
5.4.4.6 Estimating Vehicle Entries for the First Weekend of the Festival	84
5.4.4.7 Vendor Attendance.....	86
5.4.4.8 Calculating How Many Visitors Drive into Highland County.....	87
5.4.4.9 Calculating the Total Number of Overnight Visitors.....	89
5.4.4.10 Unique Visitors and Daily Visitors Estimate	90
5.4.4.11 Assumptions.....	90
5.4.4.12 Sensitivity Analysis.....	91
5.4.4.13 Potential Sources of Error	92
5.4.5 Calculating Economic Impact	93
5.4.5.1 Visitor Economic Impact	93
5.4.5.2 Calculating Visitor Spending on Lodging.....	93
5.4.5.3 Removing Outliers due to Data Skew	94
5.4.5.4 Vendor Economic Impact.....	95
5.4.5.6 Calculating the Overall Economic Impact	96
5.4.5.7 Estimating Visitor Travel Distance	96
5.5 Findings.....	97
5.5.1 Survey Results.....	97
5.5.1.2 Attendee Place of Origin and Travel Distance.....	98
5.5.1.3 New Visitors and Retention	101
5.5.1.4 What Attracted Visitors.....	105
5.5.1.5 How Visitors Heard about the Festival	107
5.5.1.6 Educational Impact.....	109
5.5.1.7 Changes in Purchasing Behavior	111
5.5.1.8 Visitor Behavior	113
5.5.2 Attendance Estimate.....	117
5.5.2.1 Vehicle Entrances and Crowd Size Measurements.....	117

5.5.2.2 Vendor Vehicle Entrances.....	118
5.5.2.3 Vendor Attendance Estimate.....	118
5.5.2.4 Estimating Overnight Visitors.....	119
5.5.2.5 How Many Visitors Came to the Highland County Maple Festival?	120
5.5.2.6 Sensitivity Analysis of Key Assumptions.....	121
5.5.3 Economic Impact.....	122
5.5.3.1 Removing Outliers	122
5.5.3.2 Estimating Lodging Spending.....	123
5.5.3.3 Visitor and Vendor Daily Spending.....	123
5.5.3.4 Visitor Spending Direct Economic Impact	125
5.5.3.5 Vendor Spending Direct Economic Impact	126
5.5.3.6 Vendor Fee Spending.....	126
5.5.3.7 Overall Direct Economic Impact.....	127
5.6 Discussion	127
5.6.1 Key Findings	127
5.6.2 Conclusions	128
5.7 References	129
6 Conclusions.....	132
6.1 Key Findings	132
6.2 Limitations	133
6.3 Recommendations for Future Work.....	133
Appendices.....	135
Appendix A: Producers Survey Form	135
Appendix B: Maple Syrup Pricing Data Collection Form	142
Appendix C: Highland County Maple Festival Survey	146

1 Introduction

Both production and consumption of maple syrup is increasing in the United States (USDA, 2019; Farrell and Chabot, 2011). Although maple syrup production is traditionally associated with the Northeastern United States and Canada, much of the Appalachian region has climate conditions required to produce syrup (Whitney and Upmeyer, 2004). The purpose of this study is to assess whether communities in central Appalachian states like Maryland, Virginia, and West Virginia can use maple syrup production as a sustainable economic development strategy.

1.1 Research Objectives

The specific objectives are this research are to

- Identify the current production levels and sales practices of maple syrup producers in Maryland, Virginia, and West Virginia
- Describe key factors in the pricing of maple syrup sold in consignment and retail stores
- Quantify the educational and economic impacts that a maple syrup festival has on a rural Appalachian community

1.2 Research Questions

- Can Maryland, Virginia, and West Virginia maple syrup producers be competitive in the consignment and retail market?
- How does agritourism impact sales of maple syrup?
- In what ways can maple syrup production contribute to economic development efforts in Appalachian communities?

2 Literature Review

Rural communities in Appalachia lag behind the rest of the United States in many key socioeconomic indicators (ARC, 2023). These communities, with high poverty rates and low levels of educational attainment, have historically depended on extractive industries such as timber harvesting and coal mining (Kratzer, 2015). There is a need for sustainable economic development opportunities in rural Appalachia that can create an economic stimulus that is socially and environmentally sustainable. One such opportunity comes from the production of maple syrup. Although historically associated with the Northeastern United States and Canada, maple syrup can be produced in Appalachian states like Maryland, Virginia, and West Virginia (USDA, 2019). The majority of the world's maple syrup is currently produced in Canada (Duchesne et al., 2009). However, shifting exchange rates and Canadian limits on the export of maple syrup have opened up an opportunity for producers in the United States (McConnell and Graham, 2016; Deslauriers, 2013). Farm products like maple syrup can also be used to develop agritourism programming which is known to provide educational benefits and increase the price farmers can sell their products at (Ammirato et al., 2020).

2.1 What is Appalachia?

The Appalachian Regional Commission (ARC) is a federal-state partnership that was created in 1965 to oversee economic development in Appalachian communities. The partnership was created because the United States Congress found that “the Appalachian region of the United States, while abundant in natural resources and rich in potential, lags behind the rest of the Nation in its economic growth and that its people have not shared properly in the Nation's prosperity” (ARC, 2023). The Commission defines the Appalachia region as 423 counties spanning thirteen states from New York to Mississippi. The ARC's definition of Appalachia is

exact, with rigid borders between counties that are Appalachian and neighbors who are not. In practice, drawing a line of where Appalachia begins and ends is a nearly impossible task. In 1896 William Goodell Frost, the president of Berea College and the person credited with coining the term “Appalachian American”, defined Appalachia as the mountainous parts of Alabama, North Carolina, South Carolina, Tennessee, Kentucky, Virginia, and West Virginia (Wilson, 2017; Scales et al., 2018). This conception of Appalachia has clearly been expanded upon by the ARC, and in the time between Frost’s definition and the creation of the ARC many other proposed borders for Appalachia have been proposed on a variety of cultural and geographic boundaries (Scales et al., 2018; Stoll, 2017). One characteristic that can be drawn on to form a conception of Appalachia is the shared economic history of extractive industries such as the timber and coal industries (Stoll, 2017).

One of the earliest industries to develop what was to be later referred to as “Appalachia” was timber harvesting (Kratzer, 2015). The industry devastated the areas that operated in, with the extraction of timber in West Virginia estimated to have damaged over 90 percent of the state’s arable land (Lewis, 1998). In the wake of the Civil War, many coal companies and speculators began purchasing large swathes of Appalachia to mine the abundant coal in the region (Stoll, 2017). This resource extraction and associated labor exploitation has had long reaching consequences for Appalachian communities. Extractive industries like timber harvesting and coal mining caused environmental degradation and operated on boom-and-bust cycles that led to large population fluctuations in communities surrounding these operations (Kratzer, 2015). Appalachian communities additionally struggled to invest in community infrastructure due to high rates of absentee landownership (Smith, 1999). The combination of absentee landownership and large corporations purchasing land to extract resources led to a

situation where many who called these communities home did not have any legal rights to the land. By 1860, Wilma Dunaway says that “Appalachians were much more likely than other Americans to be impoverished, illiterate, and landless” (Dunaway, 1996, p. 21; Smith, 1999).

In the most recently collected American Community Survey data, the Appalachian region still lags behind the country in many key socioeconomic factors. The percent of the population living in poverty is almost 2% higher in Appalachian counties than the rest of the United States, and the per capita income is almost \$15,000 less in Appalachian counties (ARC, 2023). These figures do not consider the urban and rural divide within Appalachia, where 107 of the 423 counties within the region are classified as rural. These nonmetropolitan counties represent about 10% of the population within Appalachia. While 14.7% percent of overall Appalachian residents live in poverty, this condition is more pronounced for residents of nonmetropolitan communities, where 20% live in poverty (Pollard and Jacobsen, 2022). Additionally, the per capita income in these rural counties is about \$3,000 less than the \$45,000 per capita income of Appalachian residents as a whole. The poverty and history of environmental degradation in these rural communities make the growth and implementation of sustainable economic development solutions a necessity. Seeking sustainable avenues to improve and enhance the livelihoods of Appalachian residents is a critical and much needed strategy.

2.2 Economic and Sustainable Development

Economic development as a field in the United States originated in the 1930s (Fitzgerald and Green Leigh, 2002). Early economic development efforts on a regional level were comprised of attempts to attract industries to locate in an area through tax abatements, infrastructure investment, and land development. While this form of regional economic development was taking place, international practitioners were attempting to apply similar logic to increasing

economic activity in developing countries (Barbier, 1987). During the mid-20th century, international economic development efforts began to focus on goals outside of growth-oriented metrics like gross domestic product per capita and started to focus on more holistic aims such as quality of life (Arndt, 1981). Attempts to better define what the goal of economic development should achieve continued throughout this period, and by the 1970s practitioners of international economic development were beginning to discuss the idea of environmental sustainability as inextricably linked to economic development (Barbier, 1987). Along with environmental sustainability, academic conceptions of economic development began to focus on the social impact of economic development during this period, with grassroots participation in decision making identified as vital to the process (ibid).

The ideas of sustainable development were crystallized in 1987 with the publication of *Our Common Future*, a report created by the World Commission on Environment and Development (Sneddon, 2006). This report brought sustainable development thinking into the academic and policy-making mainstream, and also provided the most commonly accepted definition of sustainable development: development that "...meets the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland Commission, 1987, p. 41). Conceptions of economic development that incorporate sustainable development thinking distinguish between economic growth and economic development, as growth does not necessarily increase community or environmental wellbeing (Fitzgerald and Green Leigh, 2002). Sustainable development thinking is now widely agreed upon as essential to economic development practices, and new practitioners are taught to balance the triple bottom line factors of economic, social, and environmental health in any project (Campbell, 1996). A commonly accepted definition of economic development comes from Edward Blakely and

Nancy Green Leigh's book: *Planning and Local Economic Development*. In their book, they define successful sustainable economic development as development where "a community's standard of living can be preserved and increased through a process of human and physical development that is based on the principles of equity and sustainability" (Blakely and Green Leigh, 2013, p. 72). In order for this to be achieved, they argue there are three essential elements: that a minimum standard of living for all is established and increases over time, that inequality is reduced, and that sustainable resource use and production is promoted (ibid).

2.3.1 Maple Syrup: an opportunity for sustainable economic development?

Within the context of sustainable economic development, one opportunity that could benefit many Appalachian communities is maple syrup production. Maple syrup is produced by boiling down sap from maple trees, mainly sugar maples, into a thick syrup concentrate (Perkins and van den Berg, 2009). This syrup is a natural sweetener that has traditionally been used for a variety of purposes. While predominantly used to cover pancakes and for baking in the 21st century, maple syrup and the derived sugar can be utilized for a variety of purposes. Maple syrup was the sweetener of choice for Quakers and other abolitionists in the 19th century, as maple sugar was viewed as a moral alternative to slave-produced cane sugar (Stiefel, 2020). Maple syrup must be made from sap extracted during the late winter and early spring when sugar content in the tree sap is highest prior to the trees forming new leaves. While sugar maples and other species of maple, like red maples, are present across the Eastern United States, maple syrup can only be reasonably produced in areas with cold winters (Mathews and Iverson, 2017). In order for sap to be extractable from trees, the temperature must remain above freezing (0 degrees Celsius or 32 degrees Fahrenheit) during the day and drop below freezing at night (Davenport and Staats, 1998). These conditions for syrup production are met in many higher altitude parts of

Appalachia, although maple syrup production is more commonly associated with Canada and northeastern states like Vermont and New York.

Historians and archeologists believe that maple syrup was first produced in North America by indigenous peoples who would collect sap and remove the excess water by freezing the sap or boiling the sap over a fire in birch-bark trays (Whitney and Upmeyer, 2004). Maple syrup and sugar was used as a trading tool by native tribes with early colonists and was adopted by French settlers in the early 18th century (ibid). Maple syrup production was also adopted by English settlers and became popular with farmers because the sugaring season of the late winter and early spring coincided with a downtime in traditional farm activity. By the 19th century, states as far south as Kentucky and Tennessee were producing thousands of pounds of maple sugar. However, decreasing prices of alternative sweeteners in the 19th century due to technological innovations led to a decline in maple sugar production in many more southern states. While maple syrup production has declined since the 19th century in states like Maryland, Virginia, and West Virginia, the industry continues to operate in these areas.

2.3.2 Maple Syrup: Economic Opportunity

Maple syrup is consumed in many countries around the world, but the greatest market for the sweetener is still the United States. Consumption of maple syrup in the United States has been steadily increasing over the past few decades. In 1975, the average American consumed about 1 ounce of maple syrup and by 2009 the average American consumed 2.6 ounces of maple syrup (Farrell and Chabot, 2011). The United States may be the largest consumer of maple syrup, but Canada is the largest producer. Quebec alone produces approximately 80% of the world's maple syrup (Duchesne et al., 2009). In order to control the large quantities of syrup being produced and ensure high prices, producers formed the Federation of Quebec Maple Syrup

Producer. This organization serves as a government-sanctioned cartel acting on behalf of Quebecois producers. The organization has limits on how much syrup producers are allowed to sell each year and holds a strategic reserve of maple syrup that can be released when production is low (Deslauriers, 2013). Production of Canadian maple syrup has been subject to the constraints of this organization since 2004. Since that time producers in the United States have increased production. The amount of syrup that is imported from Canada is also impacted by exchange rates between the United States and Canada. During the 1970's, the exchange rate began to favor Canadian producers. Lower costs of production continued to benefit Canadian producers until the early 2000's when the exchange rate began to equalize (McConnel and Graham, 2016). As shown in Figure 2.1, both the nominal and actual price of maple syrup in the United States increased after the creation of the government-sanctioned cartel in 2004. When adjusted for inflation, the value of maple syrup increased by 4.5% between 2004 and 2008. After the financial crisis of 2008, maple syrup prices began to decline.

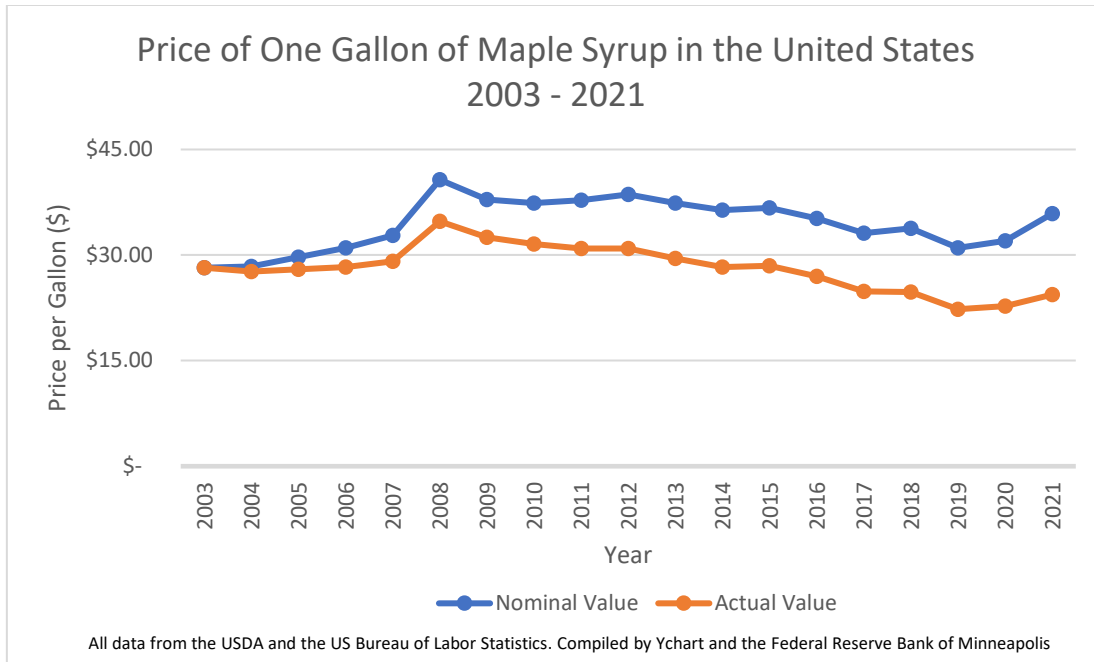


Figure 2.1: The nominal and actual price of maple syrup in the United States between 2003 and 2021

According to the 2017 Census of Agriculture, published by the United States Department of Agriculture, US maple syrup production nearly doubled between 2012 and 2017. In 2012, United States farmers produced 2,296,317 gallons of syrup. Production increased to 4,440,176 gallons of syrup by 2017 (USDA, 2019). The estimated market value of maple syrup produced in the United States in 2017 was \$141,194,000. The majority of this syrup was produced in the Northeastern Region of the United States; Vermont alone accounted for 45.5% of production in 2017. Maryland, Virginia, and West Virginia (the focus of this research) accounted for 0.37% of total US production in 2017; up from only 0.24% in 2012. The number of farms producing maple syrup in that three-state region increased from 98 to 154 between 2012 and 2017. The actual production of maple syrup also increased by 194% during that period. In 2012, those three states produced 5,564 gallons of syrup and in 2017 they produced 16,355 gallons. While the level of

production in Maryland, Virginia, and West Virginia is still modest when compared to states like Vermont or New York, the industry is growing in this region. Maple syrup production can have a big impact on a state's economy. An economic contribution study of the Vermont maple syrup industry conducted in 2013 by researchers at the University of Vermont found that the industry contributed between \$317 and \$330 million in sales to the Vermont economy during that year (Becot et al., 2015). This contribution included the sales of syrup, value-added products, equipment, materials, and the induced and indirect impacts of these sales.

Maple syrup is often sold as syrup; however, many producers also opt to sell their syrup in alternative forms that increase its value. These alternative maple products are known as value-added products. Common examples of maple syrup value-added products include infused syrups, maple candies, maple cotton candy, and maple cream. The idea of value-added products is very common in agricultural production and has been identified as a good opportunity for farmers to differentiate their products (Coltrain et al., 2000). Value-added products have also been identified as a good way for local producers to gain market share with local customers by offering something different than what can be purchased in grocery stores (Quick et al., 2022).

2.3.3.1 Maple Syrup: Social and Cultural Impact

The maple syrup industry's value to a region cannot be demonstrated through financial measurements alone as there are many cultural and environmental benefits of production. A paper by Clare Hinrichs from the University of Iowa published in 1998 documents the "cultural economy" of maple syrup production. In her study, a group of maple syrup producers in Vermont and Quebec were interviewed and asked why they engaged in maple syrup production. Aside from financial benefits, producers also cited the opportunity to maximize local labor resources and land during winter, strengthening an agrarian identity through engaging in

traditional practices, and strengthening community and family ties (Hinrichs, 1998). Hinrichs also discusses the unique position of maple syrup at the intersection of agricultural production and non-timber forest product (NTFP) use.

2.3.3.2 Non-Timber Forest Products

NTFPs are defined as anything that can be harvested from a forest other than lumber. This includes things like include nuts, mushrooms, berries, wild fruit, and maple syrup (Thomas and Schumann, 1993). When a research team from Virginia Tech conducted interviews with sixteen producers and harvesters of NTFPs in Grayson County, Virginia it was found that there were many different motivations for the harvest of these products. Financial benefits were the most commonly cited reason for harvesting NTFPs, but factors like nature and ecosystem preservation, family heritage, and community building were also frequently mentioned (Trozzo et al., 2019).

In the early 1990's the harvest of NTFPs began being looked at as an opportunity for sustainable development in rural communities (Chamberlain et al., 2001). Harvesting NTFPs was viewed as a way for people in rural communities to supplement incomes and enhance their diets while also generating value in forests that could prevent deforestation (Nepstad and Schwartzman, 1992). Early excitement about the potential of NTFPs was met with skepticism about the scalability of traditional harvesting of wild products and the inability to develop long term markets NTFPs (Belcher and Schreckenberg, 2007). Maple syrup's situation is different from other NTFPs like ginseng or wild mushrooms as markets and supply chains are already very robust in North America. Harvesting is also more straightforward as maple sap comes from maple trees that do not have to be scavenged for in the way many other NTFPs require. While

the market and procurement dynamics differ for maple syrup, the potential environmental benefits of production do not.

2.3.4 Maple Syrup: Environmental Impact

Maple syrup is often produced in forested land that would otherwise be used for timber production, and the use of the land for maple syrup production is often a disincentive for trees being cut (Farrell, 2012). The production of maple syrup in forested areas is viewed as a way to promote biodiversity, protect natural habitats, increase carbon sequestration, and protect watersheds (Clark and McLeman, 2011). In a series of interviews conducted with Ontario maple syrup producers, it was found that many standard sugarbush management practices are in line with biodiversity conservation principles and that producers are mostly receptive to increasing biodiversity conservation efforts (ibid). It has also been found that when conducted correctly, sap extraction from maple trees does not negatively impact the growth or lifespan of a tree (Perkins and van den Berg, 2009). While maple syrup production does have the potential to maintain or enhance biodiversity and other conservation efforts, this is only the case when intentional efforts are made. It is possible for maple syrup production to damage natural ecosystems when forest management reduces biodiversity to improve access to tappable maple trees and if trees are over-tapped which can negatively impact the long-term health of the tree (Murphy et al., 2012). Maple syrup production has shown the potential to be a “triple bottom line” development opportunity with the ability to enhance community financial, social, and environmental well-being. However, this is only the case when intentional efforts are made to harvest syrup with ecosystem preservation in mind.

2.4 Agritourism

2.4.1 Agritourism: Introduction

The maple syrup industry is more than just making and selling syrup. Many producers use tours of their camps to sell the experience of maple syrup production to visitors, who then often purchase syrup at premium prices (Hinrichs, 1998). Tourism has been at the forefront of debates about economic development and social equity since the mid-20th century. The tourism industry was seen by economists and policy makers as a quick way to increase the economic health of “developing” regions (Rostow, 1960). Experts believed that tourism could provide an economic stimulus that would allow for investments in infrastructure and therefore help to develop regional economies by creating centers of growth (Sinclair, 1998). Concerns over environmental sustainability and social equity in regions where tourism was growing were given a voice by the Brundtland Report which led to growing interest in pairing environmental sustainability with economic growth (Stronza et al., 2019). This focus on sustainable development in the tourism sector led to more advocacy for locally owned and organized tourism that was focused on ecosystem preservation while also providing economic opportunities for local residents (Boo and Busser, 2006). By 2002, sustainable tourism was identified by the United Nations as a key strategy in efforts towards more sustainable and equitable development throughout the world (United Nations, 2002).

Tourism is already a major industry in Appalachia. A 2020 report created for the Appalachian Regional Commission by researchers at the University of Tennessee found that Appalachian tourism generated about \$60 billion annually for the region (Ezzell et al., 2020). Much of this was urban tourism. Allegheny County, Pennsylvania, which is home to Pittsburgh, accounted for almost 10% of all tourism expenditures in the region. Although much of the total

revenue generated by tourism activities goes to urban centers, rural communities also benefit from Appalachian tourism. The report notes that “a small number of visitors can have a large impact on a small community” and that indirect impacts of tourism like “improved dining, lodging, and recreational opportunities” must be considered when measuring the true impact of tourism in a rural area (*ibid*, p. 42). The main strategy that this report recommends for increasing tourism in rural communities is agritourism: a form of tourism where working farms offer tours and host activities on their property to educate visitors and supplement the farmer’s income (Phillip et al., 2010).

Activities included under the umbrella of agritourism include traditional tours, overnight stays, festivals, farm stores and stalls, corn mazes, and other supplemental income activities that take place on a farm (Barbieri and Mshenga, 2008). Proponents of agritourism believe that offering tours to supplement farmer’s incomes provides environmental benefits such as landscape beautification, creating barriers to urban sprawl, and encouraging the conservation of natural habitats (Barbieri, 2013). Agritourism is also touted for its ability to create a stimulus for other local businesses by attracting visitors to a region while also educating these visitors about agricultural production, ecosystem preservation, and local cultural heritage (Ammirato et al., 2020).

2.4.2 Agritourism: Environmental Impact

Developing agritourism activities does offer many potential economic and environmental benefits to communities, however there are also potential downsides to this type of tourism. Some of the challenges that must be considered with agritourism are the lack of real economic benefits due to leakages from the economy, the risk of creating only low-wage jobs for local residents, and environmental degradation resulting from increased traffic in an area (Fritsch and

Johannsen, 2004). The concern of heavy traffic creating environmental degradation is amplified when an event like an agritourism festival brings thousands of people to visit a rural community at the same time. The environmental impacts of these types of large-scale events are currently under discussed in literature about the impacts of festivals (Getz, 2010). However, there have been numerous studies of the environmental impacts of agritourism in general, and these have shown that farms that engage in agritourism activities are generally practice more environmentally sustainable farming methods than similar farms that do not engage in agritourism (Choo and Jamal, 2009). A 2001 survey of agritourism businesses in Australia found that the majority of businesses were motivated personally by conservation interests and were interested in educating their guests about conservation best practices (Carlsen et al., 2001). The majority of these farmers also were engaged in environmentally sustainable practices in terms of water management, waste management, and energy conservation. To be environmentally sustainable, careful and intentional work must be undertaken by farms that engage in agritourism. The same is true for tourism activities that aim to be culturally sustainable.

2.4.3 Agritourism: Social and Cultural Impact

Tourism can be a powerful tool for education and cross-cultural learning. However, tourism activities have often been criticized for causing “cultural commoditization” (Cohen, 1988). The commoditization of culture is a process where elements of a native culture become packaged as tourism activities and assigned an exchange value. The act of creating a commodity from a cultural custom can then cause that activity to lose its original value for members of that culture. This is especially true in circumstances where dimensions of a local culture are also caricaturized. Cultural commodification is often discussed in the context of tourism in rural areas where many outsiders may be visiting and experiencing sanitized versions of a region’s customs

(Mbaiwa, 2011). Examples of caricaturizing and commoditizing culture were found in multiple regions of Appalachia in the report created at the University of Tennessee for the Appalachian Regional Commission. Some of these examples include things like “Hillbilly Mini Golf” with a course themed around empty moonshine jugs and rotting cabins and performances centered around feuding “wild families” like the Hatfields and McCoys (Ezzell et al., 2020). Cultural commodification is a very serious concern than must be addressed when creating any form of tourism attraction. Eric Cohen, an anthropologist who conducted research in Israel and Peru, argued that assigning exchange value to a cultural practice did not necessarily mean that this practice had to lose value to locals. This is especially true when those engaged in these activities derive value from the ability to teach others about a culture (Cohen, 1988). Farmers often cite the ability to teach people about farming and how food is made as one of the reasons that they engage in agritourism, and this education about an authentic experience removes many of the factors that can lead to cultural commodification in a negative sense (Colton and Bissix, 2008).

As opposed to a caricaturized tourism experience that preys on stereotypes, a well-organized tourism event that is designed with community input can be a very powerful tool for enhancing outsiders’ perspective of a community or region (Li and Vogel song, 2006). An important aspect of creating well-received tourism experiences that can improve outside perceptions of a region is authenticity, or at least the perception of authenticity amongst visitors (Park et al., 2019). Agritourism’s growing popularity is in part due to the perceived authenticity of the experience of seeing agricultural production firsthand (Daugstad and Kirchengast, 2013). This intimate look at the food production process not only creates an authentic tourism experience, it also meets an increasing desire among consumers to better understand how and where their food comes from (Jones et al., 2004).

Many consumers are interested in purchasing local and eco-friendly products, however determining a product's true cost of production can be challenging for consumers (Nuttavuthisit and Thogersen, 2017). Tourism provides an avenue for consumers to learn about the role that their purchase plays in preserving local farmland and supporting the local economy. This is valuable for farmers, because products that are seen as having a positive community and environmental impact can be sold for a premium (Guyader et al., 2017).

2.5 Summary

Appalachian communities need sustainable economic development opportunities. Research from other regions and other types of NTFPs indicate that maple syrup production could provide an economic stimulus with environmental and social benefits. However, little is currently known about the landscape of maple syrup production in Central Appalachia. The objectives of this research are to:

- Identify the current production levels and sales practices of maple syrup producers in Maryland, Virginia, and West Virginia
- Describe key factors in the pricing of maple syrup sold in consignment and retail stores
- Quantify the educational and economic impact that a maple syrup festival has in a rural Appalachian community

These research objectives will provide insights into whether maple syrup production can feasibly provide a sustainable economic development to Appalachian communities. The following sections describe the research activities undertaken to address these research objectives through three unique manuscripts:

- A survey of producers in Maryland, Virginia, and West Virginia

- Pricing analysis of maple syrup in grocery and retail stores, and
- An Economic impact analysis of the 2022 Highland County Maple Festival

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3 Maple Syrup Producer Survey: An investigation of the production and sales practices of producers in Maryland, Virginia, and West Virginia

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3.1 Abstract

Maple syrup is produced in much of eastern Canada and the United States. Although production takes place in many parts of Appalachia including Maryland, Virginia, and West Virginia, there is very limited information that exists on the industry in this region. To learn more about the maple syrup industry in Maryland, Virginia, and West Virginia, a survey was sent to producers in those states. This survey asked for production and sales data for the 2020, 2021, and 2022 production seasons. Results of this survey indicate that the maple syrup industry is growing in this region. Median production increased by 71% between 2020 and 2022. Producers also reported using more diverse distribution channels to sell their syrup in 2022 than in 2020. The creation of value-added products like maple candy and syrup blended with vanilla beans is also becoming more common. In 2022, 67% of producers reported creating value-added products. More than 80% of respondents also indicated that they either give tours of their farms or are interested in doing so. Appalachian producers' responses to this survey show an industry that is modest in terms of production, but that is utilizing many different marketing and sales strategies to continue to grow.

3.2 Introduction

The first step toward understanding if the maple syrup industry provides a real economic development opportunity to landowners in Maryland, Virginia, and West Virginia is to better understand how the industry operates. To learn more about production and sales practices of maple syrup producers in Virginia, West Virginia, and Maryland, our research team at Virginia Tech and partners at Future Generations University sent surveys to producers in each state.

The 2017 Census of Agriculture, published by the United States Department of Agriculture (USDA), estimated that there were 154 maple syrup producing farms in operation

across Virginia, West Virginia, and Maryland in 2017 (USDA, 2019). This report estimates that West Virginia had 97 active sugar camps, Virginia had 29 camps, and Maryland had 28 camps. This was a 55% increase from the 98 maple syrup producing farms that the USDA found were in operation when the 2012 Census of Agriculture was published. The 2017 Census also estimated that farmers in this three-state region produced 16,355 gallons of syrup. These three states produced 5,564 gallons of syrup in 2012, meaning there was a 194% increase in production levels between 2012 and 2017. Maple syrup production did increase across the country in this time, however production growth in this region outpaced the country as a whole. In 2012, production in these three states represented 0.24% of nation-wide production, and in 2017 they represented 0.37% of production.

Data from the Census of Agriculture provides helpful insights into the growth of the maple syrup industry in Virginia, West Virginia, and Maryland. However, the maple syrup data that is published on a by-state basis is limited to only the number of farms in operation, number of taps used, and number of gallons of syrup produced. The Census of Agriculture also reports only cumulative values for each state, with no data reported about differences between farms.

The survey that our research team sent to producers was designed to collect data that would provide a more comprehensive picture of the maple syrup industry in Maryland, Virginia, and West Virginia. A survey with a similar aim was published by researchers at the University of Vermont in 2015. The Vermont survey analyzed data from the 2013 production season.

The Vermont producers survey is one of the only other published surveys of maple syrup producers. Although a decade has passed since the data was collected, the survey report provides insights into differences between the behavior of small and large-scale maple syrup producers. The report also helps us to look into similarities and differences between production in this

study's target region and the top maple syrup producing state in the country. This chapter concludes with a brief comparative analysis of the 2013 Vermont Producers Survey with the survey conducted of Virginia, West Virginia, and Maryland producers in 2023.

3.3 Objectives

The primary goal of this survey were to create a snapshot of what the maple syrup industry looked like in Virginia, West Virginia, and Maryland in 2022, and also to examine changes between 2020 and 2022 . The specific research objectives are to:

- Estimate how much maple syrup farmers in this region produce;
- Identify the primary mechanisms farmers used to sell their syrup; and
- Examine the role that value-added products play in this region's maple syrup industry

3.4 Methods

The survey given to maple syrup producers in Virginia, West Virginia, and Maryland was intended to track changes in the production and sales practices of producers over a three-year period. Producers were asked how much syrup they produced during a season, how much syrup they sold that was produced by other farms, how they sold their syrup, where they sold it, and how many value-added products they created.

The survey was created in QuestionPro during the Spring of 2022, and surveying began in August of that year. The final surveys for this analysis were collected in February of 2023. The USDA's estimation of 154 producers in the three-state region is assumed to be accurate. However, it was not possible to contact all producers in the region. It is believed that many maple syrup producers in this region do not promote their businesses online and are not members of any maple syrup producers' associations. As many producers believed to be operating in this region do not have formal connections to outside organizations, identifying and contacting all

producers was not possible. There is not a list of all maple syrup producers operating in any of the three states covered in this study. Since there is no complete list of maple syrup producers that could be used for outreach, lists of producers compiled by state maple syrup producer's associations had to be relied upon. Due to these limitations, a snowball sampling method was used.

Snowball sampling is a convenience sampling method where researchers initially survey a small number of known contacts in a field. These initial respondents are then asked to recommend others who are in the study population who can be contacted to complete the survey (Goodman, 1961). Snowball sampling is often used when a sample is being collected from populations that are difficult to contact or identify (Handcock and Gile, 2011). Snowball sampling has inherent selection-bias and does not represent a random or representative sample of a population (Parker et al., 2019). However, snowball samples are still commonly used because of their ability to create data that tells a story about populations that would not otherwise be possible.

In this research, the survey was distributed in a variety of outlets where maple syrup producers may hear about the project that was taking place. A link to the QuestionPro survey was sent out to all members of the West Virginia Maple Syrup Producer's Association and a tentative list of potential members of a forming Virginia Producer's Association. Some members of the contact list for these groups did not have email addresses, and physical versions of the survey were mailed to these maple producers. Garrett County Economic Development, which operates in Garrett County, Maryland, sent a link to the QuestionPro survey to all maple syrup producers in its region of the state. Future Generations University, which operates maple syrup

outreach programs in Appalachia also posted links and calls to share the survey on their various social media pages.

Overall, there were 43 commercial maple syrup producers contacted via the West Virginia Maple Syrup Producer's Association mailing list, 27 commercial maple syrup producers contacted via the Virginia producers mailing list, and 12 commercial producers were contacted in Maryland. Hence, direct outreach was made to 82 commercial producers.

After this initial round of surveys was sent out, targeted outreach through phone calls and emails was made to maple syrup producers that Virginia Tech and Future Generations University staff had prior working relationships with. Due to the predisposition for larger producers to have working relationships with researchers, or to be in the social networks of producers who do have relationships with this research team, it is assumed that the data collected in this experiment is skewed toward more established and larger producers in the region.

In total, 44 surveys were collected from maple syrup producers in Virginia, West Virginia, and Maryland. Only 31 of these producers actually sold any syrup during the three-year period of 2020, 2021, and 2022. As this survey was primarily conducted to learn more about how producers in this region are selling their syrup and other maple products, data analysis was only conducted on these 31 producers. These 31 respondents represent 20.01% of the 154 producers that the USDA reports are active in the region. The 31 respondents represent a 37.8% response rate for the 82 producers that were able to be identified by the research team. Table 3.1 shows how many producers were contacted and how many producers responded in each state of the study region.

Response Rate of Maple Syrup Producers in Maryland, Virginia, and West Virginia				
	Maryland	Virginia	West Virginia	Total
USDA Estimate of Producers	28	29	97	154
Producers Identified by Research Team	12	27	43	82
Producers that Completed Survey	2	10	19	31

Table 3.1: Number of producers identified and number of producers that completed the survey in each state.

The state with the most respondents was West Virginia with 19 completed surveys. Virginia had 10 producers complete the survey and Maryland had 2 producers complete the survey. No information was analyzed on a regional basis within this dataset. In order to ensure the anonymity of all producers who participated in this study, discussion of individual production levels will be limited. The research instruments and methods used in this study were reviewed and approved by the Virginia Tech Institutional Review Board as IRB 21-879 with a Not Human Subject Research designation.

3.5 Findings

Data was collected for each of the 2020, 2021, and 2022 maple syrup production seasons. Many questions in this survey allowed respondents to select multiple options, so displayed responses frequently add up to above 100%. The survey instrument is included in Appendix A.

3.5.1 Maple Syrup Production Levels

Respondents were asked to provide data for the 2020, 2021, and 2022 maple production seasons, however not every respondent produced syrup in all three years. Of the 31 respondents, 25 produced syrup in all three years. Two respondents produced syrup in only the 2020 and 2021

seasons, one respondent only produced syrup in the 2021 and 2022 seasons, and one respondent produced syrup in only 2022. Two respondents did not produce any syrup of their own during this three-year period, and only sold syrup that others produced.

The 27 respondents who produced syrup in 2020 yielded an average of 242 gallons. In 2021, 28 respondents produced an average of 249.29 gallons, and in 2022 the 26 respondents produced an average of 230.81 gallons. The median production levels for were 45 gallons in 2020, 60.5 gallons in 2021, and 77 gallons in 2022. Although the average values slightly decreased between 2020 and 2022, the median value increased by 71% over this period. The 2017 Census of Agriculture reported that the average seasonal production for a farmer in Maryland, Virginia, and West Virginia was 106.2 gallons. This value falls between the mean and median production levels recorded in this survey of producers. That indicates that the results of this survey represent a sample of producers that on average produce more syrup than the average producer in the region. The data collected for this analysis is skewed by a few producers who produced very large quantities of syrup, so the median is the best estimate of what a standard farm that participated in this survey produced. Table 3.2 shows the number of respondents, average production level, and IQR for each production season.

Quantity of Syrup (Gallons)			
Categories	Season		
	2020	2021	2022
Respondents	27	28	26
Minimum	1	1	3
1st Quartile	15.5	33.75	43
Median	45	60.5	77
3rd Quartile	251	226.25	276.75
Maximum	1800	1980	1700
Average	242.00	249.29	230.81

Table 3.2: IQR and average production levels for respondents by year

3.5.2 Distributing Maple Syrup Produced by Others

Maple syrup is not only sold by producers to consumers, but also commonly sold through secondary markets by other farmers and commercial distributors. Respondents to this survey were asked how much syrup they sold each year that was produced by others. Fifteen (15) of the 31 respondents, or 48.39%, sold syrup produced by others in at least one of the three years covered by this survey. Only four respondents distributed syrup in this way all three years. Four respondents did this in only 2021 and 2022, one did in 2020 and 2021, two did in only 2020, one did in only 2021, and three did this in only 2022.

The average amount syrup that was sold by one producer but made by another was 107.57 gallons in 2020, 121.5 gallons in 2021, and 152.27 gallons in 2022. The median value was 40 gallons in 2020, 75 gallons in 2021, and 180 gallons in 2022. This increase in both median and mean values alludes to an increasing trend of more syrup being sold by people who are not producing the syrup. The highest response rate to this question was also in 2022, where 11 respondents engaged in this practice, as opposed to 7 respondents in 2020 and 10 respondents in 2021. There were two respondents who only sold syrup produced by others. For the other respondents, nobody sold more syrup produced by others than syrup that they themselves produced. Table 3.3 shows the number of respondents who sold syrup produced by others, as well as the IQR and average number of gallons they sold.

Syrup Sold but Produced by Others (Gallons)			
Categories	Season		
	2020	2021	2022
Respondents	7	10	11
Minimum	10	2	3
1st Quartile	19	13.25	31.5
Median	40	75	180
3rd Quartile	171	190	260
Maximum	323	380	320
Average	107.57	121.5	152.27

Table 3.3: IQR and average amount of syrup sold by but not produced by respondents.

3.5.3 How Producers Sell Their Syrup

There are a multitude of ways that maple syrup producers sell their products. These include selling directly to consumers through programs like farmer’s markets and roadside stalls, using social media platforms like Facebook, at special events like festivals, and through consignment and retail stores. Respondents to this survey were asked in what different ways they sold syrup in 2020, 2021, and 2022. Respondents were provided with eight options: direct sales through outlets such as farmer’s markets and roadside stalls, social media, a producer’s website, festivals, consignment and retail markets, wholesale, bulk sales, and “other”. Twenty-eight (28) respondents indicated selling syrup in 2020, 26 provided sales data for 2021, and 27 provided data for 2022.

The most common way that producers sold syrup was through direct sales in farmers markets and roadside stands. In 2020, 96.43% of respondents indicated selling this way. In 2021 96.15% of respondents used direct sales, and 96.30% of respondents sold this way in 2022. For each of these years, only one respondent indicated not selling directly to consumers using farmers markets and roadside stalls. The next two most common ways respondents sold syrup was through festivals and in consignment and retail markets. In 2020, 39.29% of respondents

sold syrup at festivals. This number stayed relatively consistent with 38.46% and 40.74% of respondents indicating they sold at festivals in 2021 and 2022 respectively. There was large increase in respondents selling in consignment and retail markets between 2020 and 2022. In 2020, 32.14% of respondents sold in these markets, and that increased to 48.15% of respondents in 2022. There was not data collected about the specific types of consignment and retail stores that respondents sell their products in.

Many respondents also engaged in the wholesale selling of syrup. Wholesale selling is the selling of large quantities of syrup for a lower-than-retail price. In 2020, 21.43% of respondents sold syrup wholesale, and by 2022 this had increased to 33.33%. Social media was also a common way of selling syrup, with about 30% of respondents indicating that they sold this way in all three years. Using social media was more common than selling on an independent website that respondents had created, however websites did become increasingly popular as the rate of respondents who sold in this way increased from 14.29% in 2020 to 22.22% in 2022. Bulk sales of syrup changed slightly over the three-year period. In 2020, 14.29% of respondents sold syrup in bulk, and this decreased to 11.11% in 2022. No producers indicated that they sold syrup through other mediums than the seven answer options presented. Figure 3.1 illustrates the diversification in market channels that took place between 2020 and 2022.

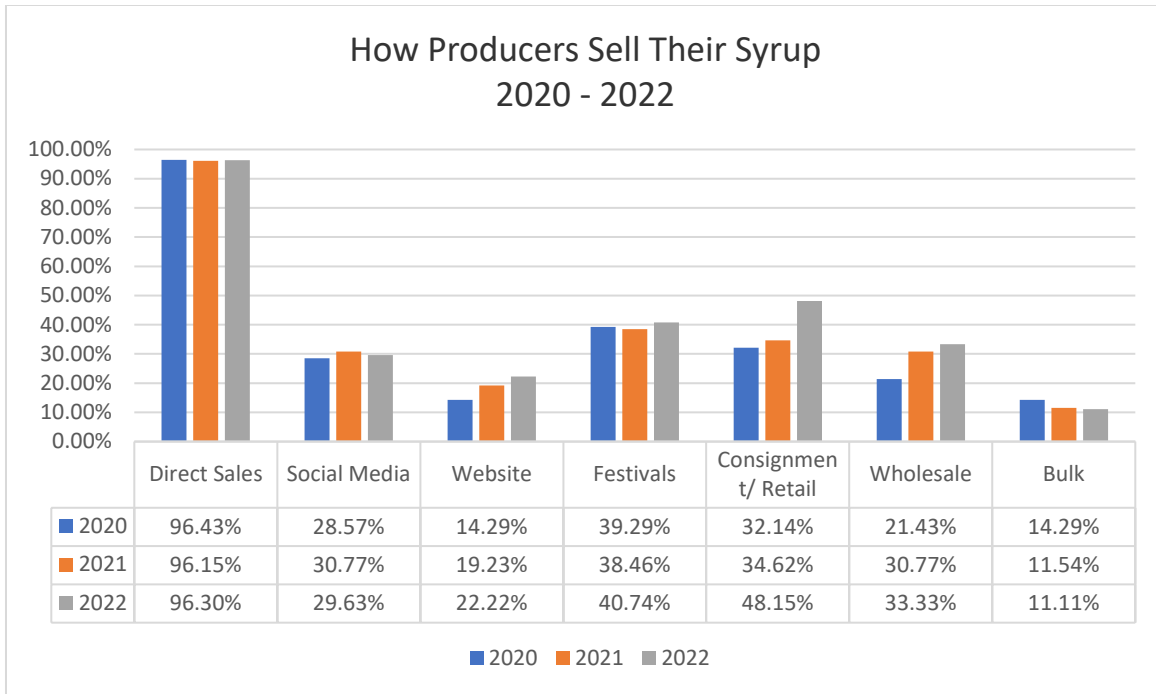


Figure 3.1: Diversification of market channels between 2020 and 2022

Most respondents sold syrup in multiple different ways. One of the most notable changes in how syrup was sold between 2020 and 2022 is the number of respondents who sold syrup using only one medium. In 2020, 39.29% of respondents sold syrup using only direct sales. By 2022, this rate decreased to 22.22%. Direct sales was the one sales method used by every producer who sold in only one way. Respondents in 2020 sold syrup using an average of 2.5 different methods, and this increased slightly to an average of 2.6 methods in 2021 and 2022.

3.5.4 Where Producers Sold Syrup

Since maple syrup producers sell their syrup and other products in so many different mediums, these sales often take place in different locations. This survey asked how far from their operations, in driving time, maple syrup producers sold their products. This question was asked

to better understand if producers were primarily selling syrup only within their communities, or if sales were taking place in a broader geographic region.

Twenty-seven (27) respondents provided information about their 2020 sales, twenty-six (26), and twenty-seven (27) respondents provided data for 2021 and 2022 respectively. In 2020, the most common distance that respondents sold syrup at was between a 0- and 30-minute drive from their operation, with 48.15% of respondents selling in this area. Additionally, 40.74% of respondents sold syrup in locations that were between 30 and 60 minutes from their operations. Just under 30% of respondents sold syrup at locations that were between one and two hours away, and 22.22% of respondents sold syrup at locations more than two hours away.

Responses to this question changed quite a bit between 2020 and 2022. The percentage of respondents who sold syrup between 0- and 30- minutes from their operation decreased from 48.15% to 44.44%. The rate that sold between 30- and 60- minutes from their operations increased from 40.74% to 48.15%. Respondents were slightly less likely to sell syrup between one and two hours from their operation, with that rate of respondents selling in this range decreasing from 29.63% to 25.93%. The largest change between 2020 and 2022 was the rate of respondents selling their syrup more than two hours away from their operation. The rate of respondents selling syrup and other maple products more than two hours away increased from 22.22% to 33.33%. Figure 3.2 displays the changes between 2020 and 2022 in how far from their operation producers sold maple syrup.

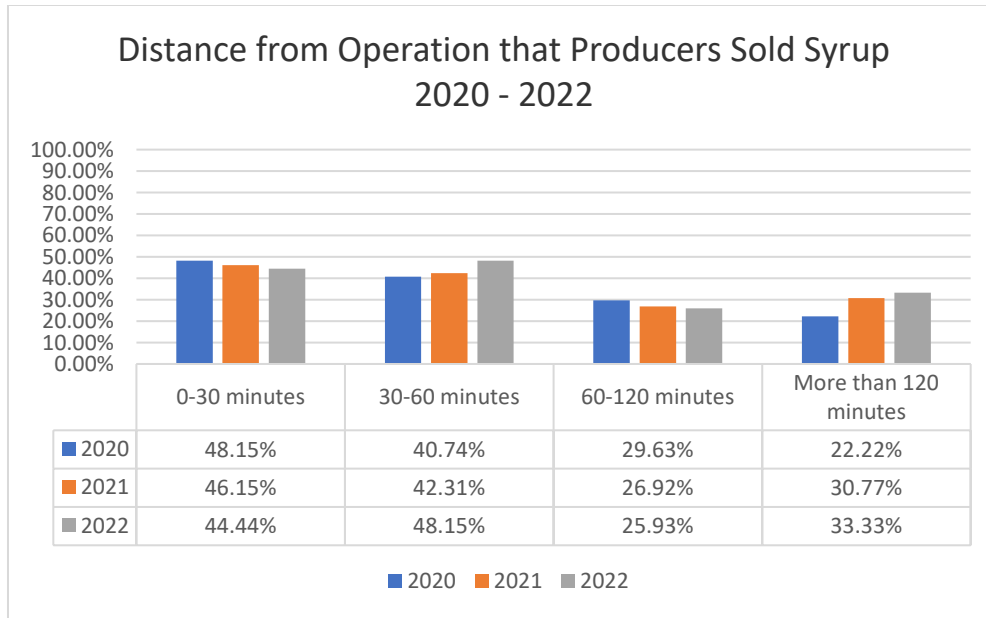


Figure 3.2: Change between 2020 and 2022 in the distances from their operation that producers sold syrup.

3.5.5 Value-Added Products

Respondents were asked what value-added products they created in each 2020, 2021, and 2022. They were given the options of donuts, infused syrups, butter, sugar, cream, and “other”. In 2020, there were 13 respondents to this question. This increased to 14 for 2021 and 18 for 2022. There were 28 respondents who sold syrup in 2020, and 13 of them produced value-added products that year. In 2021, 53.85% of respondents who sold syrup also produced value added products. By 2022, this rate had increased to 66.67% of the 27 respondents who sold syrup that year. The percentage of respondents selling value-added products increased from 46.43% to 66.67% over the three years respondents provided data for. Table 3.4 shows a table displaying the percent of producers creating value-added products for each production season.

Producers Who Made Value-Added Products			
Category	Season		
	2020	2021	2022
Producers who sold syrup	28	26	27
Producers who made value-added products	13	14	18
Percent that made Value-Added Products	46.43%	53.85%	66.67%

Table 3.4: Percent of producers that made value added products for 2020, 2021, and 2022.

For all three years, the most commonly selected value-added product that respondents sold was “other”. The values reported in this section represent the portion of total producers that sold syrup in each year, and not just producers who sold value added products. In 2020, 29.63% of respondents were selling value-added products not included in the survey options. In 2021, 28.57% of respondents sold “other” value-added products, and 42.31% of respondents were selling “other” products in 2022. Respondents who selected this option were asked what products they produced. A few products were mentioned by producers several times. These included maple candy, cotton candy, and candied tree nuts. Producers also created maple flavored popcorn, fudge, moonshine, bourbon, and apple butter. No producers reported making maple butter or maple donuts.

For the options provided in the survey, the most commonly produced were maple sugar and maple cream. In 2020, 22.22% of respondents produced sugar, and that increased to 26.92% by 2022. There were also 22.22% of respondents producing maple cream in 2020, and by 2022 that rate had increased to 34.62%. Infused maple syrup was created with slightly less frequency,

with 18.52% of respondents creating this product in 2020 and 26.92% of respondents producing it in 2022. No respondents produced either maple donuts or maple butter. Figure 3.3 shows what percent of producers created different types of value-added products in each season. It is significant to note that for every value-added product that was produced, the rate of production increased between 2020 and 2022.

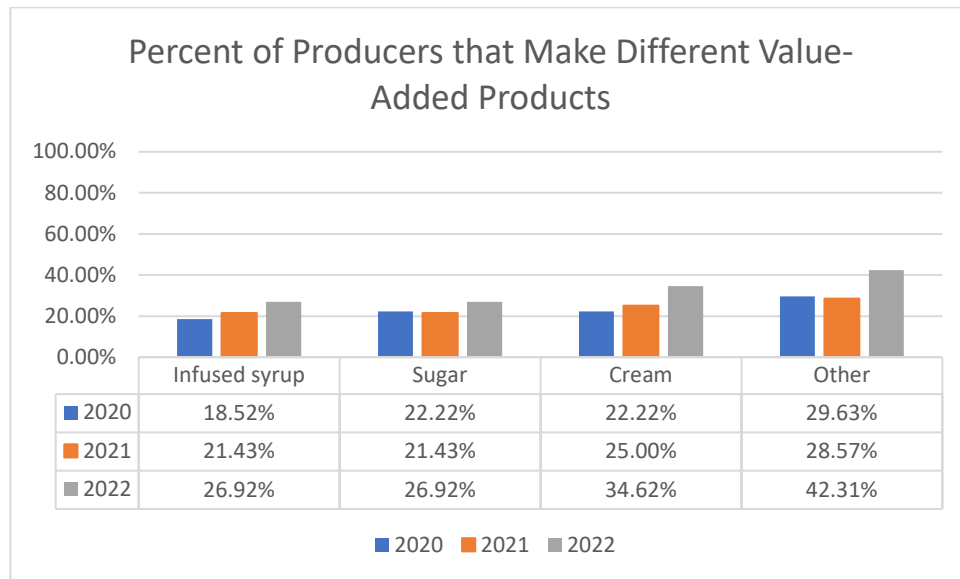


Figure 3.3: Types and frequency of value-added products that were produced in 2020, 2021, and 2022.

3.5.6 Percentage of Syrup Used to Produce Value-Added Products

To learn more about the role that value-added products play in the business models of Virginia, West Virginia, and Maryland producers, respondents were asked about how much of their syrup goes into making value-added products. The differing rates of response to this question make comparative analysis challenging, but general trends can be identified in the data. For 2020, nine respondents provided data. Thirteen (13) respondents provided data for both 2021 and 2022. This reflects the trend seen in the previous question that more producers were engaged in value-added production in 2022 than in 2020. For the nine respondents who provided for

2020, the median percent of syrup used for value-added production was 25% of total syrup. The average for 2020 was 37.89%. The third quartile of syrup usage was 50%, showing that it was not common for producers to dedicate more than half of their supply to value-added products. In 2022, the median percent of syrup being used for value-added products had increased to 33%. However, the average decreased slightly to 35.85% of syrup being used for value-added products when compared to the average of 37.89% in 2020. The IQR and average production information is shown for each season in Table 3.5.

Percentage of Syrup Used to Produce Value-Added Products			
Category	Season		
	2020	2021	2022
Minimum	5.00%	2.00%	5.00%
First quartile	15.00%	15.00%	15.00%
Median	25.00%	25.00%	33.00%
Third Quartile	50.00%	50.00%	50.00%
Maximum	100.00%	100.00%	100.00%
Average	37.89%	34.23%	35.85%

Table 3.5: Percentage of syrup respondents used to create value-added Products.

3.5.7 Sales from Value-Added Products

Survey respondents were asked what percentage of their total sales came from value-added products. Ten respondents provided data for 2020, twelve for 2021, and fifteen for 2022. For these respondents, a similar trend emerged as in the question asking what percentage of producer’s syrup went into value-added products. The average of all responses decreased slightly between 2020 and 2022, however the median value increased.

In 2020, respondents reported that an average of 41.60% of their sales came from value added products. The median value was 27.50%, and this data is only for producers who do engage in value-added product creation. In 2022, the average percent of sales that value-added

products accounted for was 37.67%, and the median value was 30.00%. This trend, along with the increased number of respondents for 2022, indicates a growing number of maple syrup producers engaging in the creation of value-added products. This data also indicates that for producers who sell value-added products, the sales of these products represent a higher portion of total sales than the ratio of syrup that goes into creating them. Table 3.6 shows what percent of sales value-added products accounted for in 2020, 2021, and 2022.

Percentage of Sales that Come from Value-Added Products			
Category	Season		
	2020	2021	2022
Minimum	1.00%	1.00%	1.00%
First quartile	21.25%	22.50%	20.00%
Median	27.50%	29.00%	30.00%
Third Quartile	60.00%	62.50%	55.00%
Maximum	100.00%	100.00%	100.00%
Average	41.60%	39.58%	37.67%

Table 3.6: Percent of sales that value-added products accounted for.

3.5.8 Year-Round and Seasonal Tourism

All survey respondents were asked if they offer tours of their facilities to potential customers. The majority of respondents do give tours to visitors, with 64.52% of the 31 respondents offering tours in some capacity. The most common response from respondents was that they offer tours of their facilities year-round, with 38.71% of respondents selecting this option. About a quarter of respondents (25.81%) give tours to visitors only during the maple season. For the 35.48% of respondents who do not offer tours, many are interested in beginning

to do so. Only 19.35% of respondents indicated they do not, and are not interested in giving tours. The other 16.13% of respondents said that although they do not currently engage in any form of agritourism, they are interested in doing so. Of the respondents to this survey, more than 80% either do engage in agritourism or are interested in doing so. Table 3.7 shows how producers responded to the question of how they offer tours.

How Producers Offer Tours		
Category	Count	Percent
Year-Round	8	38.71%
Only During Maple Season	12	25.81%
Do Not, But Interested	5	16.13%
Do Not Offer Tours	6	19.35%

Table 3.7: Maple syrup producers’ different ways of offering tours to visitors.

3.6 Discussion

3.6.1 Summary

The results of the producers survey reflect a changing maple syrup industry in Maryland, Virginia, and West Virginia. In 2022, the median producer created produced 77 gallons of syrup, compared to 45 gallons in 2020. Producers also reported selling their syrup in more diverse ways in 2022 than in 2020. There was a 16% increase in the number of producers selling syrup in consignment and retail stores and an 8% increase in producers selling syrup using websites. The most common way to sell syrup in both 2020 and 2022 was through direct sales at farmer’s markets and roadside stalls, with more than 96% of respondents using that method in all three years.

Producers also began selling their syrup further from their operations and selling more value-added products during this three-year period. In 2022, 66.7% of producers sold value-

added products. This was a 24% increase from 2020. As producers continue to diversify the products they sell, and where they sell them, agritourism provides an opportunity for continued growth. In 2022, 64.52% of producers offered tours of their farms to visitors. An additional 16.13% of producers indicated they are interested in doing so in the future.

3.6.2 Comparison of Data to Vermont Survey

In 2015, the Center for Rural Studies at the University of Vermont published an economic contribution study for the state's maple syrup industry. This report estimated that the maple syrup industry contributed between \$317 and \$330 million in sales to the state of Vermont in 2013 (Becot et al., 2015). To create this estimate, the researchers sent out a survey to all maple syrup producers, distributors, and equipment manufacturers asking about expenditures in a variety of categories. In addition to questions about expenditures, producers were asked about their production levels and sales practices. These surveys asked respondents to provide data for only 2013. The researchers identified and contacted 2,656 maple syrup producers in Vermont. They received completed surveys from 298 producers for a response rate of 11.22%.

Based off the 298 completed surveys, the research team was able to make estimations of how Vermont maple syrup producers as a whole operated in 2013. The research team found that the average Vermont producer had made 1,221.7 gallons of syrup during the 2013 season. This data was highly skewed, and the median production level was 295 gallons of syrup. In 2022, the survey of producers in Virginia, West Virginia, and Maryland found that producers made an average of 230.81 gallons and the median production level was 77 gallons. There is a large difference between the production levels in Vermont and in West Virginia, Virginia, and Maryland. This difference in production impacts how syrup is marketed and sold in these

different areas of the country. Table 3.8 shows the difference in median and average production between the study region and Vermont.

Quantity of Syrup (Gallons)		
	Study Region (2022)	Vermont (2013)
Median	77	295
Average	230.81	1221.70

Table 3.8: Comparison of production levels between 2013 in Vermont and 2022 in this survey’s target region

Producers in Vermont reported selling their syrup quite differently from how respondents to our study sold syrup. Only 40.2% of Vermont producers sold directly to consumers. In our study, 96.3% of producers sold syrup directly to consumers in 2022. This difference in business model can partially be attributed to the scale of operation in Vermont. The Vermont survey showed that 36.4% of syrup produced in the state was sold in bulk. Within Vermont, smaller scale producers were more likely to sell their syrup directly to consumers and less likely to sell in bulk. For Vermont producers that had fewer than 500 taps, 54.9% sold syrup directly to consumers and only 6.4% sold in bulk. The rate of producers selling directly to consumers dropped to 18.5% for producers with more than 5,000 taps. In the Vermont study, as the number of taps used increased, sales to directly to consumers declined and bulk sales increased. This is a trend that appears to be consistent across the maple syrup industry. Smaller scale producers are more likely to sell their products directly to consumers.

The Vermont report also details that the state had 24 licensed packers and processors, which are defined as operations that purchase and distribute at least 1,000 gallons annually in secondary markets. The existence of this industry highlights the vast differences between the region targeted in this study and Vermont. Only 11.29% of producers in Maryland, Virginia, and West Virginia sold syrup in bulk, and the vast majority of syrup was sold directly to consumers.

Vermont maple syrup is far more likely to be distributed by non-producers to outside organizations that repackage and brand syrup as part of third-party brands like store-brands in grocery stores.

Vermont producers also engage in less value-added production than producers in Maryland, Virginia, and West Virginia. In Vermont, only 13.8% of producers created maple cream, 11.1% made maple candy, 3.4% made sugar, and 4.7% made “other” products. It is likely that many producers that make one type of value-added product make multiple different types of products. Even if this is not the case, The total rate of Vermont producers making value added products could not be higher than 33%, or one third of producers. This can be compared to 66.67% of producers in our study that made value-added products in 2022. Respondents to our survey were more than twice as likely to produce value-added products, which are generally sold directly to consumers and are not found in grocery stores and other venues where bulk syrup is sold. Interestingly, the rate of value-added product creation increased in Vermont as the number of taps used increased. This could potentially mean that the limited sales that large-scale producers in Vermont do make directly to consumers come from the sale of value-added products.

3.6.3 Limitations

The applicability of the findings from the survey given to producers in Virginia, West Virginia, and Maryland is limited due to the number of participants and sampling method. This was not a random data collection process. Data was collected from 31 maple syrup producers, and the USDA estimates that there are 154 producers operating in the region. Average production levels for producers who completed this survey were much higher than the USDA reported average. This indicates that the sample size analyzed represents producers who make

more syrup than the average Central Appalachian producer. While the results and findings from this survey can inform decisions and provide information on general trends, this data should not be treated as representative of all maple syrup producers in this three-state region.

3.6.4 Conclusions

The purpose of this study was to better understand how much maple syrup is produced and how that syrup is sold in Virginia, West Virginia, and Maryland. The respondents to this survey make much less syrup than is produced by farmers in states like Vermont, but median production levels are increasing. This study also found that producers most commonly sell syrup and other products directly to consumers through farmer's markets and roadside stalls. While this was still the case in 2022, other forms of selling such as through consignment and retail stores is becoming more common. Over 90% of producers sell syrup within an hour of their farms, showing that most of the markets for these products is local. However, the rates of sales happening more than two hours away from farmer's operations is increasing. Producers in this region are also increasingly creating and selling value-added products, which allow farmers to sell their syrup at higher prices and differentiate their brands from what can be purchased in grocery stores. The findings from this survey illustrate that while the maple syrup industry in this region is growing, production and sales practices still indicate that the industry is smaller and more localized than the maple syrup industry of Vermont.

The differences in scale of production and sales practices between the region of Maryland, Virginia, and West Virginia and in Vermont do not mean that maple syrup production does not offer a viable economic development opportunity for producers in Appalachia. The difference in scale does, however, mean that the industry must operate differently. Bulk sales and commercial distribution will most likely never be the primary outlets for Appalachian syrup.

This means that selling directly to consumers at farmers markets and events like festivals will continue to play a key role in the Appalachian maple syrup industry.

3.7 References

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4 Maple Syrup Pricing Analysis: Factors impacting the price of maple syrup in grocery and retail outlets

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4.1 Abstract

The majority of maple syrup that is sold in the United States is sold in retail outlets like grocery stores. Although most syrup is sold in this market, there is no publicly available research discussing the characteristics of maple syrup that is sold in this way. To gain a better understanding of how maple syrup is priced and sold in food product outlets like grocery stores, an analysis of maple syrup on store shelves was conducted. Data collection took place in major grocery store chains, local grocery stores, health food stores, and general merchandise retail stores across the east coast of the United States. Data was collected for each different brand and maple syrup product that was found on the shelves of these stores. Many different characteristics of these products were analyzed, and it was found that the factor that best explained the price of maple syrup was whether or not it was part of a store-brand. Syrup that is sold as part of a store-brand is usually maple syrup that has been purchased in bulk by a commercial distributor. The most common place of origin for maple syrup observed was “North America”, which represented 38.15% of observations. About 25% observed syrup was produced in each Canada and Vermont. No other location made up more than 5% of observed syrup. The findings of this study indicate that retail outlets like grocery stores primarily carry syrup that is produced by large scale producers, and often sold in bulk and then packaged and labeled by a third party.

4.2 Introduction

Maple syrup producers sell their syrup in many diverse ways, but grocery stores are still the main place where consumers purchase maple syrup (Farrell and Chabot, 2011). Although retail and grocery stores are the primary market for maple syrup in the United States, no publicly available research has ever been conducted on the characteristics and pricing of maple syrup.

The purpose of this study is to catalogue the type of maple syrup available in these stores, and to investigate how various features of this syrup are related to the price.

An analysis of the price of maple syrup within the Northeastern United States between 1916 and 2012 found that there is no statistically significant variation in price between any of region of the United States with historical pricing data (McConnell and Graham, 2016). The lack of variation in price between states indicates that individual producers have limited control over the price of syrup in their region. This study also found that maple syrup prices increased by an average of 0.95% annually over the past century when adjusted for inflation.

Between 1975 and 2010, the average annual per capita consumption of maple syrup in the United States increased by over 155% from 1.03 fluid ounces to 2.63 fluid ounces per person (Farrell and Chabot, 2011). This increase in demand for maple syrup has been met with an increase in production, however much of that production happens outside of the United States. Canada far outpaces the United States in terms of maple syrup production, and Quebec alone produces nearly 80% of the world's supply of maple syrup (Duchesne et al., 2009). The United States is a net importer of maple syrup. In 2019, the United States imported nearly 66% percent of maple syrup that was consumed (USDA, National Agricultural Statistics Service; U.S. Department of Commerce, Bureau of the Census, 2020). The bulk production of maple syrup in Canada has lowered prices of American maple syrup, and historically caused many American producers to cease production (McConnell and Graham, 2016). Commercially produced bulk syrup is often sold to large bottling and distribution companies, where it is then repackaged as part of a large chain's label.

In the past two decades exchange rates and government policies have made exporting syrup from Canada more difficult (McConnell and Graham, 2016). Along with growing consumer demand,

this has created an opportunity for American producers to sell more syrup. This study will be the first of its kind to investigate where maple syrup on store shelves comes from, and how it is correspondingly priced.

4.3 Objectives

The main objective of this case study is to better understand how maple syrup sold in brick-and-mortar stores is priced. The specific research objectives are to:

- Determine how different characteristics of maple syrup are related to the price of the product
- Investigate the difference in price between store brand and non-store brand syrup that is available in brick-and-mortar stores
- Identify where maple syrup available in brick-and-mortar stores is produced

4.4 Methods

4.4.1 Overview

During the Summer of 2021, a research team conducted in-store shelf surveys of food product outlets including major grocery chains, independent grocery stores, health food stores, and gift shops to determine the prevalence and pricing of real maple syrup. A training video, Zoom training session, and written resources were created for all members of the surveying team. A survey form was designed in Google Forms where data collectors could enter information about various characteristics of maple syrup including the brand, size, price, packaging material, and place of origin for the syrup. No information on sugar-based “table syrup” was collected – only containers of real maple syrup were catalogued. Data was collected for every unique container of syrup stocked in each store. If there were multiple containers of the same brand, size, and packaging material, then only one observation was made for that syrup. In

total, 382 unique containers of maple syrup were observed. Due to a data collection error, data on the place of origin for maple syrup was only collected for 173 of the 382 observations, so analysis of this variable was conducted on a smaller sample size.

The primary focus of this study was Virginia and neighboring areas. Stores surveyed were in areas where local syrup was not expected to be available, and most were some distance from regional producers. For example, stores were surveyed in Richmond, the greater Washington, DC area, and northeastern Tennessee. Sixty-two stores were surveyed. Forty-eight stores in Virginia, four in Maryland, three in both Tennessee and Washington DC, and one each in West Virginia, Connecticut, Ohio, and North Carolina were surveyed. The stores that were selected to be surveyed represent a convenience sample based on the location of members of the surveying team.

Surveys were conducted at five categories of stores: Chain grocery stores, independent grocery stores, health food stores, artisan arts and crafts stores (gift shops), and retail stores. Forty-one (41) chain grocery stores, eight (8) health food stores, five (5) independent grocery stores, four (4) retail stores, and four (4) crafts stores (gift shops) were surveyed. The data collection form is found in Appendix B.

Once this data was collected, analysis was conducted to understand the relationship between the price of syrup and other variables. This report presents an analysis of the pricing of maple syrup, and how price is related to variables including the type of store the syrup is sold in, the quantity of syrup, packaging material, syrup place of origin, and if the syrup is sold as part of a store-brand or from an independent company. Maple syrup is sold in many different quantities. To create a comparative unit for analysis, all pricing analysis was done on a dollars-per-ounce basis.

4.4.2 Identifying Store Brand Syrup

A key variable in this analysis is whether or not maple syrup is being sold as part of a store-brand or not. Store-brand syrup is syrup that is purchased in bulk from producers and then resold by a commercial distributor to retail and grocery stores who package the syrup under their own brands. The purpose of comparing store-brand and non-store brand syrup was to isolate syrup that was clearly purchased in bulk by a national or international distributor. To identify what syrup was part of a store-brand, the research team investigated all sixty-three brands of syrup identified in this study, and found which brands were owned by the same organization that owns the store the syrup was found in. Store-brand syrup is not the only commercially distributed syrup that was observed in this study. There are non-store-brands like Food Club and Field Day that sell syrup purchased in bulk from a variety of producers. However, it was outside of the scope of this project to investigate the supply chain of all sixty-three brands of syrup identified. Isolating the store-brand syrup provided a simple way to begin an investigation into the differences between syrup purchased in bulk and syrup that is packaged and branded by maple syrup producers. When reading this report, it is important to remember that even the non-store-brand classified syrup does have many containers of syrup that are being sold by commercial distributors.

4.5 Findings

4.5.1 Overview of Characteristics

For the 173 observations in which place of origin was observed, 38.15% of syrup was listed as produced in North America, which means produced in either the USA or Canada. Additionally, 25.43% of observations were produced in Canada and 24.28% were produced in

Vermont. No other “place of origin” listing represented more than 5% of observations. Table 4.1 shows the full place of origin distribution for syrup observed in this study.

Maple Syrup Place of Origin		
Location	Percent	Count
North America	38.15%	66
Canada	25.43%	44
Vermont	24.28%	42
New York	4.62%	8
Wisconsin	4.05%	7
USA	1.73%	3
Pennsylvania	0.58%	1
Virginia	0.58%	1

Table 4.1: Place of origin of maple syrup observations.

Many stores carry a “store brand” maple syrup, and these comprised 127 (33.2%) of the 382 observations made. 18 of the 63 brands (28.6%) observed were store brands. Maple syrup was sold in four types of packaging: glass, plastic, metal, and cardboard (a large bulk container lined with plastic material). Syrup was most often packaged in glass, with 61.13% of observations packaged in this material. The second most common packaging material was plastic with 36.06% of containers made out of this material. About 2.30% of maple syrup was sold in metal packaging. Figure 4.1 shows the breakdown of packaging materials observed.

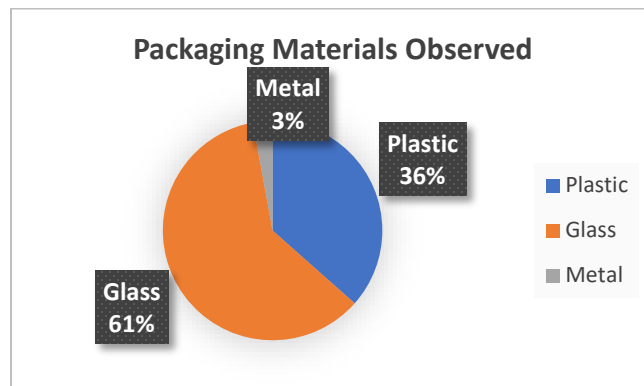


Figure 4.1 Packaging materials that maple syrup was bottled in.

Maple syrup is sold in a variety of containers and quantities, and 23 different sized containers were observed in this study. These ranged from 1.69 fluid ounce to 64 fluid ounce (half gallon) containers. Most observations fell into three size categories: 8 fluid ounces (18.59%), 12 fluid ounces (22.25%), and 32 fluid ounces (22.51%). Figure 4.2 shows the frequency of each observed size container of maple syrup. There was a high level of variability in container sizes with many containers being labeled as fractional sizes, such as 8.5 fluid ounces and 12.7 fluid ounces. No gallon sized containers were observed in this study.

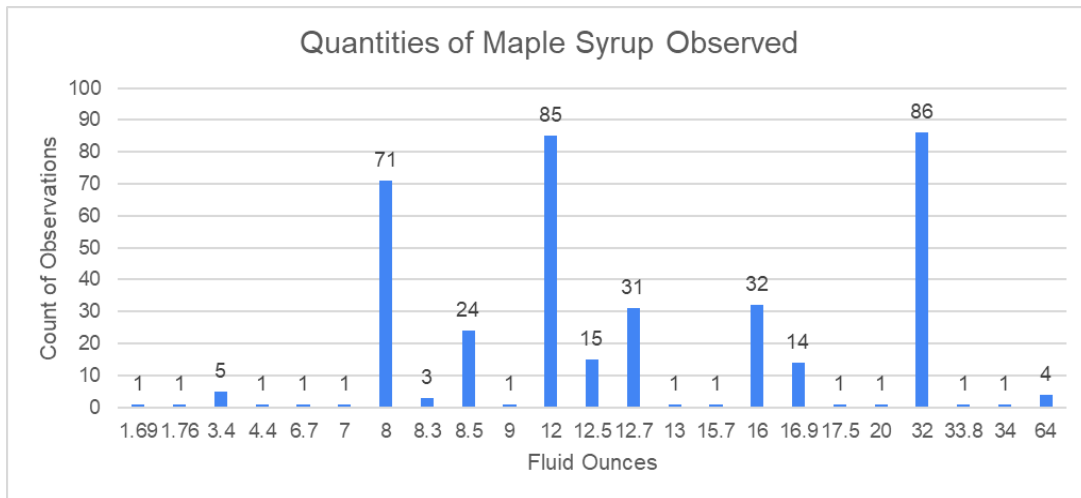


Figure 4.2: Frequency of different sized containers observed.

4.5.2 Pricing

Maple syrup identified in this study came from a variety of sources and was sold in several different container sizes with wide variation in prices. To find common trends in the data the average price of the common bottle sizes of maple syrup was found. All syrup quantities that were observed four or more times were included in this analysis. The container sizes analyzed were 3.4, 8, 8.5, 12, 12.5, 12.7, 16, 16.9, 32, and 64 fluid ounces. The container size with the highest average price was the 64 fluid ounce containers. Conventional thinking would indicate

that as the amount of syrup being sold increases, the price also increases. However, in this sample, 8 fluid ounce containers had an average price of \$8.02 and 8.5 fluid ounce containers had an average price of \$5.73. Additionally, 12.5 fluid ounce containers were listed for less on average than 12 fluid ounce containers of syrup. Figure 4.3 shows the averages prices of common quantities of maple syrup that were observed.

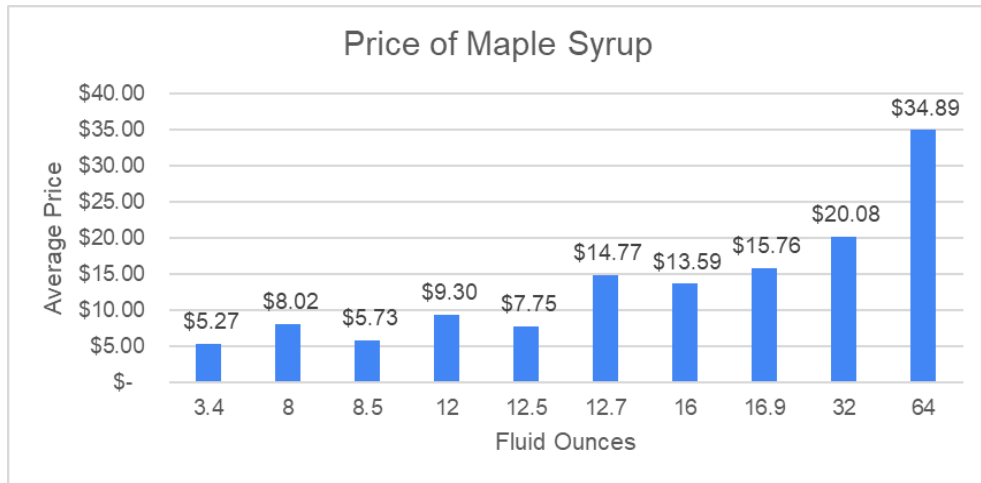


Figure 4.3: Average prices of commonly sold quantities of maple syrup.

4.5.3 Price-Per-Ounce

To better compare the price of maple syrup between container sizes, the price-per-ounce of maple syrup was found for each container size. Maple syrup sold in 3.4 fluid ounce quantities had a price-per-ounce of \$1.55, which was the highest price observed. The price-per-ounce of 8 fluid ounce containers was \$1.00 and 8.5-ounce containers had an average price-per-ounce of \$0.67. The 12.5-ounce containers of syrup had an average price-per-ounce of \$0.62. However, 12.7 fluid ounce containers had an average price-per-ounce of \$1.16, which is nearly double the price-per-ounce of 12.5-ounce containers and the second highest amount behind the 3.4 fluid ounce containers. The \$0.62 price-per-ounce of the 12.5 fluid ounce containers is the lowest

price and closest to the \$0.63 price-per-ounce of 32 fluid ounce containers. Figure 4.4 shows the average price-per-ounce for commonly observed quantities of syrup.

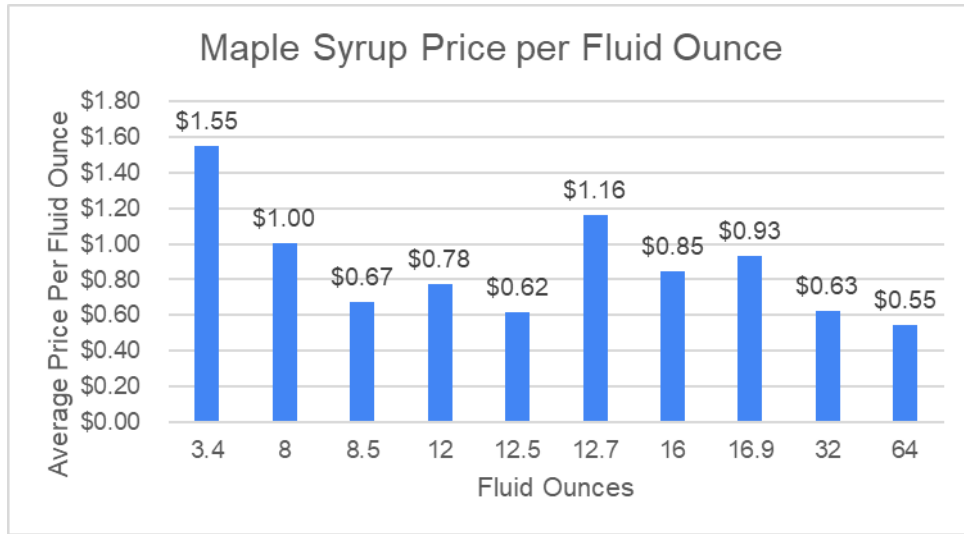


Figure 4.4: Average price-per-ounce of commonly sold maple syrup quantities.

The trends in price-per-ounce of maple syrup cannot be explained by the quantity sold alone, so further analysis was conducted to determine if the percentage of syrup that is store-brand versus non-store-brand impacts price. The percentage of store-brand syrup in each of the common container sizes was found and added to the price-per ounce graph in Figure 4.5.

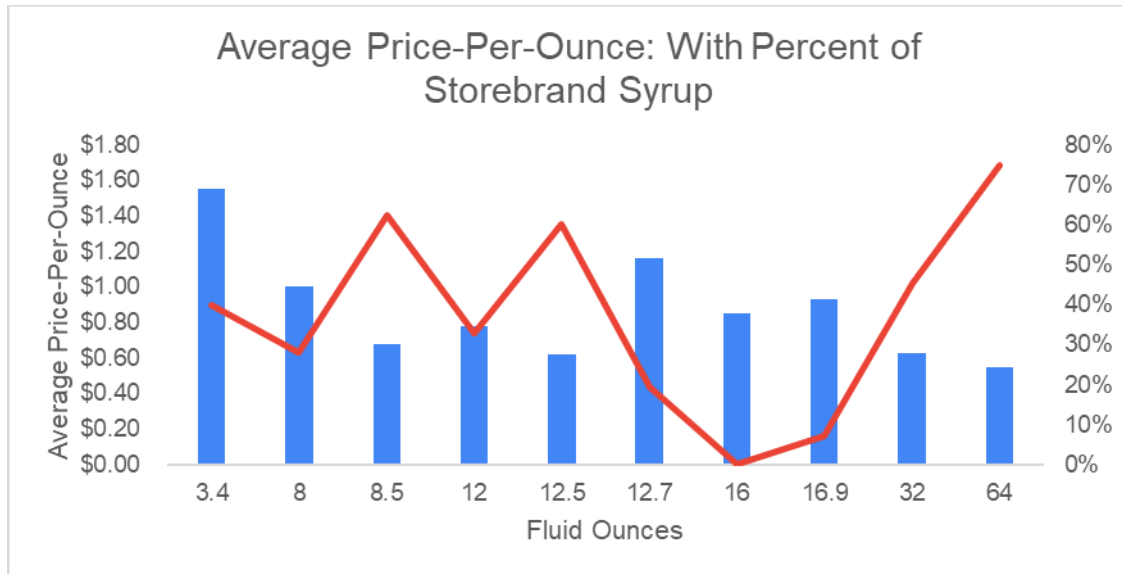


Figure 4.5: Average price-per-ounce of syrup with the percentage of store-brand syrup in each category added as a red line with a secondary axis.

When a secondary axis is added to the chart showing average price-per-ounce (see Figure 4.6) a clearer idea of why some syrup quantities have such a low price-per-ounce begins to emerge. Table 4.2 displays the same information as Figure 4.5 to clearly show that the four quantities with the lowest price-per-ounce are also the four quantities with the highest proportion of syrup being sold as store-brands. For 12.5 fluid ounce syrup containers observed, 60% were store-brand, which is the second highest rate only behind the 63% for 8.5 fluid ounce containers. This relationship does not fully explain the price-per-ounce differences between quantities, but it does help illustrate why some quantities of syrup are generally less expensive than others: they are the quantities that store-brands are selling syrup at.

Maple Syrup Average Price-Per-Ounce		
Container Size (Fl. Oz.)	Price-Per-Ounce	Percent Store-brand
3.4	\$1.55	40%
8	\$1.00	28%
8.5	\$0.67	63%
12	\$0.78	33%
12.5	\$0.62	60%
12.7	\$1.16	19%
16	\$0.85	0%
16.9	\$0.93	7%
32	\$0.63	45%
64	\$0.55	75%

Table 4.2: Average price-per-fluid ounce and the percent of syrup in each quantity being sold as a store-brand.

To gain a clearer view of the relationship between price and quantity of syrup, a scatterplot was created to show the distribution of syrup price-per-ounce compared to the quantity of syrup. This scatterplot (Figure 4.6) illustrates the general trend that syrup prices decrease as size of the package increases. When this scatterplot was colored to show store-brand data points and non-store-brand data points (Figure 4.7), a clear divide with store-brand syrups having a lower price-per-ounce than non-store-brand syrups emerges. The average price-per-ounce of store-brand syrups was found to be \$0.64 compared to an average of \$0.95 for non-store-brand syrups.

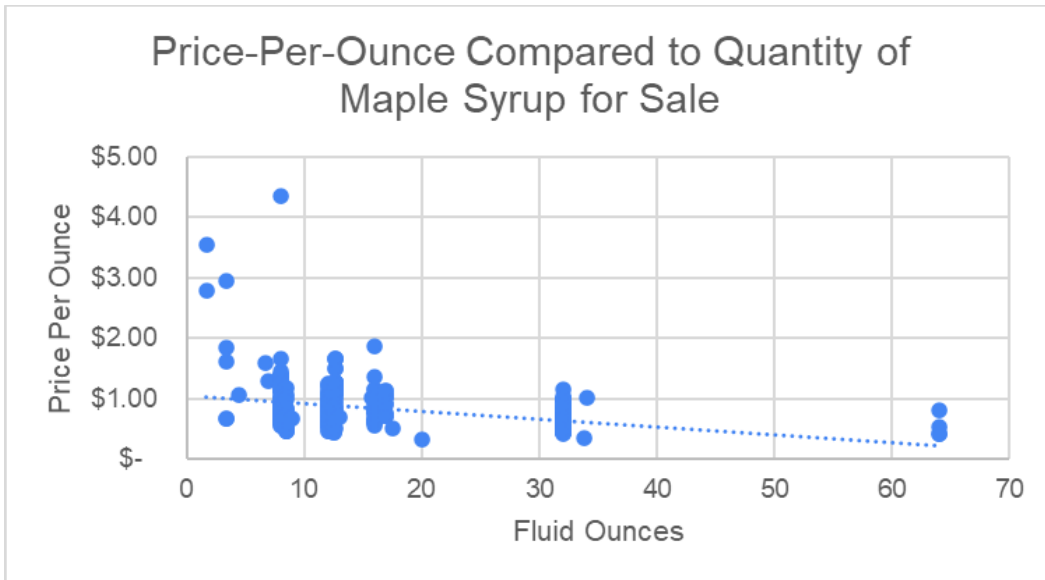


Figure 4.6: Scatterplot showing distribution of price-per-ounce compared to quantity of syrup being sold.

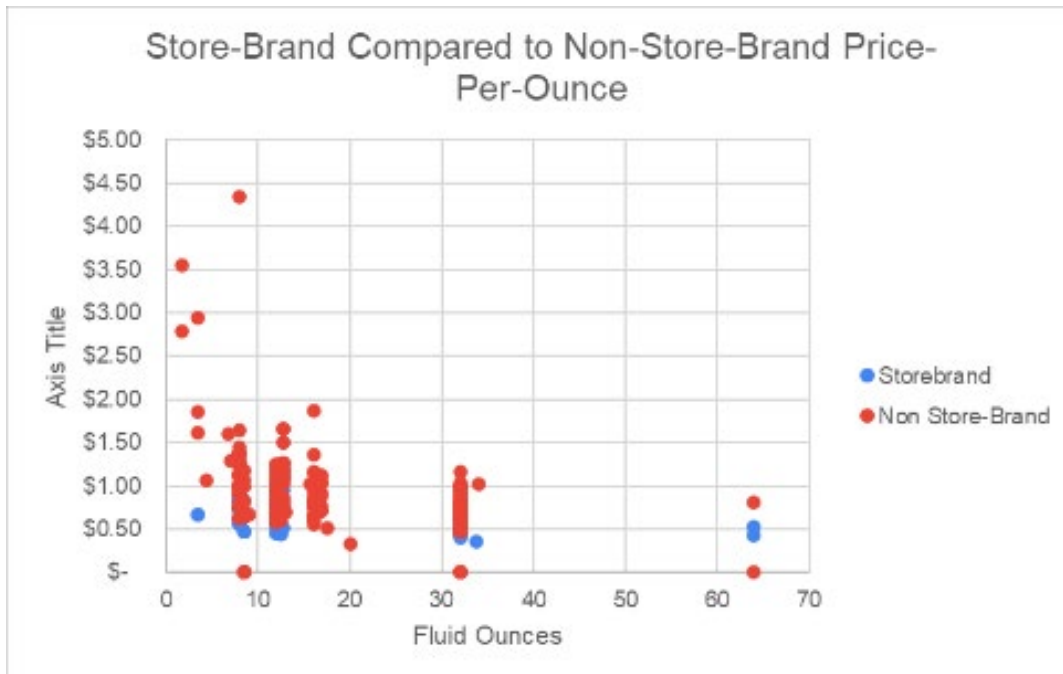


Figure 4.7: Comparison of store-brand to non-store-brand syrup prices.

4.5.4 Other Pricing Variables

Other pricing variables that were investigated include the type of store the syrup was being sold in, the packaging material the syrup was in, and the location in which the syrup was produced. When the type of store in which the syrup was sold was investigated it was found that large retail stores such as Target and Walmart sell syrup at the lowest price with an average price-per-ounce of \$0.61. Based on the data collection method of making one observation for each different bottle of syrup on the shelves, these stores also carry the largest proportion of store-brand syrups. In these stores, 50% of syrup on the shelves was store-brand. The next lowest price-per-ounce was found at chain grocery stores where syrup was listed for an average price-per-ounce of \$0.80. Chain grocery stores had the second largest proportion of store-brand syrup, with brands owned by the store making up 46% of syrup observed. Table 4.3 shows the average price-per-ounce of syrup broken out by the type it was sold in.

Price of Maple Syrup by Store Type			
Category	Price	Observations	Percent Store-brand
Retail	\$ 0.61	22	50%
Chain Grocery	\$ 0.77	253	46%
Gift Store/Artisan Center	\$ 1.05	4	0%
Health Food	\$ 1.07	85	0%
Independent Grocery	\$ 1.08	18	0%

Table 4.3: Average cost of syrup based off what type of store it was in.

The next variable investigated was the packaging material the syrup was bottled in. It was found that in this data set syrup packaged in plastic containers had a much lower price-per-ounce than syrup in glass or metal packaging. Syrup bottled in plastic had an average price-per-ounce of \$0.75 compared to \$0.89 for glass-bottled syrup and \$0.95 for syrup in metal containers. Glass-bottled syrup had the largest proportion of store-brand products at 31%, and 36% of

plastic-bottled observations were store-brands. Table 4.4 shows the average price of maple syrup for each packaging material.

Price by Packaging Material			
Category	Price	Observations	Percent Store-Brand
Plastic	\$ 0.75	140	31%
Glass	\$ 0.89	232	36%
Metal	\$ 0.95	11	0%

Table 4.4: Price information for the packaging material of syrup.

The final price variable analyzed was the listed place of origin for the maple syrup. This information was only collected for 173 observations. It was found that “North American” syrup had the lowest price-per-ounce with this syrup listed for an average price of \$0.66 per ounce. This syrup also had the largest proportion of store-brand syrup at 58%. The next cheapest syrup was from Wisconsin, with a price-per-ounce of \$0.69. All Wisconsin syrup observed in this study comes from the same brand, Anderson’s Maple Syrup. Virginia and Pennsylvania had the most expensive syrup per ounce, but there was only one observation of syrup from each state in this study. Table 4.5 shows the average price of maple syrup based on its place of origin.

Price by Place of Origin			
Category	Price	Observations	Percent Store-Brand
North America	\$ 0.66	66	58%
Wisconsin	\$ 0.69	7	0%
New York	\$ 0.74	8	38%
USA	\$ 0.81	3	33%
Canada	\$ 0.86	44	27%
Vermont	\$ 0.90	42	14%
Pennsylvania	\$ 1.36	1	0%
Virginia	\$ 1.45	1	0%

Table 4.5: Price of syrup based on place of origin.

4.6 Discussion

4.6.1 Limitations

This study was limited by the novelty of the research being conducted and the intensive hours required to visit stores and record data. A follow-up study could be strengthened by analyzing a data set with more observations collected from other regions of the United States. Analysis was also only conducted on maple syrup present on shelves, and no data on the actual sales of maple syrup was conducted.

4.6.2 Conclusions

Based on the 382 observations collected from 64 different stores, it appears the most influential factor on the price of maple syrup is whether it is sold as a store-brand or as a non-store-brand. Store-brand syrup was sold for an average price-per-ounce of \$0.64 while non-store-brand syrup was sold for an average price-per-ounce of \$0.95. Syrup sold in plastic containers tended to be cheaper than syrup in glass or metal containers, and “North American” syrup was cheaper than syrup produced in any more specific region. In this study, store-brand syrup serves as a proxy for bulk syrup that is distributed by a large company. In grocery and retail stores,

which are believed to be the primary markets for maple syrup purchasing in the United States, nearly half of all maple syrup observed was part of a generic store brand. The findings in this study highlight the difference in price of syrup purchased in bulk by commercial distributors and syrup sold by farmers or smaller businesses.

This study also found that 87.86% of the different bottles of syrup observed came from either “North America”, Canada, or Vermont. This finding highlights the difference in how producers in Central Appalachia market and sell their syrup compared to producers from the Northeast. Only one of the 173 bottles that place of origin data was collected for came from Virginia. No observations came from Maryland or West Virginia.

The lack of syrup from Maryland, Virginia, and West Virginia and the lower cost of bulk syrup show that grocery and retail stores are not currently a market that producers from Central Appalachia are competitive in. A future shift in market conditions, such as if consumers were more interested in paying a premium for locally branded products, could allow Central Appalachian producers to be more competitive in this space. In the current situation, sales mediums like farmer’s markets, festivals, and websites afford a more realistic platform for Appalachian producers.

4.7 References

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5 Highland County Maple Festival: Investigating the economic and educational impacts of a rural agritourism event

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5.1 Abstract

Special tourism events like festivals provide communities with an opportunity to attract visitors to an area for a community celebration. One such event is the Highland County Maple Festival. This festival has taken place at the end of the maple syrup production season since 1959. The 62nd annual Highland County Maple Festival took place over the second and third weekends of March in 2022. A research team from Virginia Tech partnered with Future Generations University and the Highland County Chamber of Commerce to conduct an economic impact analysis of this event. Surveys were given to both visitors and vendors at the event. Attendance at the event was estimated with car counting information from the Virginia Department of Transportation. This research found that approximately 26,500 visitors came to the festival and spent somewhere between \$1.37 and \$2.02 million dollars. Approximately 21% of this spending took place at the ten maple syrup farms that offered tours during the event. This means that most of the money spent in Highland County during the festival went to other types of businesses in the area. The impacts of the Highland County Maple Festival go beyond just the money that was spent. Over 73% of visitors reported being interested in visiting the county during another season because of their experience at the festival. One-fifth of visitors learned what real maple syrup was during the festival, and visitors reported being 21% more likely to purchase maple syrup after attending. The 2022 Highland County Maple Festival provided an economic boost to businesses throughout the county and created new maple syrup customers for the future.

5.2 Introduction

In the survey of maple syrup producers in Maryland, Virginia, and West Virginia, over 80% of producers indicated that they offer tours of their facilities or are interested in doing so. Nearly 39% of producers who were surveyed offer tours year-round, and an additional 26% offer

tours only during the maple season. Sixteen percent (16%) of respondents indicated they are planning to offer tours in the future. Maple syrup-based tourism offers producers the ability to sell their syrup to customers in a more personalized setting at a substantial markup compared to bulk commodity prices (Hinrichs, 1998). The analysis of maple syrup in brick-and-mortar stores showed that bulk syrup is commonly available in most stores. Direct sales through farmers markets, roadside stands, and tourism provide an opportunity for Appalachian producers to sell syrup without having to lower their prices to match that of bulk syrup.

Offering tours of a working farm is a widely acknowledged method of generating supplemental income and increasing the price of local farm products (Kim et al., 2019). However, developing agritourism programs and taking the time to give tours of a facility can be a substantial time burden for farmers (Colton and Bissix, 2008). One method of lowering the time commitment required to engage in agritourism activities is to limit the time that farms are open to the public to set dates every year, such as through an agricultural festival.

In a comprehensive literature review conducted by Donald Getz in 2010, festivals are defined as themed public celebrations of community values and identity (Getz, 2010). Festivals are generally themed around a unique aspect of a community's identity such as an urban legend, an agricultural commodity, or anything else that can be simultaneously used to celebrate the unique identity of a community while also attracting outside visitors to attend the event (Derret, 2003). Community-based festivals have proliferated since the 1990's as a way to attract visitors to a region and stimulate spending while not requiring the intensive infrastructure investment of traditional tourism activities due to their time-limited nature (Gursoy et al., 2008). Festivals have also been found to enhance visitors' image of a region (Huang et al., 2010). As festivals became

a key part of many region's advertising and tourism strategies, the number of academic articles published about festivals also surged in the 1990's and early 2000's (Getz, 2010).

The main area of focus of literature about festivals is the economic impact that these events have, meaning the "net change that occurs in an economy as the result of a special event or festival" (Long and Perdue, 1990, p. 10). The amount of money generated by these events is of interest to planners and community members as they try to understand the return-on-investment for the many volunteer hours and public funding that goes into organizing and hosting these events. Festivals have been an important way for Appalachian communities to celebrate their culture and stimulate economic activity since the early 19th century (Hackbert, 2009). However, little work has been done to quantify the economic and other impacts that these events have had in Appalachia. The purpose of this study is to quantify the economic and educational impacts of the 2022 Highland County Maple Festival.

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 during the second and third weekends of March every year. 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 were open for tours, pancake breakfasts were offered in four different locations across the county, and vendors were set up in the towns of Monterey and McDowell. 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 complete a case study on the impact that this festival has for Highland County and particularly for maple syrup producers in the area.

5.3 Objectives

The goal of this research is to quantify the impacts that a maple syrup-based agritourism festival has in a rural Virginia community. The specific research objectives are to:

- Quantify the direct economic impact of the 2022 Highland County Maple Festival in Highland County, Virginia;
- Quantify the educational impact that attendance to the festival has on visitors; and
- Investigate changes in visitor attitudes toward purchasing maple syrup and visiting Highland County during seasons of the year after attendance to the festival.

5.4 Methods

5.4.1 Economic Impact Analysis Framework

The general framework of an economic impact analysis is to identify how many people attended an event, survey visitors randomly to estimate the average spending per visitor, multiply these two numbers by each other to estimate the “direct” economic impact, and then use multipliers to estimate “induced” and “indirect” economic impacts based off the “direct” economic impact (Crompton, 1995). Due to resource limitations and broader range of impacts

being assessed during this study, only the “direct” economic impact was estimated. The “direct” economic impact is all spending that takes place in a spatial zone explicitly because of a certain event. In this study, the event is the Highland County Maple Festival, and the spatial zone is Highland County, Virginia.

5.4.2 Data Collection

To conduct this analysis, both vendors and visitors to the festival were surveyed. Visitors were surveyed in multiple locations in the county using an intercept method during each day of the festival which took place over the second and third weekends of March on March 12th, 13th, 19th, and 20th. 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. This left a total of 380 visitor surveys for analysis. There were 40 responses to the vendor survey. Many surveys were returned only

partially completed, so questions had slightly different numbers of responses. Nonresponse bias was not analyzed as a part of this research.

5.4.3 Survey Design

In 2001, John Crompton, Seokho Lee, and Thomas Schuster authored an influential paper on how to appropriately conduct an economic impact analysis, and how to avoid common mistakes. The common mistakes that they warn about in this article are the inclusion of spending from casual visitors, “time switchers”, and local residents (Crompton et al., 2001). In this terminology, casual visitors are visitors from outside of the defined geographic region who would have come to that area regardless of whether or not the special event being analyzed was taking place. Time switchers are visitors who were planning to come to the region regardless of the event but decided to switch when they planned to visit the area due to the special event taking place. The spending of local residents cannot be included in an economic impact analysis because this type of study is only interested in new brought into an area by the event, and local resident’s money does not enter the region even if they purchase goods at the event.

In the planning stage of this study, it was determined that it was not possible to be a time-switcher at the Highland County Maple Festival, because so many of the businesses, vendors, and sugar camps that were making sales during this event do not operate in this capacity during the rest of the year. To avoid collecting data from casual visitors, survey respondents were asked in the beginning of the survey if the Highland County Maple Festival was the primary reason for their visit to the county. The visitor survey can be seen in Appendix C. All survey responses from local residents and visitors who were in the county for reasons other than the festival were filtered out of the data before any analysis was conducted. The attendance method used for this study only accounted for visitors who entered Highland County, so it is assumed no local

residents were accounted for in the attendance estimate. To ensure only spending that took place in Highland County was represented, survey respondents were clearly asked to only provide spending estimates for their time in Highland County. One potential source of error in this study comes from the fact that visitors were asked to estimate their spending for the entirety of their stay in Highland County while still in the area. Visitors' estimates of their future spending in the county could be misrepresentative of their actual spending during the rest of their stay.

5.4.4 Attendance Estimate

5.4.4.1 Festival Setup

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 Highland County. In 2022, ten sugar camps were open for tours, vendors were set up in the towns of Monterey and McDowell, and pancake breakfasts were hosted in the towns of Monterey, McDowell, Blue Grass, and Bolar. There was an admission cost to enter the indoor venues where vendors were set up, however there was no entry fee to tour the sugar camps or to visit vendors who set up along the streets in each town. Figure 5.1 shows the many points of interest that visitors could go to during the festival. Another factor to consider when measuring attendance is the many different ways in which a visitor could attend the festival. In some cases, visitors may have driven into Highland County to only visit their favorite maple syrup producer, while others may have visited all ten sugar camps over a two-day period, some visitors may have only attended a pancake breakfast, while another visitor may have driven into Monterey to view the arts and crafts vendors for a few hours before departing.

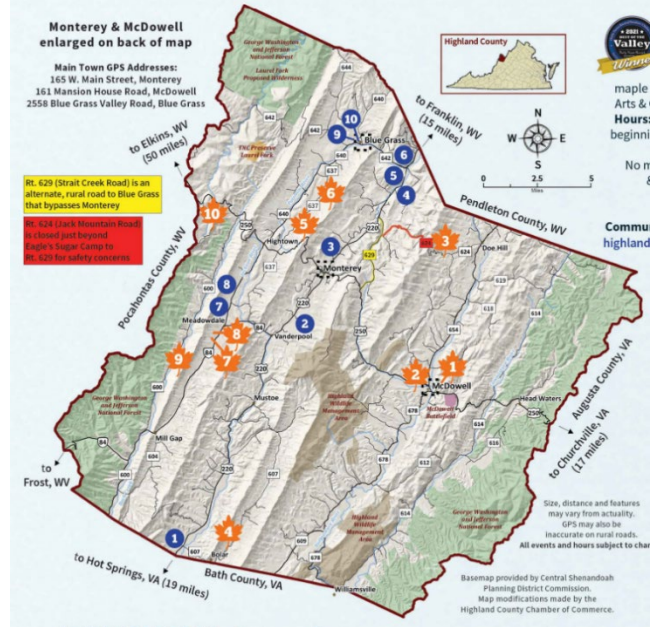


Figure 5.1: A map included in the 2022 Highland County Maple Festival brochure showing points of interest (Highland County Chamber of Commerce).

5.4.4.2 Attendance Methodologies Review

To address these challenges, methods of measuring attendance at an open gate event were investigated. However, due to the decentralized nature of this event none were feasible. The methods that were investigated include use of 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 vehicles in event parking lots.

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 activities occur 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 a central location, such as Monterey or McDowell, however it was deemed inappropriate due to its inability to account for multiple venues characterizing the Highland County Maple Festival. 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 a low-cost method of estimating attendance at open-gate festivals (Hara et al, 2016; Tyrell and Ismail, 2005). In this method, 15-minute counts are multiplied by four to account for the entire hour. This method was also not feasible due to the need to perform these counts at all 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 vehicles entering assigned parking areas, 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 visit 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 developed 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, 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.

5.4.4.3 Attendance Counting Method Overview

To estimate attendance at this festival, an adaptation of the method used by the National Park Service was created. The full account of the methodology employed is found in sections 5.4.4.4 through 5.4.4.12. The key components of this methodology are:

- Comparative crowd density estimates from multiple locations in Highland County that were taken each day of the festival.
- Observations collected by pneumatic tube car counters on the number of vehicles that entered Highland County through four main gateways during festival operating hours on March 19th and 20th.

- Survey responses from vendors indicating how many people were in their vehicles when entering the county, and whether they stayed overnight or drove into the county each day of the festival.
- Survey responses from visitors indicating how many people were in their vehicles, how many days they attended the festival for, and whether they stayed overnight or drove into the county each day they attended the festival.

This data was first used to estimate how many vehicles entered the county during all four days of the festival. Then the number of vendor vehicles was estimated and separated from the number of visitor vehicles that entered the county. Survey responses were then used to determine how many people were in the average vendor and visitor vehicles, and how many visitors had stayed overnight in Highland County prior to attending the festival. All of this data was analyzed to create estimates of both how many different visitors attended the festival, and how many “days” visitors had spent at the four-day event overall.

5.4.4.4 Applying Traffic Counting to the Highland County Maple Festival

The Maple Festival is a decentralized event spanning essentially the entire county. However, the entrances to the County are limited; four main gateways are found, with U.S. Routes 220 and 250 intersecting at the center of the county. There is one additional entrance from Virginia State Route 84 that receives less traffic than the main gateways. To estimate attendance, we assume that all traffic entering Highland County during the hours of the festival are visitors to the festival. This assumption may lead to an overestimate of attendance. The Virginia Department of Transportation (VDOT) placed pneumatic tube vehicle counters at each of the four main gateways to measure traffic during the second weekend of the festival. The locations of the pneumatic tube vehicle counters are shown in Figure 5.2. 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 collected, and this information, along with data collected from festival visitors from the random intercept survey was used to estimate unique visitors and the total number of visitor-days. Unique visitors are the number of individuals attending, while visitor-days reflect multiple visits over different days made by the same individual.

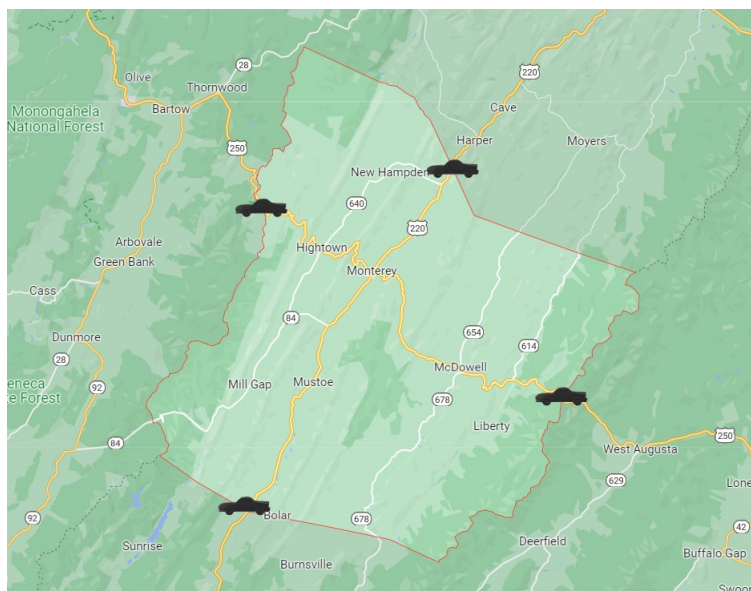


Figure 5.2: A map of Highland County showing where pneumatic tube vehicle counters were placed (marked by black auto symbol).

5.4.4.5 Vehicle Counting on March 19th and 20th

The first step of estimating attendance 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 12th, March 13th, March 19th, and March 20th. On Saturday March 13th and Saturday March 19th, the festival began at 7:00 am when pancake breakfasts opened, 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 13th and March 20th, 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 19th, and between 6:00 am and 4:00 pm for March 20th.

5.4.4.6 Estimating Vehicle Entries for the First Weekend of the Festival

Snow and ice on the roads during the first weekend of the 2022 Highland County Maple Festival made it impossible to use pneumatic tube vehicle counters. Hence, the research team employed a version of the 15-minute gate-counting method discussed in section 5.4.4.2 on page 81. Two teams surveyed visitors for 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 every hour to count how many visitors entered their respective facilities. These counts were then multiplied by four to estimate hourly visitors. Two additional 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. The locations of these venues are available in Figure 5.3. These counts were used to estimate the difference in crowd size between the first and second weekend of the festival.

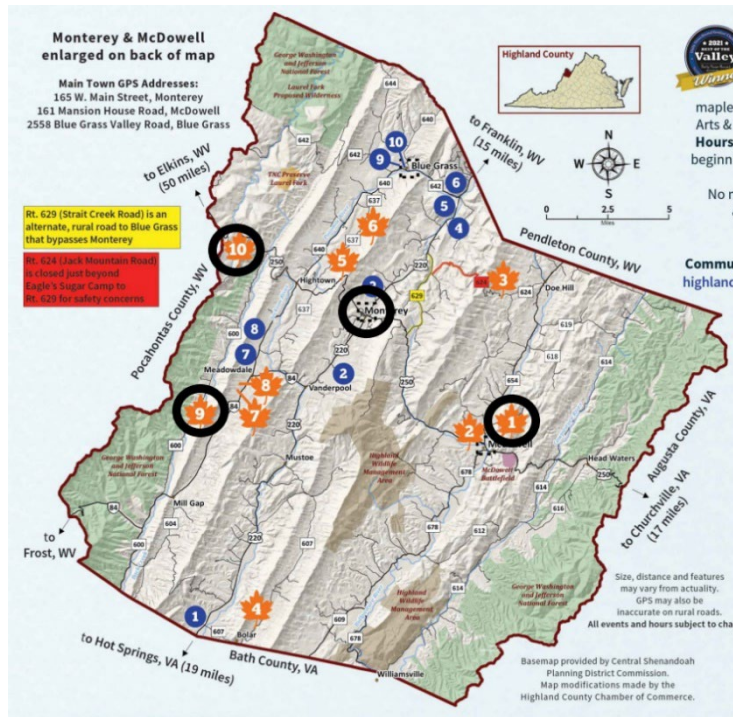


Figure 5.3: Map of the Highland County Maple Festival with locations where crowd size counts occurred circled in black.

Crowd Size Measurement				
Location	12-Mar	13-Mar	19-Mar	20-Mar
Laurel Fork Sapsuckers	X	X	X	X
Highland High School Gym	X	X	X	X
Back Creek Farms	X	X	X	X
Tonoloway Farm	X	X	X	X
	Sum of March 12 counts	Sum of March 13 counts	Sum of March 19 counts	Sum of March 20 counts
Total				

Figure 5.4: Crowd size measurement plan at locations throughout Highland County.

The total number of visitors counted using the survey methods on the 12th of March was then divided by the number of visitors counted on the 19th of March, providing a day-specific ratio. This ratio was then multiplied by the number of vehicles observed entering Highland County on March 19th using the traffic counters to create a vehicle count estimate for March 12th.

The same process was applied to create a vehicle estimate for March 13th using the Sunday ratio (March 13th and March 20th). The formula used is shown in Figure 5.5.

$$(\text{Sum of March 12th Counts} / \text{Sum of March 19th Counts}) * \text{Vehicles Observed on March 19th} = \text{Vehicle Estimate for March 12th}$$

$$(\text{Sum of March 13th Counts} / \text{Sum of March 20th Counts}) * \text{Vehicles Observed on March 20th} = \text{Vehicle Estimate for March 13th}$$

Figure 5.5: Equations used to estimate vehicles entering Highland County during the first weekend of the festival.

5.4.4.7 Vendor Attendance

The Highland County Chamber of Commerce organized 139 commercial vendor stalls at the 2022 Highland County Maple Festival. This includes vendors who sell arts, crafts, and food items. It was not known how many of these vendors are locals to Highland County. In addition to surveying visitors to the festival through a random intercept method, every vendor was emailed a survey at the conclusion of the festival. Vendors were asked where their home residence is. The ratio of vendor respondents who live in Highland County was found through this survey, and this percentage was applied to all 139 vendors to estimate how many vendors from outside of Highland County participated. 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 responses from vendors who did not live in Highland County's responses were examined for this question.

Responses to this question were used to calculate the portion of vendors that drove into Highland County for the festival all four days, the portion that drove into the county for only one weekend, and the portion that stayed overnight in Highland County during both weekends of the festival. These ratios were then multiplied by the number of vendors from outside of Highland

County to estimate how many entrances each group made to the county. This information was used to account for how many total vehicles were driven into Highland County by vendors during the festival. Vendors and visitors have different PPV multipliers and must be accounted for differently, so this number of vehicles was subtracted from the total number of vehicles that are estimated to have entered Highland County during the festival. The remaining vehicles are assumed to represent visitors entering Highland County.

The vendor survey asked respondents to provide the size of their travel party, and these responses were used to develop a PPV multiplier for vendors. The PPV multiplier serves as a proxy for vendor group size. This multiplier was applied to the non-local vendors to estimate how many people attended the festival as vendors. This multiplier was only applied to vendors who live outside of Highland County, because local residents do not count as “visitors” to the festival. It is assumed that all vendors attended all four days of the festival, which means that the total number of people who attended the festival as vendors was multiplied by four to calculate how many total days vendors spent at the festival. This is necessary because spending is being calculated for visitors and vendors per-day at the festival.

5.4.4.8 Calculating How Many Visitors Drive into Highland County

The counts provided by the pneumatic tube vehicle counters and the crowd density measurements taken during the Festival were used to estimate how many vehicles entered Highland County during the festival. The number of vendor vehicles estimated to enter the county was removed from this total estimate. Assuming that all vehicles entering the county during the festival also visited the festival, the remaining vehicles that entered the county represent visitors to the festival.

In the random intercept survey given to visitors during the festival, respondents indicated whether they stayed overnight in Highland County while attending the festival or if they drove into Highland County during the day to attend. Unfortunately, respondents did not indicate what nights they stayed overnight, so it is assumed 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 each have to be added into the count of vehicles entering Highland County once. The festivalgoers who stayed overnight and attended two days have to be added in twice, and so on for visitors who stayed overnight and attended for three and four days.

To determine how many festivalgoers stayed overnight in Highland County, it must first be determined how many individual vehicles account for the total count of 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 how many days each respondent attended the festival for, and this information was used to determine the number of unique entrances by visitors to the festival.

To identify how many unique vehicles entered the county, these percentages of respondents who attended for one, two, three, and four days were 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 each group of visitors attended the festival. The total

percentage of entrances that one-day, two-day, three-day, and four-day visitors accounted for was then found. These proportions were then multiplied by the number of visitors' vehicles that entered the county during the festival. The total number of entrances that one-day, two-day, three-day, and four-day visitors are responsible for was then found. These totals were then divided by the number of days each group attended the festival to determine how many different visiting vehicles there were.

5.4.4.9 Calculating the Total Number of Overnight Visitors

Once the number of different visitor vehicles that entered the county was known, this value was assumed to represent the percentage of visitors who did not stay overnight in Highland County during the festival. The percentages of survey respondents who indicated they did and did not stay overnight during the festival is assumed to apply to all visitors. These percentages were then used to estimate how many vehicles overnight visitors drove into Highland County outside of festival hours.

The number of different vehicles that represents overnight visitors to Highland County represents visitors who attended the festival for varying numbers of days. The survey responses from overnight visitors were used to estimate what percent of overnight visitors attended for one-day, two-days, three-days, and four-days. Those percentages were then weighted by how many days each group of visitors attended the festival for, and then multiplied by the number of different vehicles that overnight visitors used to enter the festival. The resulting number shows how many daily vehicle entrances overnight visitors would have accounted for if they were not staying overnight in the county.

5.4.4.10 Unique Visitors and Daily Visitors Estimate

The daily vehicle entrances estimate from overnight visitors were added to the daily visits counted by the pneumatic tube counters and crowd density measures. The resulting number represents total daily vehicle entrances made during the festival. As vehicles are a proxy count for human visitors, it was necessary to determine how many people one vehicle represents. This was 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. The PPV multiplier for visitors was then multiplied by the number of unique vehicles to estimate how many unique visitors attended the festival. The multiplier was also multiplied by the number of daily vehicle entrances to estimate how many one-day visits were made to the festival. This value of one-day visits was then added to the number of one-day visits made by non-local vendors to estimate the total number of days that visitors and vendors spent at the 2022 Highland County Maple Festival.

5.4.4.11 Assumptions

- All vehicles entering Highland County between 6:00 am and 7:00 pm on March 19th and between 6:00 am and 4:00 pm on March 20th represent either visitors or vendors attending the Highland County Maple Festival.
- The crowd size measurements collected at Laurel Fork Sapsuckers Sugar Camp, Tonoloway Farm, Back Creek Farms, and the Highland County High School Gym are accurate and serve as 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.

5.4.4.12 Sensitivity Analysis

To assess the impact that each assumption had on the final attendance estimate, a sensitivity analysis was conducted. This sensitivity analysis identified the three key assumptions underpinning the attendance estimate and found the impact that each assumption had on the final estimate. The three assumptions analyzed were:

- All vehicles entering Highland County between 6:00 am and 7:00 pm on March 19th and between 6:00 am and 4:00 pm on March 20th 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.

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.

5.4.4.13 Potential Sources of Error

As previously stated, creating an accurate attendance estimate for the Highland County Maple Festival posed many challenges. The decentralized nature of the event made 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 leads to a slight overcount of visitors to the 2022 Highland County Maple Festival. The inability to place a pneumatic tube vehicle counter on Virginia State Route 84 leads 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.

5.4.5 Calculating Economic Impact

5.4.5.1 Visitor Economic Impact

Although the festival took place over four days, visitor and vendor spending was calculated on a per-day basis. There were 253 visitor surveys and 35 vendor surveys with complete spending information. Both visitors and vendors were asked 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. 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 visitors are spending money on.

5.4.5.2 Calculating Visitor Spending on Lodging

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. 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. Nine (9) vendors who responded to the survey did stay in Highland County and provided their lodging expenses. The data from these two groups was combined to creating the “average daily lodging cost”. 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.

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.

5.4.5.3 Removing Outliers due to Data Skew

Spending data collected at festivals is often heavily skewed, so using only mean spending can lead to an overestimation of the economic impact of the event (Long and Perdue, 1990). To address this issue, two estimates were found for each category: one estimate with every response included and one estimate with outliers removed. Outliers were identified as any survey response that fell further than 1.5 times the interquartile range (IQR) outside of the IQR.

The spending estimates including the outlier spenders were treated as an upper bound, and the estimates created with the high-spending outliers removed were 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.

5.4.5.4 Vendor Economic Impact

The majority of vendors at the festival were not local to Highland County. Since money spent at these nonlocal vendors does not stay in the county, that spending not contribute to the economic impact of the event. To calculate how much spending at vendor stalls did stay in the area, survey responses were used to estimate how many vendors were local to Highland County. The total spending at vendor stalls was then multiplied by the percent of local vendors.

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. For all other spending categories, spending by non-local vendors was calculated using the same methodology used for visitors, except all vendors were assumed to have been at the festival every day of the event.

5.4.5.6 Calculating the Overall Economic Impact

Before visitor spending could be calculated. The total number of days that visitors spent at the festival was multiplied by the percent of survey respondents that said the Highland County Maple Festival was their primary reason for being in the county. This avoided including the spending of casual visitors. The daily visitor spending upper and lower-bound estimates for all categories, except spending at vendor stalls, were multiplied by the remaining number of days that visitors spent at the festival. The upper and lower-bound estimates for spending at vendor stalls were multiplied by the remaining number of days visitors spent at the festival and the percent of vendors that resided in Highland County. This same process was completed for vendor spending estimates. The vendor fee spending estimates were then multiplied by the total number of nonlocal vendors that attended the festival. These visitor spending estimates, vendor spending estimates, and vendor fee spending estimates were then combined to create overall upper and lower-bound direct economic impact estimates for the festival.

5.4.5.7 Estimating Visitor Travel Distance

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. While 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.

5.5 Findings

5.5.1 Survey Results

There were 380 respondents to the random intercept visitor survey given out during the Highland County Maple Festival. Many respondents opted to complete the survey only partially. For partially completed surveys, all completed questions were included in the analysis.

5.5.1.1 Age of Survey Respondents

Visitors were provided with five age-range brackets. These options were Under 18, 18-29, 30-45, 46-64, and 65 or older. The most common age range for respondents was between 46-

64 years old. Responses to 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. Twenty-five percent (25%) of respondents were between 30 and 45 years old, and the other 22.2% of respondents were 65 and older. The full distribution of the age of respondents is available in Figure 5.6.

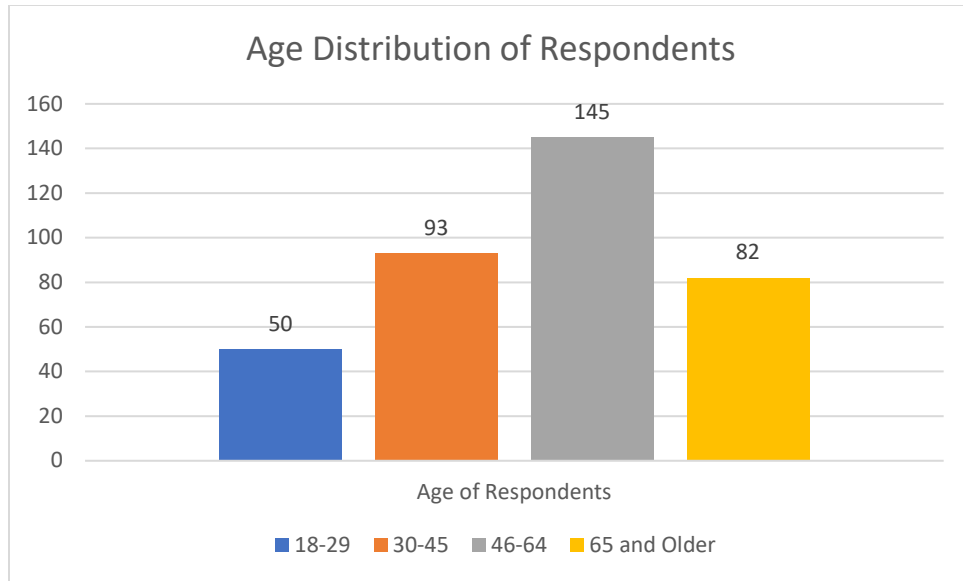


Figure 5.6: Distribution of respondent’s ages.

5.5.1.2 Attendee Place of Origin and Travel Distance

The 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 third most common state with 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 from their homes 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. Figure 5.7 shows a map of the United States with the home residence of each respondent shown by a black marker. Monterey, which is in the center of Highland County, is represented by a red marker. A full distribution of the home residence of respondents is available in Table 5.1.

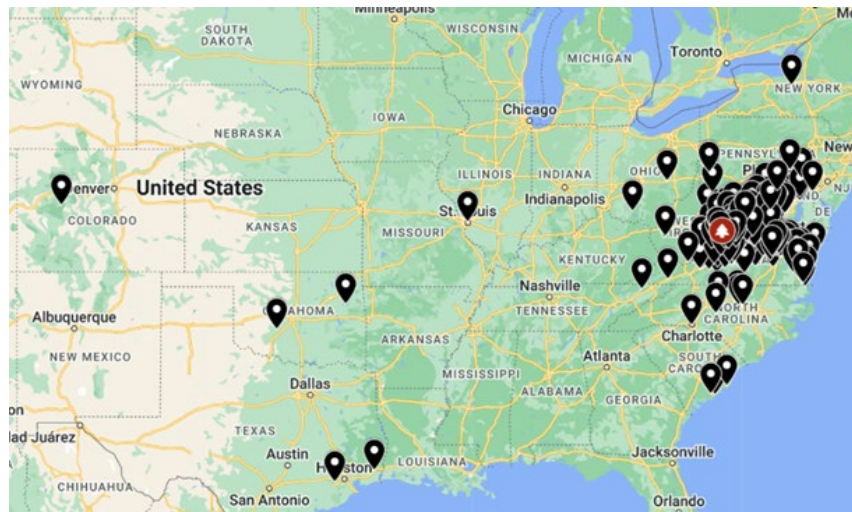


Figure 5.7: A map showing geographic distribution of respondents.

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%
Total	379	

Table 5.1: The geographic distribution of respondents.

The average distance traveled to attend the festival 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 IQR 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 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 included 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. A histogram representing this data is available in Figure 5.8. The IQR is displayed in Table 5.2.

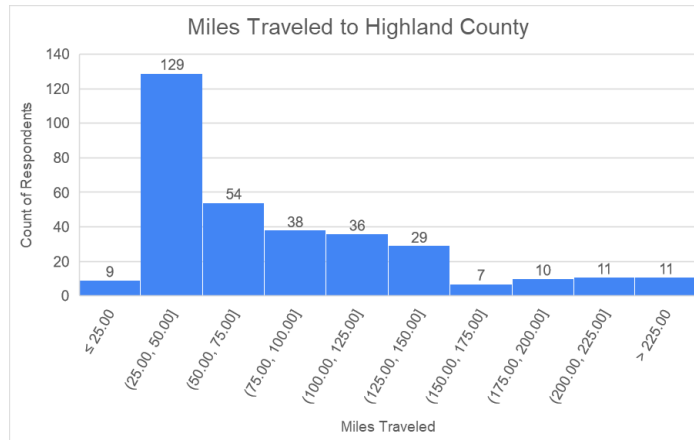


Figure 5.8: Histogram displaying how far visitors traveled to attend the Highland County Maple Festival. The upper bound of each bin represents values less than or equal to that amount.

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

Table 5.2: IQR of visitor travel distances .

5.5.1.3 New Visitors and Retention

Only 29.27% of respondents were first time visitors. The 70.73% of respondents who had attended the festival before had attended the festival an average of 13.18 times prior to 2022, and this same population had a median of seven years attended. The data was skewed by a few

respondents who had come for many years, such as the respondent who has attended the Highland County Maple Festival all 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. A histogram representing this data is available in Figure 5.9. The IQR for the number of years respondents had attended the festival is available in Table 5.3.

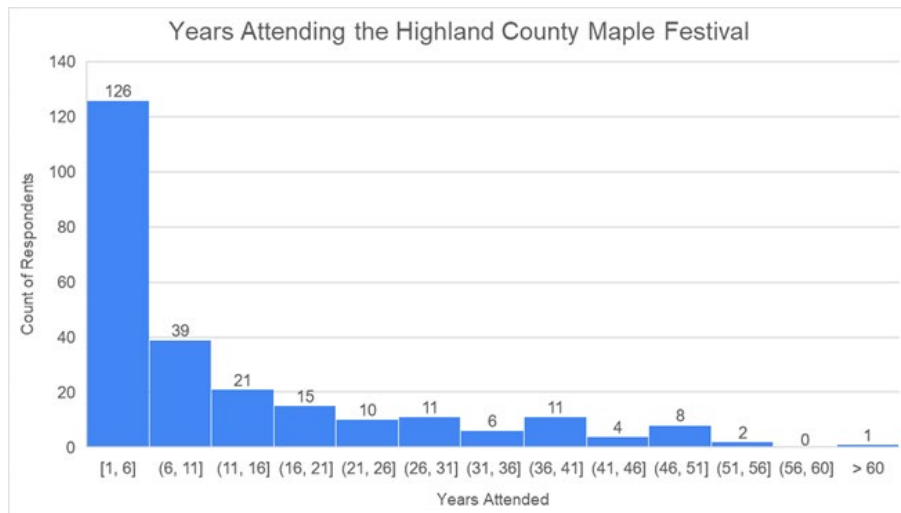


Figure 5.9: Histogram displaying how many years visitors have attended the Highland County Maple Festival. The upper bound of each bin represents values less than or equal to that amount.

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

Table 5.3: IQR of years visitors have attended the festival.

The festival appears to have very good retention, 91.95% of respondents said that they would either definitely or probably attend the Highland County Maple again. Only 1.43% of 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 respondents who indicated they may not attend again were first-time visitors. The distribution of all respondents answer to this question is available in Table 5.4. The distribution of only first-time visitors' responses is available in Table 5.5.

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	

Table 5.4: Rate 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	

Table 5.5: First time visitors' response to the question of whether they will attend the festival again in the future.

The festival serves as a way to increase tourism in Highland County year-round, as 73.85% of respondents said they are definitely or probably interested in visiting during another time of year. For first-time visitors, 62.25% were interested in visiting the area during another time of year. The distribution of all respondents answer to the question of if they are interested in visiting during another time of year is available in Table 5.6. The responses of only first-time visitors is shown in Table 5.7.

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	

Table 5.6: 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	

Table 5.7: First-time visitor respondents interested in visiting Highland County during another time of year.

5.5.1.4 What Attracted Visitors

Nearly 93% (92.58%) of respondents indicated that the main reason for their visit to Highland County was the 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 sample 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. These responses focused on 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. Only 27 (8.1%) visitors said that the live performances hosted during the festival were part of the reason they attended. The distribution of what attracted visitors to the Highland County Maple Festival is shown in Figure 5.10.

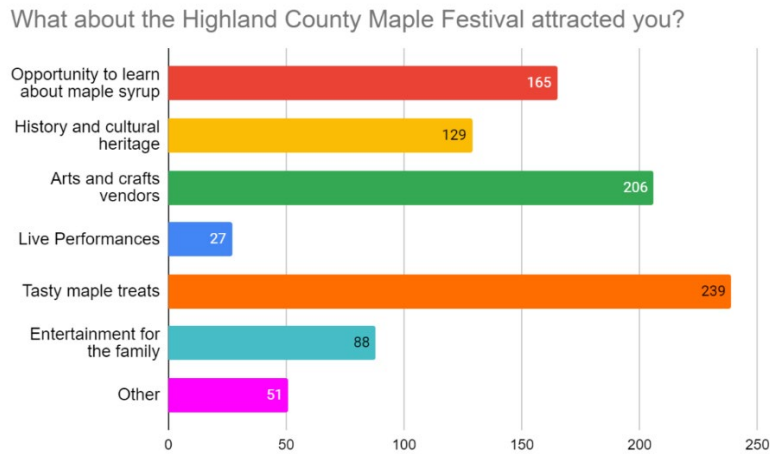


Figure 5.10: What attracted respondents to visit the festival? There were 330 respondents to this question, and this question asked them to select all relevant choices.

Visitors were then asked to select their favorite aspect of 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. The full distribution of respondent’s favorite part of the festival is shown in Table 5.8 and in Figure 5.11.

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	

Table 5.8: Table showing respondent’s favorite part of the Highland County Maple Festival.

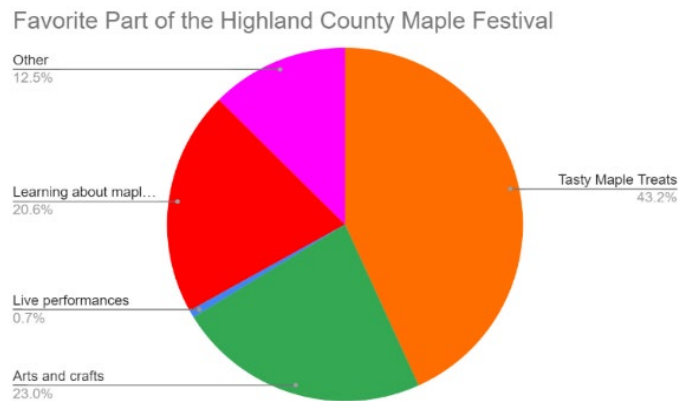


Figure 5.11: A pie chart displaying respondent’s favorite part of the Highland County Maple Festival.

5.5.1.5 How Visitors Heard about the 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 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. The distribution of how respondents had heard of the festival is shown in Figure 5.12 and Table 5.9.

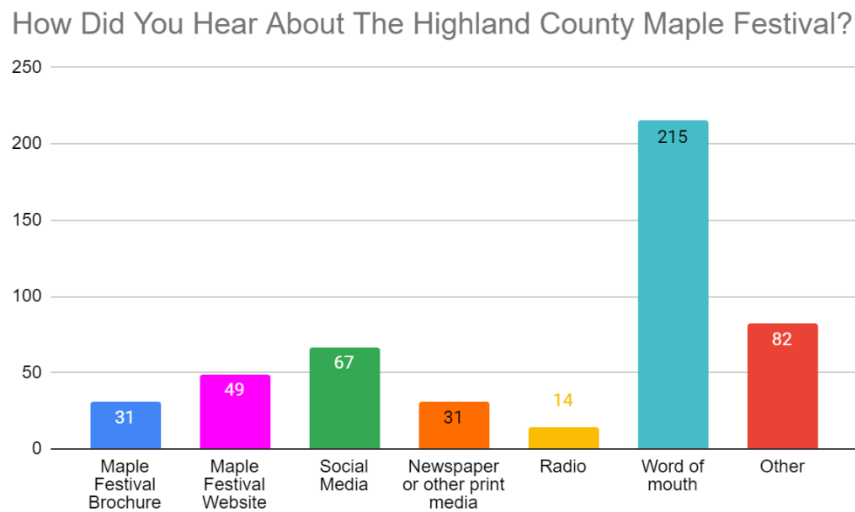


Figure 5.12: How respondents learned of the Highland County Maple Festival.

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	

Table 5.9: How respondents learned of the Highland County Maple Festival.

5.5.1.6 Educational Impact

When asked what they learned about maple syrup at the festival, respondents most frequently said they learned “A lot” about maple syrup production, with 39.13% of 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. The full distribution of how much respondents indicated they learned during the festival is shown in Table 5.10

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

Table 5.10: 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. This question showed that 91.69% of 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 the 2022 festival. When only first-time visitors were considered in this question, the results were very similar. Eighty-nine percent (89%) of first-time visitors were aware of the difference and 21% of these visitors had learned about the difference during their visit to the Highland County Maple Festival. The distribution of respondent’s knowledge of maple syrup is shown in Table 5.11. The distribution for only first-time visitors is shown in Table 5.12.

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	

Table 5.11: 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	

Table 5.12: First time visitors' knowledge of the difference between real and artificial syrup.

5.5.1.7 Changes in Purchasing Behavior

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. The full distribution of respondent’s maple syrup purchasing behavior in the 12 months prior to the festival is available in Table 5.13. The distribution of planned purchasing behavior after the festival is shown in Table 5.14.

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	

Table 5.13: 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	

Table 5.14: How many respondents plan to purchase maple syrup after attending the festival.

5.5.1.8 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. The distribution of respondents staying overnight inside and outside of Highland County is shown in Table 5.15. Anecdotally, the research team learned 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	

Table 5.15: 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%). The distribution of where visitors were staying overnight in Highland County is shown in Figure 5.13 and Table 5.16.

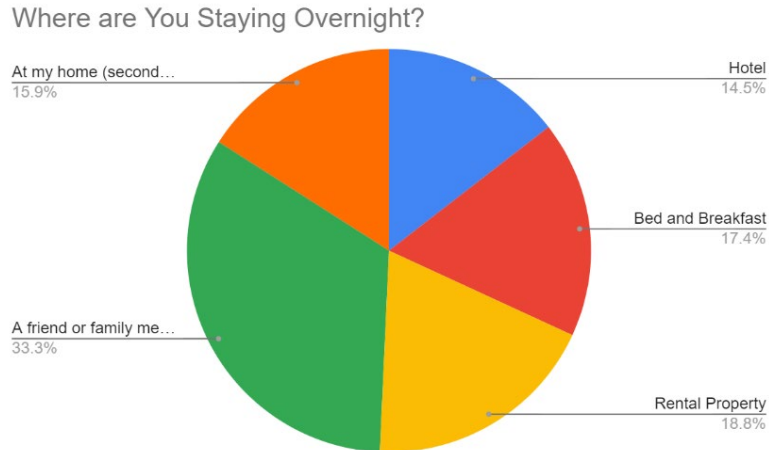


Figure 5.13: Overnight lodging for visitors to Highland County during the festival.

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	

Table 5.16: 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. The number of days respondents planned to attend the festival is shown in Table 5.17.

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

Table 5.17: 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. The number of sugar camps that respondents planned to visit is shown in Table 5.18. A histogram representing this data is shown in Figure 5.14.

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	

Table 5.18: Number of sugar camps each respondent planned to visit.

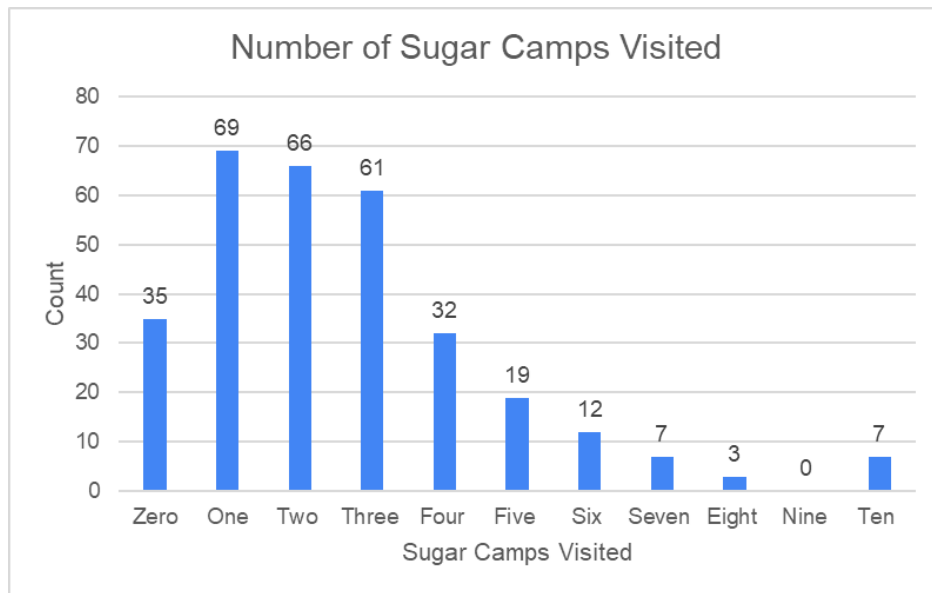


Figure 5.14: Number of sugar camps respondents planned to visit.

5.5.2 Attendance Estimate

5.5.2.1 Vehicle Entrances and Crowd Size Measurements

There were 2,073 vehicle entrances to the county on Saturday, March 19th and 1,249 vehicle entrances on Sunday, March 20th. The total crowd measurement when visitors to all four locations were added together was 7,724 visitors on March 19th and 3,243 visitors on March 20th. There were 2,337 visitors counted on March 12th and 3,061 visitors on March 13th. The counting data for each location is shown in Figure X. The number of visitors observed on March 12th, the first Saturday of the event was 30.26% of the visitors observed on the second Saturday, March 19th. This was due to a heavy snowfall on Saturday March 12th. The first Sunday of the event, March 13th, had 94.39% of the visitors observed on March 20th. When these ratios were applied to the number of vehicles that entered the county on March 19th and 20th respectively, it was estimated that 627 vehicles entered Highland County on March 13th and 1178 vehicles entered the county on March 13th. When these counts were added to the vehicles observed entering the county during the second weekend of the event, the total number of vehicle entrances to the county during the Highland County Maple Festival is 5,127. The crowd size measurements from every location are shown in Table 5.19.

Crowd Size Measurement				
Location	12-Mar	13-Mar	19-Mar	20-Mar
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
Total	2337	3061	7724	3243

Table 5.19: Attendance Counts from locations around Highland County during the 2022 festival.

5.5.2.2 Vendor Vehicle Entrances

Responses to the vendor survey indicated that 90.48% of vendors lived outside Highland County. This means that approximately 126 of 139 vendors are not locals to Highland County. Survey responses indicated that 58.33% of these vendors drove into the county each day of the festival. Only 5.56% of these vendors drove into Highland County one weekend and stayed overnight the other weekend. The remaining 36.11% of vendors stayed overnight in Highland County both weekends of the festival. When these ratios were applied to the 126 vendors from outside of Highland County, it was 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 determine 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 assumed to be visitors driving into the festival.

5.5.2.3 Vendor Attendance Estimate

The vendor PPV multiplier from survey responses was 2.09, meaning that vendor vehicles had an average of 2.09 people in the vehicle. 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 263. It is assumed that all vendors attended all four days of the festival, which means that these 263 vendors accounted for 1,052 visitor days, or “vendor days”.

5.5.2.4 Estimating Overnight Visitors

The random intercept survey given to visitors indicated that 78.01% of visitors did not stay overnight in Highland County while attending the festival. It was assumed the 4,821 vehicle entrances represent these 78.01% of visitors. 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. When these percentages were weighted by the number of daily visits by each group, 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 on three days, and 65 vehicles that entered the festival on all four days. The 3,936 unique vehicles represent 78.01% of festival visitors according to the survey responses.

Since the 3,936 unique 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 overnight visitors also did not all attend the festival for the same number of days. According to the random intercept survey, 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.

5.5.2.5 How Many Visitors Came to the Highland County Maple Festival?

The 1,897 entrances from overnight visitors were then added to the 4,821 entrances estimated by the pneumatic tube vehicle counters and crowd density measures. The total number of vehicles entering Highland County during the festival is found to be 6,718. Survey responses indicated the average number of people in a visitor car was 3.95, and this was used as the visitor PPV multiplier. When the PPV multiplier is applied, it is found that 6,718 vehicles is equivalent to 26,536 daily visitors to the Highland County Maple Festival. When 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. This is in addition to the 1,052 one-day visits to the festival made by 263 vendors.

5.5.2.6 Sensitivity Analysis of Key Assumptions

The sensitivity analysis 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 23,256 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 24,663 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%. The full results of the sensitivity analysis are shown in Table 5.20.

Sensitivity Analysis of Key Assumptions						
	75%	80%	85%	90%	95%	100%
All Vehicles Attended Festival	23256	23912	24568	25224	25880	26536
First Weekend Visitor Count Accuracy	24754	25110	25467	25823	26180	26536
Overnight Visitors Arrived Outside Festival Hours	24663	25037	25412	25787	26161	26536

Table 5.20: Sensitivity Analysis of key assumptions made in the attendance estimate.

5.5.3 Economic Impact

5.5.3.1 Removing Outliers

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”. Outliers removed from visitor spending data are shown in Figure 5.15. Outliers removed from vendor spending data are shown in Figure 5.16.

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 5.15: 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 5.16: Outliers removed from vendor spending analysis in order to create a lower-bound estimate.

5.5.3.2 Estimating Lodging Spending

The average daily lodging cost for the eleven visitor respondents who included lodging spending in their surveys was \$70.23. The average daily lodging cost for the nine vendors 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 visitor respondents who stayed overnight in paid lodging in Highland County during the festival. The “Lodging” category added \$8.03 to overall daily average spending per person.

5.5.3.3 Visitor and Vendor Daily Spending

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. The full spending breakdown by category for both visitors and vendors is shown in Table 5.21. Visitors spent the most money in the “Food and crafts from vendors” category. 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. This means that spending at maple syrup producer’s farms comprised somewhere

between 20.58% and 21.11% of total visitor spending during the 2022 Highland County Maple Festival.

Visitors spent the least amount of money on “Other” spending in Highland County. The second least amount of money was spent on “Lodging” as only 21.99% of respondents stayed overnight in Highland County. In addition, 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, meaning 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	
Total Spending	\$ 105.76	\$ 73.18	\$ 59.08	\$ 31.60	

Table 5.21: Daily spending estimates of visitors and vendors during the Highland County Maple Festival.

5.5.3.4 Visitor Spending Direct Economic Impact

Visitor survey responses showed that only 92.58% of visitors to the festival were in the county primarily for the festival. This percent was multiplied by the 26,536 one-day visitors at the festival 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. We can conclude 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 vendors who are local to Highland County. The total estimate of visitor spending at that stayed in Highland County is between \$1,314,925.65 and \$1,938,487.92.

5.5.3.5 Vendor Spending Direct Economic Impact

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 stalls was factored out. This was done 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 each 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.

5.5.3.6 Vendor Fee Spending

Vendor fees were calculated separately from other spending categories as this was a flat rate charged to vendors by the Highland County Chamber of Commerce. This flat rate did vary based on when the vendor registered. Vendors spent an average of between \$253.81 and \$288 on vendors fees to participate in the festival. The average vendor fee spending is shown in Table 5.22. The upper and lower-bound vendor fee estimates were multiplied by the 126 vendor stalls that were from outside of Highland County. Vendor fee spending contributed between \$31,980.06 and \$36,288.00 to the economic impact of the festival.

Vendor Fee Spending	
Outliers Removed	\$ 253.81
All Data	\$ 288.00

Table 5.22: Estimate of overall vendor fee spending per vendor.

5.5.3.7 Overall Direct Economic Impact

The estimates of visitor spending, vendor spending, and vendor fee spending were all combined to estimate that the overall direct economic impact of the 2022 Highland County Maple Festival was between \$1,366,961.67 and \$2,015,165.36.

5.6 Discussion

5.6.1 Key Findings

The key findings of this study were:

- The festival generated between \$1,366,961 and \$2,015,165 in direct spending in Highland County
- Approximately 19,925 visitors spent 26,536 days at the festival
- Visitors traveled an average of 97.69 miles to attend the festival
- More than 73% of respondents said they are interested in visiting Highland County during another time of year after attending the festival.
- 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.

5.6.2 Conclusions

The findings from this study of the 2022 Highland County Maple Festival indicate that rural agritourism festivals that are well organized can have many positive impacts in a community. Thousands of visitors from around the country visited a rural Virginia community to spend money and learn about maple syrup production because of this event. Agritourism events like this festival give maple syrup producers the opportunity to sell the full experience of local maple syrup production, which allows them to sell their products for higher prices than they could command in a grocery store. These events also create a connection between consumers and producers, with many visitors planning to return to purchase maple syrup again in the future.

Many visitors to the festival also want to return to the area during other seasons because of their experience at the festival. While maple syrup was the primary driver to attract visitors to Highland County, the festival benefits the whole community. Only between 20.58% and 21.11% of visitor spending took place at sugar camps. The rest of the spending during the festival went to other businesses in the community. The broad economic impact of the Highland County Maple Festival showcases how maple syrup production in Appalachia can provide a sustainable economic development opportunity for the region. Regardless of the scale or efficiency of production, maple syrup can be used to draw visitors into the region to spend money at other businesses. The Highland County Maple Festival provides an example of just how effective this strategy can be for communities with the proper conditions to produce maple syrup.

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6 Conclusions

6.1 Key Findings

Production of maple syrup is increasing in Virginia, West Virginia, and Maryland. The median producer made 77% more syrup in 2022 than in 2020. Maple syrup producers in 2022 were also more likely to sell in markets other than farmer's markets and roadside stalls, however these are still the primary markets for syrup and maple products in the region. As production grows in the region, producers are more commonly producing value-added products. In 2022, 66.67% of producers in the region created at least one type of value-added product. These products generate additional revenue for maple syrup producers and differentiate local products and brands from syrup that can be purchased in grocery stores. More producers from this region are now selling their products in consignment and retail stores than before, but much cheaper syrup from Canada and Vermont will always be available in major grocery and retail stores.

In the face of competition from bulk producers in other regions, maple syrup producers in Virginia, West Virginia, and Maryland can use agritourism events like festivals to sell their products. More than 80% of producers in the region have expressed interest in offering tours of their facilities to customers, and these tours have been proven to increase the sales of maple syrup. The case study of the Highland County Maple Festival shows that a well-organized maple syrup tourism event can create new customers for maple syrup producers. This case study also showed that this type of event can be a significant economic boost for the entire community, with many other types of businesses benefiting from maple syrup tourism. Agritourism events offer producers a chance to educate visitors about what maple syrup is, and how it is made. By showing the production process and impact that consumers can make by purchasing these locally produced products, maple syrup producers can generate income for themselves and create an economic boost for their communities.

6.2 Limitations

The analysis and findings in this report were limited by the intensive data collection necessary to learn about the maple syrup industry, and a lack of existing literature on maple syrup production in Virginia, West Virginia, and Maryland. A random survey design of maple syrup producers would provide data that could confidently be generalized. The collection of data related to the price of maple syrup in brick-and-mortar stores was limited by a lack of existing literature on how to conduct a study of this nature. The analysis of maple syrup offered in different types of stores was also limited by the infeasibility of collecting sales data to complement the pricing data.

6.3 Recommendations for Future Work

Using the findings of this research as a starting point, the following recommendations for future research can be made:

- Data should be collected about the amount of time that maple syrup producers dedicate to this industry, and how much of their time is spent pursuing other economic opportunities.
- A study should be conducted to ascertain what portion of farmer's income comes from maple syrup production, and how much comes from other economic ventures.
- A follow-up producer survey should be conducted to collect data from a larger sample size of producers in the region. The response rate for the follow-up survey could be improved by creating a shorter survey that only asks for a few key data points.
- Research should be conducted to track changes in the impact of the Highland County Maple Festival from year to year.

- Research on the impact of other forms of maple syrup tourism, including smaller events and the year-round tours offered by farmers, would be insightful of the true impact of maple syrup tourism.
- An analysis of the pricing of maple syrup should be conducted with a randomly selected sample of stores. This analysis should also collect data on the volume of different bottles of syrup on the shelf, and sales data for each type of maple syrup.

Appendices

Appendix A: Producers Survey Form



As a part of our Project ACER program, Virginia Tech and Future Generations University's Appalachia program are seeking baseline data about the production and sales of maple syrup. Thank you for taking the time to answer these questions for us. The research teams at Virginia Tech and Future Generations University will collect, sort, analyze, and share the anonymous data with each of you. This information will inform our future programming to support maple syrup producers and businesses (Virginia Tech IRB 21-879).

Where is your maple syrup operation located? (Please enter a 5-digit zip code code)

How much maple syrup (in gallons) did you produce? Note: If you are unsure of exact amounts, please provide an estimate.

	Maple Syrup Produced (in gallons)
2020	<input type="text"/>
2021	<input type="text"/>
2022	<input type="text"/>

Did you sell any maple syrup made by other producers? If so, how much (in gallons)?
Note: If you are unsure of exact amounts, please provide an estimate.

Maple Syrup Produced (in gallons)

2020	
2021	
2022	

How did you sell your syrup and other maple products?

	Direct Sales (Farmer's Markets/Roadside Stall)	Social Media (i.e., FaceBook)	Website	Festivals	Consignment/Retail	Wholesale	Bulk	Other
2020	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2021	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2022	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

If you selected "Other", how else did you sell your syrup and other maple products?

How far away from your operation did you sell your products (in terms of driving time)?

	0-30 minutes	30-60 minutes	60-120 minutes	More than 120 minutes
2020	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2021	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2022	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Do you offer tours of your maple syrup producing operation?

- Yes, only during maple season

- Yes, I offer tours year-round
- No, but I am interested in offering tours
- No

In what container sizes did you sell your syrup

	12 ounces or less	Quart	Half Gallon	Gallon	More than a gallon	Other
2020	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2021	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2022	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

What other container sizes did you sell syrup in?

	Other Container Sizes
2020	<input type="text"/>
2021	<input type="text"/>
2022	<input type="text"/>

For quantities of 12 ounces or less, what type of container(s) did you use?

- Plastic
- Glass
- Tin
- Other

For syrup sold in quarts, what type of container(s) did you use?

- Plastic

- Glass
- Tin
- Other

For syrup sold in half gallons, what type of container(s) did you use?

- Plastic
- Glass
- Tin
- Other

For syrup sold in gallons, what type of container(s) did you use?

- Plastic
- Glass
- Tin
- Other

For quantities larger than a gallon, what type of container(s) did you use?

- Plastic
- Glass
- Tin
- Other

What value added maple products did you sell?

Note: Value added products are any products that have been physically altered to increase the value, for example, infusing maple syrup with another flavor, or produced in a way that increases value, for example, meeting organic certification requirements.

	Donuts	Infused syrup	Butter	Sugar	Cream	Other
2020	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2021	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2022	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

What other value added products did you make?

What percentage of the syrup sold by your business was used to produce value added products? (If you are unsure, please skip this question)

2020



2021



2022



What percentage of your total maple sales came from value added products? (If you are unsure, please skip this question)

2020



2021



2022



What marketing resources or programs would be most helpful to you? Please check all that apply.

- Join a maple syrup marketing cooperative
- Participate in a regional common maple syrup brand
- Mentoring for marketing and sales of maple products
- Business planning
- Maple products sales web site
- Advertising Assistance
- Other

Thank you for your help in answering these questions. Would you be willing to be contacted to answer a few additional questions? If so, please provide your name, phone number, and email below.

Phone

Email Address

Name

What is the name of your maple syrup operation? (This is an optional question, and information will only be used to track who has responded. This will not be associated with other responses in this survey)

Appendix B: Maple Syrup Pricing Data Collection Form

Maple Syrup Store Shelf Canvas

General guidelines

1. In each city, please try canvas a minimum of 10 locations with the following distribution: 5 grocery stores, 3 specialty/gift stores, and 2 health food stores. If there are fewer than the suggested number of stores in a category, please canvas other types of stores (i.e., without 5 grocery stores, you could canvas other types of stores that sell maple syrup) or you may expand the geographic area of your canvas beyond a single city.
2. Please complete the Maple Syrup Store Shelf Canvas Sheet for each store you visit (page 1 of the paper Canvas Sheet).
3. Please complete a Brand Information Sheet for each brand in the store (page 2 of the paper Canvas Sheet).

 danielg2@vt.edu (not shared) [Switch account](#)



* Required

Suggestions to help make your store visit more productive


1. Print out and bring with you several Brand Information Sheets (page 2 of the canvas).
2. Locate maple syrup in the store and keep in mind that it may be in more than one location. Note: Most stores display maple syrup near Jams and Jellies, with Breakfast/Cereal, Baking/Sweeteners, Produce/Natural Goods, an "I'm Local" section, or in the organic food's section.
3. Speaking with the store manager or buyer during your visit is important.
 - Be sure to introduce yourself, describe the context for your visit (the purpose of the canvas), and be mindful of the person's time. Ask a supervisor or manager if the store would be willing to stock regional maple syrup, or maple products? If so, who should we talk with to discuss the product on boarding process (get their name, title and contact information).
 - Ask about / look for maple-based value-added products (i.e., maple sugar, cream, spread). These products might be in another section of the store and may be difficult to find.
 - Ask if the store has a "local products" section or shelf. That section may also display maple products.
4. Carry a hard copy of the survey (Maple Syrup Store Shelf Canvas Sheet) and several Brand Information Sheets into each store so you can make notes for reference.
5. Take pictures of the bottles and the store shelves so you can refer to the photos later when entering your survey results.

Store Canvas Completed by (name):

Your answer _____

Date visited *

Date

mm/dd/yyyy 

Location: Name of Store *

Your answer _____

Location: Street Address *

Your answer _____

Location: Town *

Your answer _____

Location: State (Two Letter Abbreviation) *

Your answer _____

Location: Zip Code *

Your answer _____

Type of Store *

Chain Grocery Store (ie Kroger, Food Lion, Independent Grocery)

Health Food store

Gift Store/Artisan Center, Arts and Crafts Shop

Retail

Other: _____

If possible, talk to the owner/an employee/store manager before looking for maple syrup.

Ask the buyer/manager about their interest in carrying Appalachian branded maple syrup. If there is interest, get contact information so we can contact them in the future (Name, title, and phone number)

Your answer _____

Product Placement: Where in the store is maple syrup displayed/located? For *
example: in the baking aisle, near sweeteners, end cap, promotional island, kiosk,
etc. (Submit photos via email to himal@vt.edu)

Your answer _____

Additional comments/observations on the store or the display of maple products
(special promotions, flyers, recipes, rack cards, etc.):

Your answer _____

Are maple syrup and related products displayed anywhere else in the store? Please
provide a short description of any additional displays.

Your answer _____

Are there any value added products in this store? *
i.e., maple candy, maple cream, infused maple syrups and other products

Yes

No

Next

Clear form

Appendix C: 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.

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



405

To respond or

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ECXE 0001

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

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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

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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



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