

A PLACE FOR BOURBON? A GEOGRAPHICAL ANALYSIS OF BOURBON PRODUCTION IN
THE UNITED STATES

by

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DEDICATION

This thesis is dedicated to my wife, Kendra Copler, for her unwavering support and encouragement through my graduate degree.

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ABSTRACT

Bourbon is often referred to as the “American Spirit” and rightly so. In 1964 when congress passed Title twenty-seven of the code of Federal Regulations legally protecting bourbon as a distinctly American product, limiting its bounds of production to the United States. Despite this, there is a common misunderstanding that bourbon must be produced in Kentucky, which leads to a unique dichotomy between the true geography and the understood cultural geography of bourbon. At present, however, there has been little if any research on the spatial distribution and character of the bourbon industry’s expansion. This study utilizes a survey of bourbon distillers across America as well as a site suitability analysis to better understand the relationship between the current distribution of bourbon distillers and the historical narrative of bourbon. This study also utilizes the concept of terroir to assess if bourbon distilleries have situated themselves in settings reminiscent of the predominant bourbon producing regions in Kentucky, thus exploring the relationship between modern distillers, the bourbon they produce, and the historical and perceived geographies of bourbon.

1. INTRODUCTION

In 1964, Title twenty-seven of the United States (U.S.) code of Federal Regulations protected bourbon as a distinctly American product, and, in turn, defined the parameters of what constitutes bourbon (Mitenbuler, 2016). Specifically, the law states that, for a whiskey to qualify as bourbon, it must be produced within the geographical bounds of the U.S. (code of Federal Regulations, 1964). Further, bourbon mash must be at least fifty-one percent corn, and the whiskey must enter a new charred oak barrel between eighty and 125 proof. The single permissible additive to lessen the proof when necessary is water - no other ingredients are permitted (Mitenbuler, 2016).

Despite what many people believe, bourbon can be produced anywhere in the U.S.; however, until recently, there were few distillers outside of Kentucky doing so. Even now, as bourbon distilleries have emerged elsewhere, 95 percent of the world's bourbon continues to be produced in Kentucky (Kentucky Distillers Association, 2018). Although most bourbon is produced in Kentucky, there are now hundreds of craft distillers across America that produce bourbon. From 2003-2017, American whiskey revenues grew from around 1.3 billion USD to over 3.3 billion USD¹ (Distilled Spirits Council, 2018). This expansion in the distilled spirits industry has not just been in revenues, but in the number of distilleries as well. Between 2010 and 2017 the number of craft distilleries grew from 204 to over 1,700 (American Craft Spirits Association, 2018).

¹ Revenue statistics include American whiskies other than bourbon because bourbon specific numbers for revenue are not reported on a national scale.

The craft beer sector in the U.S. has also experienced a surge in recent decades and has, accordingly, been the focus of a large and growing number of geographic studies (Reid, McLaughlin, & Moore, 2014) . In contrast, there has been little research on the geographies of bourbon distilleries.² In the former case, the expansion of craft beer in the U.S. has been exponential. In 1979 there were two registered craft breweries in the U.S. - by 2015, that number had jumped to 4,144 (Elzinga, Tremblay, & Tremblay, 2015; Reid & Gatrell, 2017). Such rapid expansion has caught the attention of academic researchers, who have found that growth in the craft beer industry encouraged or accompanied the revitalization of old neighborhoods - and coincided with booms of economic output, (Myles, Holtkamp, McKinnon, Baltzly, & Coiner, 2020). But, it has not all been good news; in many urban neighborhoods where craft breweries have moved in, gentrification has followed (Mathews & Picton, 2014). Gentrification has been shown to coincide with several negative social effects such as an increase in low-level policing and rising housing costs (Beck, 2020, Lloyd, 2016).

Although there are still many avenues of exploration in this emerging stream of research on craft beer, the literature to date has been clear on at least one thing: The new and rapidly expanding geographies of craft beer are changing the industry (Argent 2018, Elzinga, Tremblay, and Tremblay 2015). These entities are affecting their wider social, cultural, and economic landscapes in a variety of substantive ways that have

² There has been some work done on craft distillation, however, most of this work has been centered on craft distilling based tourism (Cole 2017, Przybylek 2017, and Hernandez and Dekom 2017).

implications for community development, place identity, and sustainable local business practices, among other phenomena (Myles et al., 2020).

On that foundation, it is natural to think that changes in the geographies of craft bourbon distilling might provide equally fertile ground for scholarly research. Indeed, just like in the beer sector, scores of bourbon-producing craft distilleries have begun to open across the U.S. (Distilled Spirits Council, 2018). At present, however, there has been little research on the spatial distribution and character of the bourbon industry's expansion. What is more, recall that within the distilling industry more broadly, bourbon takes on historic importance as a distinctively American product, one that came into being on the American frontier and has since been steeped in a rural tradition and rooted in the hills and fields of Kentucky. Indeed, many bourbon producers from Kentucky would undoubtedly argue that bourbon has a *terroir*, and that Kentucky-based bourbon is superior to bourbons produced elsewhere. For these reasons and more, I follow the example of craft beer researchers and tap the potential for probing how the bourbon landscape might be itself changing and, in turn, changing the landscape.

A necessary first step for such research is to engage directly with the contemporary geographies of bourbon productions: Where is bourbon being produced? Is it still a "rural" product? Is the industry centered in and around Kentucky? The aim of this thesis is to begin answering these sorts of questions by studying the growth patterns of bourbon distilleries across the U.S. to better understand how bourbon is diffusing from its historic "Old Kentucky Home" (Holtkamp, Lavy, & Weaver, 2020).

2. PURPOSE STATEMENT AND RESEARCH QUESTIONS

This study explores the growth and geographic (or spatial) diffusion of bourbon distilleries throughout the U.S. and discuss their connections to the historical geographies of bourbon production. The thesis leverages Geographic Information Systems (GIS) to interpret the observed distribution of bourbon distillers. The goals of the study are to:

1. Identify, through engagements with the primary literature, physical and social landscape features that have historically been linked to bourbon production;
2. Map the spatiotemporal distribution of bourbon distilleries in the U.S.; and
3. Interpret the geographic spread of bourbon distilleries relative to the placement of an expanding product that might be expected from spatial diffusion theory.

Thus, the central research questions addressed in this thesis are:

1. What geologic, land cover, social landscape features, and geographic locations have historically been tied to bourbon production?³
2. What is the current spatial distribution of bourbon production and how has it changed over from 2000 to 2017?
3. Has bourbon's cultural heritage as a rural product influenced the ways in which distilleries have spread? Specifically, are distilleries sited in more rural locations, despite being further from economic hubs, to maintain the cultural image of

³ While there are many physical geographic features –water quality, climatic factors, elevation, etc– that could be considered in a study of this type, this paper focuses on geologic and land cover data due to the spatial extent of the project.

bourbon whiskey? Or, more consistent with spatial diffusion theory, did distilleries spread first to major population centers and then diffuse to other locations?

As there has been little research conducted on the spread of bourbon distilleries, this project is, by necessity, an exploratory or descriptive study. Once the bourbon landscape has been made clearer, opportunities for further research may emerge.

3. LITERATURE REVIEW

This section is divided into several subsections that each discuss thematic or methodological areas relevant for studying the historical and cultural significance of bourbon whiskey. The final subsection looks at the bourbon industry itself to introduce how main bourbon producers make geographic claims to the landscape.

The History of Bourbon

How bourbon first came to be called bourbon whiskey is still unclear, however, Michael Veach a historian with the Filson Historical Society in Louisville, Kentucky has an idea of how the name came to be. Oddly, Veach thinks the name came from Bourbon Street in New Orleans, not bourbon county Kentucky as one might assume (Kiniry, 2013). In an interview with Smithsonian Magazine, Veach states that in the 1800s two brothers started shipping whiskey from Louisville to New Orleans because they noticed when it arrived it would taste similar to a French brandy (Kiniry, 2013). When the barrels arrived in New Orleans, the drinks were sold in the entertainment district, which was, and still is, called Bourbon Street (Kiniry, 2013). Over time, people began to ask for “that whiskey they sell on Bourbon Street” which eventually turned to bourbon whiskey (Kiniry, 2013).

Bourbon is often referred to now as the “American Spirit”. As of 1964, bourbon whiskey was legally protected by a federal statute (code of Federal Regulations, Title twenty-seven, Section 5.22, 1964). This new law ensured many things, from the consistency of what goes in to making bourbon (known as the mash bill) to the maximum proof (or alcohol content) for bourbon going into the barrel. Title twenty-

seven Section 5.22 also protected bourbon whiskey by adding a provision that it can only be produced within the U.S.. This bill was the final piece in a long road of legal, and sometimes illegal, processes to get to the bourbon that is quickly expanding its market share and geographic footprint now (American Craft Spirits Association, 2018; Kentucky Distillers Association, 2018).

Whisk(e)y has influenced many parts of American culture spanning back before the Revolutionary War (Rorabaug, 1991; Winkler, 1968). Taxes on whiskey shortly after the revolution caused immense problems for the new nation during the “Whiskey Rebellion” (Krom & Krom, 2013; Whitten, 1975). Another legal battlefield that whiskey has encountered in America is the eighteenth amendment, better known as Prohibition. Ratified in 1919, the eighteenth amendment prohibited the production, sale, and consumption of any alcohol beverage within the U.S. (U.S. Const. amend. XVII §1). Prohibition lasted from January 1919 to December 1933. During this time, American drinking slowed, but it certainly did not stop; near the end of Prohibition alcohol consumption was about 70 percent of what it was pre-Prohibition (Miron & Zwiebel, 1991). . Alcohol related deaths, however, after a sharp decline in the early 1920s, returned to pre-Prohibition levels by the middle of the decade (Miron & Zwiebel, 1991). This is attributed, in part, to the low-quality of the liquor that was being consumed. As alcohol was illegal, producers no longer needed to follow the Clean Food and Drugs Act of 1906, and often whiskey was mixed with industrial alcohol containing chemicals to discourage people from drinking it, making alcohol during the Prohibition years rather dangerous (Miron & Zwiebel, 1991; Mitenbuler, 2015). While Prohibition did not quench

America's thirst for whiskey, it certainly affected its perception of the drink, morphing it into a Gatsby-esque luxury. In the beginning of the twentieth century, whiskey was at the center of some hotly debated legal battles in America. Now, in the early 21st century, whiskey and specifically bourbon whiskey, is on the move again. This time, however, it is not shaping our laws regarding food. Rather it is on the move across the map. Craft distilleries are spreading rapidly and opening all over the U.S., many of them trying their hand at one of America's most storied whiskies, bourbon (Anderson, 2012).

Spatial Diffusion Theory

When ideas or products spread, we frequently expect them to follow a pattern of diffusion first theorized by Torsten Hagerstrand in 1968 (Morrill, 2005). Hagerstrand studied population movement and noticed a pattern in the way products (such as automobiles, postal banking services, and telephones) spread throughout our world (Hagerstrand, 1968). Using these examples, Hagerstrand demonstrated that innovations typically do not simply spread from one town to the next in a circular dispersion from their source, but rather from city center to city center (usually where wealthy people live) and then out to rural areas (Hagerstrand, 1968). A goal of my study is to see whether bourbon whiskey follows this same diffusion pattern. I suspect that bourbon may differ from this diffusion pattern because of its rural heritage brought about in part by prohibition and the national lore surrounding the time and drink.

Spatial diffusion theory has been applied to a wide range of concepts since its introduction in 1968. Everything from new loyalty programs for retail to beer have been analyzed using this method (Allaway, Berkowitz, & D'Souza, 2003; Baginski & Bell 2011).

Allaway, Berkowitz and D'Souza (2003) used Hagerstrand's theory to show the adoption of a loyalty card program and look at the time lapse in first purchase with the card based on distance from the store. Baginski and Bell (2011) used a hierarchical based diffusion analysis to assess the rate of diffusion of craft breweries in the American south (Baginski & Bell, 2011)

Bourbon's Historical Production Landscape

When studying a product with this type of location-based heritage, classic spatial diffusion theory may not apply. Rather, it is reasonable to believe that the product's historical geographic context might influence subsequent location decisions, so that distillers can leverage (or protect) the product's heritage.

Following the example of Beck and Sieber (2010), it may be possible to map out bourbon's ecological niche, or a set of "suitable" sites for bourbon production, based on the product's historic profile. That profile can almost certainly be derived from the Kentucky bourbon producing regions wherein, even today, 95 percent of bourbon is produced (Kentucky Distillers Association, 2018). This suitability analysis approach has been demonstrated for other products where location of production is an important factor, such as wine (Jones, Snead, & Nelson, 2004). For example, Jones Snead and Nelson (2004) use GIS modelling to analyze an American Viticultural Area (AVA) within a county in Oregon to assess if it encompasses the best wine grape growing areas in the county.

The relation of a particular product to its place of production is often discussed via the concept of *terroir* (Trubek 2008, Blue II & Karioris, 2017). Historically, the concept of “terroir” was applied to viticulture and oenology, but it is now also being applied to other products from local food to (craft) beer (Trubek 2008). Blue II and Karioris (2017) make an argument that beer also has terroir pointing out that while two brewers might make the same style of beer, the two beers will not have the same taste. The authors also cite beer marketing strategies as being reminiscent of wine marketing, noting how MillerCoors’ marketing campaigns focus on Rocky Mountain water (Blue II & Karioris, 2017). Similarly, many distilleries in Kentucky claim that the physical geography

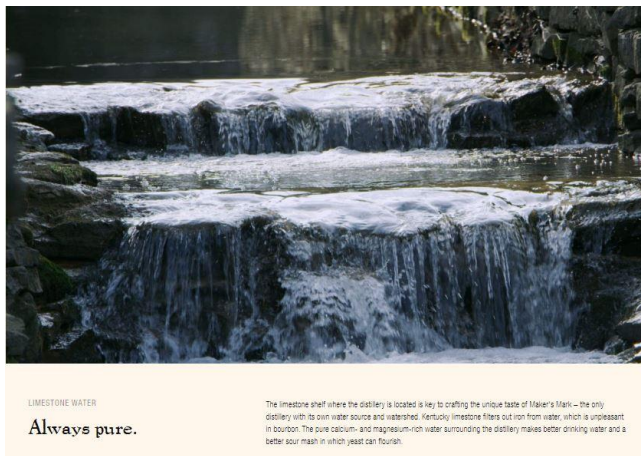


Figure 1: Maker's Mark's website image that states Kentucky waters importance to the production of bourbon.

of the area is (at least part of) what makes Kentucky bourbon so special. A quick visit to the websites of the two top bourbon brands in the U.S. in 2017 – Jim Beam and Maker's Mark – demonstrate this (Figure 1;

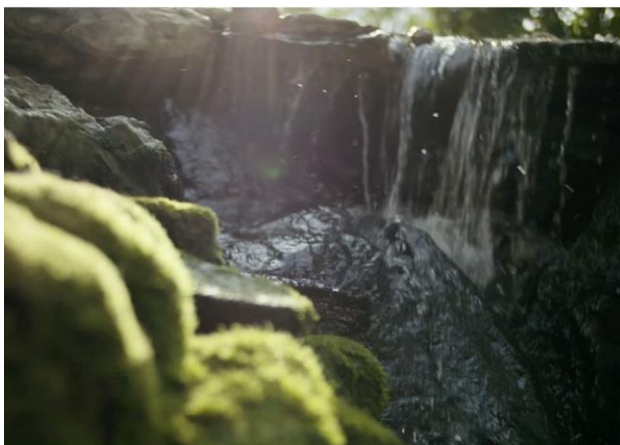
Figure 2). Both distiller's websites

speak of the “Kentucky limestone” that filters the water removing impurities such as iron and adding calcium and magnesium to make the bourbon better (Maker's Mark, 2019; Jim Beam, 2019). Further evidence for bourbon's terroir is evidenced in a study from 2017 wherein researchers determined that there were significant elemental

differences in various types of whiskies from different locations (Hopfer, Gilleland, Ebeler, & Nelson, 2017). The null model used for this study will be constructed using the conditions found in the bourbon producing regions of Kentucky because, as stated before, 95 percent of the bourbon in the world is (still) produced there (Kentucky Distillers Association, 2018).

Craft Beer

Another product that has seen significant growth and rapid spread in the recent past is craft beer (Elzinga et al., 2015). The craft beer movement started in the mid-1990s and is therefore more developed than the craft bourbon movement is today. Nevertheless, craft beer provides a framework not only for what kind of questions to ask in this study but how to go about answering those questions, questions like why a product, as well as the ideology behind it, spreads. An important distinction between craft beer and bourbon, however, is that the craft beer movement is a multi-national phenomenon; the U.S., Australia, and Canada have all experienced recent surges of small brewpubs opening in the past twenty or so years (Argent, 2018; Elzinga et al.,



STEP 2: ADD KENTUCKY WATER

It's no coincidence that more than 95% of all bourbon comes from Kentucky. The real secret is the water. You see, any whiskey made from water containing iron will turn black and have a slightly metallic taste—not exactly appealing. Kentucky, however, just so happens to sit on a natural limestone shelf that acts as a filter, creating iron-free, calcium-rich water. This helps to craft the slightly sweet, golden brown bourbon we all know and love.

Figure 2: Jim Beam's website image that states Kentucky waters importance to the production of bourbon.

2015; Mathews & Picton, 2014; Reid & Gatrell, 2017), wherein the bourbon industry is restricted to the U.S.

Craft breweries in the U.S. have mostly followed the spatial diffusion theory as set by Hagerstan, first moving to downtown areas then further out into the suburbs (Gatrell, Reid, & Steiger, 2018; Mathews & Picton, 2014). Reid and Gatrell (2017) speculate that one of the most significant drivers of the recent growth in the craft beer market is the so called “Creative Class”. This creative class seeks products that are not only locally sourced and produced, but whose producers act responsibly in the local community (Reid & Gatrell, 2017). This creative class, while often associated with the millennial generation, is also associated with the “locavore” movement; this movement typically seeks out products with local ties and may also be associated with the slow-food movement or buy-local movement (Reid et al., 2014). Reese, Faist, and Sands (2010) determined that the most accurate way of estimating the creative class of a city was to examine the university employment, same-sex households, and creative employment (Reese, Faist, & Sands, 2010). Although the “creative class” may have an influence in the way bourbon distilleries have spread through the U.S., it is outside the scope of this project to explore why.

Moonshine

One of the questions this thesis seeks to answer concerns the balance between how bourbon distilleries situate themselves within the historical narrative of bourbon production and their modern setting. This difficulty of balancing a distillery’s appearance to be modern or rustic has recently been on display in moonshine distilleries in

Tennessee. Moonshine also has a rural backstory of running illegal liquor down dark country roads to evade the law during Prohibition, hence invoking the term “moonshiners” for their label (Rosko, 2017). Tennessee’s recent distillery boom came about a little differently than bourbon’s resurgence; in 2009, the state of Tennessee changed liquor laws allowing over forty counties to open commercial distilleries. As of 2011, twenty-two distilleries had taken advantage of the new rules and started making moonshine commercially (Rosko, 2017). Some of these distillers, such as Sugarlands Shine, one of the biggest moonshine brands, chose to modernize and placed their distillery on the main strip in Gatlinburg, Tennessee (Rosko, 2017). Others, such as Tennessee Hills Distillery chose to stay small, maintaining a three-person operation in Jonesboro that operates out of a renovated 180 year old salt house (Rosko, 2017).

Although these two distilleries took vastly different approaches to the geographic context in which they chose to operate, one commonality between them is that both lay claim to rural heritage stories (Rosko, 2017). Sugarlands Shine interviewed old moonshiners before production to try to recreate an authentic recipe as well as build a geographic context for their moonshine (Rosko, 2017). Tennessee Hills Distillery, alternatively, was founded by an active moonshiner who had been around moonshine in the Appalachian Mountains their entire life (Rosko, 2017). The claim to rural heritage stories is something moonshine distillers share with most bourbon producers, whether their distillery is on Main Street in downtown Louisville, Kentucky, like the Evan Williams distillery, or if they are located in the woods surrounded by the rolling hills of Versailles, Kentucky, as is Woodford Reserve’s production site. Both brands claim to have over a

hundred years of heritage, pre-dating Prohibition, either indirectly, as is the case with Woodford Reserve, or directly, like Evan Williams.

Bourbon

Bourbon is different from other whiskies due to its use of corn in the mash bill (the combination of grains that is fermented and then distilled to make whiskey). To be considered bourbon, the mash bill must be at least 51 percent corn; the other 49 percent of the inputs of the mash bill is up to the distiller (code of Federal Regulations, 1964). Corn whiskies became popular on the American frontier for a few reasons, partly because importing sugar cane and molasses from the Caribbean to make rum was very expensive and partly because corn was plentiful and native to the region (Fryar, 2009; Heiser Jr., 1965). Another claim often made by bourbon distillers, especially those in Kentucky, is that what makes for a “good bourbon” is the quality of water that goes into the production; for example, distillers in Kentucky highlight the limestone water that they use in their product (Jim Beam, 2019; Kentucky Distillers Association, 2018; Maker's Mark, 2019).

THE TIME OUR STILLS RAN DRY.

Imagine working your entire life toward one goal, only to suddenly be told that goal is no longer legal. That's exactly what happened to Jim Beam, and for the 13 years of Prohibition, he was forced to give up his life's work. This marked the one and only time in our over 220-year history that our family didn't distill bourbon. Needless to say, there isn't much bourbon history to recount from these times, but Jim Beam was far from defeated. To support his family, he took a shot at coal mining and citrus farming. Fortunately for us, he wasn't any good at either.



Figure 3: Jim Beam's website illustrating the brand's trial of prohibition

**BY ALL MEANS, CALL
IT A COMEBACK.**

When Prohibition was finally repealed in 1933, Jim Beam didn't celebrate. Instead, at the ripe age of 70, he put the pedal to the metal. With the help of friends and family, Jim Beam rebuilt his entire distillery by hand in Clermont, KY in just 120 days. And still, he didn't celebrate, wanting his first drink in over 13 years to be of his own bourbon. In 1935, Jim's first batch of post-Prohibition bourbon was ready, and since he no longer owned the rights to the Old Tub name, he sold his first new bottle as Colonel James B. Beam Bourbon. Finally, the man now known as "The Colonel and The Legend" could celebrate.



Figure 4: Jim Beam's website illustration of their return after prohibition ended

Bourbon's heritage and culture is often leveraged by the "big names" in the distilling industry, especially those in Kentucky (Holtkamp et al., 2020). Some examples include Old Forester, Kentucky Gentleman, Ancient Age, Woodford Reserve, Jim Beam, and Evan Williams. These brands invoke rural legends and frontiersmen, and most of their labels, company websites, or marketing campaigns tell a story that connects their brand to a small still established several hundred years prior. They also typically reference Prohibition and how their brand managed to persevere and come out on the other side. Although many of the distilleries in Kentucky clearly make connections to the history or heritage of the product, those outside of Kentucky are not as prone to do so (Holtkamp et al., 2020). In contrast, as Holtcamp, Lavy, and Weaver (2020) point out, distilleries outside of Kentucky are more likely to mention local sourcing of inputs to establish a place-based connection. This suggests that many bourbon distillers outside of Kentucky are eager to establish themselves within their immediate locales versus connecting to the historical narrative of bourbon. This gives distillers a choice in making

a connection to their immediate location with their story, or, connecting to the history that comes with producing bourbon.

This thesis seeks to explore the *fermented landscapes* of bourbon (Myles 2020), assessing whether the history and rural identity of bourbon is strong enough to pull distilling operations out into rural spaces reminiscent of central Kentucky or, rather, if distilleries choose to locate in urban areas, making their own place(s).

4. METHODS

Quantitative Methodology

This study used a mixed methods approach, blending both qualitative and quantitative methods. In addition to utilizing Geographic Information Systems (GIS) geologic, land cover, and distillery location data, surveys were sent to bourbon distilleries across the U.S.. Bourbon distilleries were located using a previously collected (unpublished) database assembled by Dr. Rusty Weaver and colleagues. For each distillery (n=246) already in the dataset, local address information was added using a web-based search engine. From this, eleven distilleries within the dataset were identified as closed since the time the data was collected; these distilleries were included in the GIS analysis, but were unable to be included in the survey analysis.

Addresses were geocoded into ArcGIS Pro using the “address geocoding” tool (Figure 5).

Once distilleries were geocoded, buffers were drawn around each distillery using a one-mile radius. These buffers were then used to extract geologic and land cover data from around each distillery site. Geologic data for the

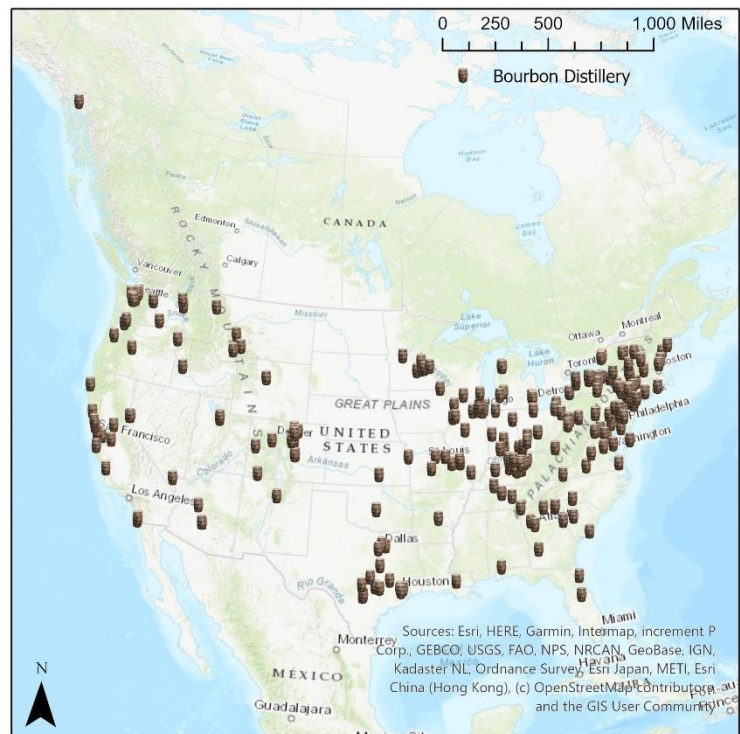


Figure 5: All bourbon producers in the United States as of early 2017 when the dataset was collected

conterminous U.S. and Alaska were obtained from the United States Geological Survey (USGS) State Geology Map Compilation (SGMC). The geology datasets included major geologic layers in addition to other geologic data such as minor rock types and age of the features. Land cover data for the conterminous U.S. was obtained from the Multi-Resolution Land Characteristics Consortium (MRLC); the land cover dataset that was used was the 2016 National Land Cover Database (NLCD) 2016. Land cover for Alaska was also obtained from the MRLC, however, the most recent land cover data available for Alaska was the NLCD 2011 dataset.

Data were compiled in ArcGIS Pro and geologic and land cover datasets were clipped to the radii of the distillery buffers. As this is a comparative analysis between the historical narrative and the current dispersion of bourbon production, four spatial scales of data were collected: national, national except Kentucky, Kentucky, and “bourbon country”; which was defined as fifteen counties in north central Kentucky (Figure

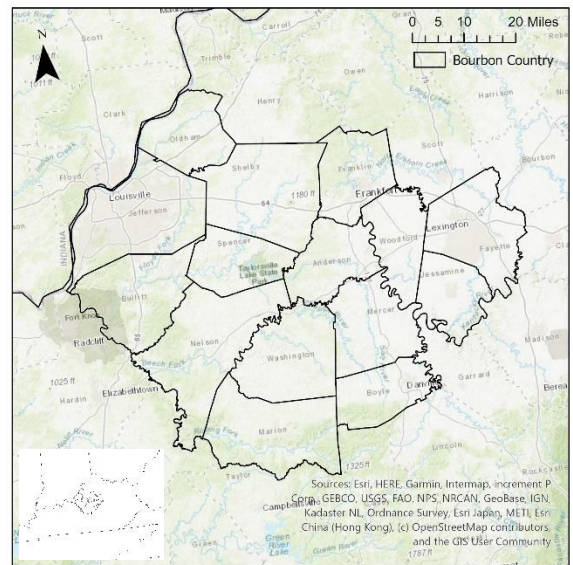


Figure 6: Counties in central Kentucky that make up "Bourbon Country"

6). The term bourbon country has been used to various degrees in marketing and media in reference to this region of Kentucky but there did not seem to be a physical spatial boundary set for the area. Therefore, I chose these fifteen counties were selected because they are home to several of the large Kentucky bourbon brands as well as

Bardstown, Kentucky, which claims to be the “Bourbon Capital of the World” (Bardstown-Nelson County Tourist & Convention Commission, 2019). These fifteen counties also make up most of the Kentucky bourbon trail (Kentucky Distillers’ Association, 2020). Once data were collected and compiled in ArcGIS Pro, geologic and land cover data were extracted to the one-mile radius buffer surrounding each distillery within the four spatial scales. These data were then exported to Microsoft Excel for analysis.

In addition to the use of four spatial scales five time frames were also utilized to assist in describing and understanding the dispersion of bourbon distilleries. These time frames were: distilleries established in the year 2000 and before (Figure 7), distilleries established between 2001 and 2005 (Figure 8), distilleries established between 2006 and 2010 (Figure 9), distilleries established between 2011 and 2015 (Figure 10), and distilleries established in 2016 or 2017 before the dataset was collected (Figure 11). In addition to individual snapshots of these timeframes, a cumulative dispersion map is shown in figure 12. From this cumulative dispersion map an average nearest neighbor analysis was performed for each time frame to assess clustering at each time. The average nearest neighbor analysis was performed with the same study area across all five time frames due to the sensitivity of this analysis to changes in the study area.

Survey Methodology

The survey used in this study was adapted from a previously written survey that was never deployed (Appendix A). The survey instrument deployed in this study was developed using Qualtrics software and was approved by the Texas State University

Institutional Research Board (IRB) (Appendix B). The survey was designed to take no more than ten minutes for a representative of a bourbon distillery to complete. A representative of a bourbon distillery, for this project, is defined as: an employee or volunteer who is at least eighteen years of age who works for a distillery that produces bourbon. Distillery emails were obtained from distillery websites or social media pages. A preliminary message inquiring whether a representative of the distillery would be willing to participate in the survey was sent to identify the best representative for each distillery to answer the survey. Distilleries that responded to the preliminary email, and who agreed to participate, provided an email of the proper distillery representative to whom the survey will be emailed. For distilleries that did not respond to the initial inquiry, surveys were sent to their general information email address. Distilleries with no email address were ineligible to complete the survey but still included in other analyses. Surveys were then distributed via email which included an anonymous link to a Qualtrics page where the survey could be completed. A follow-up email was sent one week after the initial email to maximize response rate.

After the initial two-week data collection period, the response rate was 8.15 percent (n=19). In an attempt to improve the response rate, a spatially stratified random sampling strategy was employed. For this, the U.S. was divided into four regions, West, Central, Northeast, and Southeast (table 1). Every distillery in each region was assigned a number and seven numbers per region were randomly generated using an online random number generator. Each of those distilleries were contacted via phone call for recruitment purposes, encouraging them to participate in the study. Distilleries who had

Table 1: List of all states within each region for the additional recruitment efforts for the survey

West (n=54) Figure 13	Alaska, Hawaii, Washington, Idaho, Montana, Oregon, Wyoming, California, Nevada, Utah, Colorado, Arizona, and New Mexico
Central (n=43) Figure 14	North Dakota, Minnesota, Wisconsin, Michigan, South Dakota, Nebraska, Iowa, Illinois, Kansas, Missouri, Oklahoma, Arkansas, Texas and Louisiana
Northeast (n=61) Figure 15	Pennsylvania, New Jersey, New York, Connecticut, Rhode Island, Vermont, New Hampshire, Maryland, Massachusetts, and Maine
Southeast (n=55) Figure 16	Indiana, Ohio, West Virginia, Delaware, Virginia, Kentucky, Tennessee, North Carolina, Mississippi, Alabama, Georgia, South Carolina, and Florida

previously completed the survey, or who were permanently closed, were not included in the counts for each region.

The initial phone calls to the distilleries resulted in one of five outcomes: the distillery was not interested (n=2); a voicemail was left explaining the purpose of the phone call requesting a call back (n=9); the distillery did not have a voicemail box set up (n=3); the call failed (n=8); or a distillery representative was contacted and requested email follow up to a specific individual at the distillery (n=6). For the distilleries where contact was not made (n=20), the phone number was re-checked using a web-based search engine and a second phone call was made the following day. After this, the surveying period was considered closed. From this supplemental outreach an additional five distilleries completed they survey bringing the total response rate to 10.3 percent (n=24).

5. RESULTS

Geology

The geologic data used in this study were descriptive in nature; the features that were utilized were the primary or major structure type. Analysis of the major lithology within one mile of bourbon distillers in the U.S. showed that 13.77 percent of the primary major structure is limestone (Figure 17). When the state of Kentucky is omitted from the analysis, the percentage of limestone is decreased to 10.32 percent (Figure 18). This differs greatly compared to distilleries in both Kentucky (Figure 19) and bourbon country (Figure 20) where limestone makes up 50.66 percent and 41.21 percent of the major lithologic structures within one mile of distilleries respectively.

Land Cover

Analysis of the landcover surrounding bourbon distillers in the U.S. is shown in figure 21. The majority of land cover around distilleries is developed space, accounting for a total of 53.98 percent. Similar to geology, omitting the state of Kentucky from the analysis changes the percentage of developed land cover, increasing it to a total to 55.37 percent (Figure 22). Green spaces, i.e. cultivated crops, hay/pasture, and forest land cover, make up a total 32.13 percent of land cover surrounding distilleries in the U.S. (Figure 21). When Kentucky is omitted, this decreases to 29.91 percent green coverage (Figure 22). Conversely, the developed land cover around distilleries in Kentucky is 39.08 percent (Figure 23). When looking at Bourbon Country specifically, developed land cover is slightly higher at 39.09

percent coverage (Figure 24). When comparing the coverage of green space, however, distilleries across Kentucky have 56.37 percent coverage of hay/pasture, cultivated crops, and mixed forests (Figure 23). For bourbon country, green land cover makes up 56.77 percent of coverage (Figure 24).

Table 2 List of descriptive statistics included in this study

** These statistics were collected using the survey instrument and therefore are limited to distilleries that completed the survey rather than the full dataset.*

Descriptive Statistics	Geology, land cover, distillery production (both in proof gallons and nine liter cases per year)*, date of first bourbon barrelled*, date of first bourbon bottled*, importance of local community relationships*, importance of customer visits*, available activities at distillery*, importance of local ingredients*, familiarity with bourbon's history*, importance/expression of bourbon's history*, and rural v suburban v urban*
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Average Nearest Neighbor Analysis

The average nearest neighbor analysis results are shown in Table 3. From these data we see that the distribution of bourbon distilleries established “before 2001” was highly clustered and had the lowest of the five nearest neighbor ratios, indicating that the distribution was the most clustered of the five time frames analyzed. In the “prior to 2006” time frame, there is a large change in both nearest neighbor ratio and mean distance, which is visualized in the cumulative distribution map (Figure 12) as distilleries opened on both the east and west coasts during this time period. In the following three time frames (“2006-2010”, “2011-2015”, “2016-2017”) the nearest neighbor ratio does not change much, however, the mean distance steadily decreases between each time step. This suggests that after the initial coast to coast dispersion between 2001 and

2006, there has been infill and clustering wherein new distilleries opened nearer to other established distilleries.

Table 3 Results of the average nearest neighbor analysis for the cumulative distribution of bourbon distilleries across five time frames

Time frame	Z-score	P-value	Nearest Neighbor Ratio	Mean distance (m)
Prior to 2001	-6.58	0.00000	0.080	39550.28
Prior to 2006	-5.66	0.00000	0.355	142667.99
Prior to 2011	-6.66	0.00000	0.584	128489.17
Prior to 2016	-12.85	0.00000	0.552	67826.48
All in dataset	-13.82	0.00000	0.539	63341.04

Survey Data

Of the 246 distilleries in the dataset collected by Dr. Rusty Weaver and colleagues in 2017, twelve have since ceased operations. An additional distillery could not be confirmed as closed, but I was unable to find contact information for the business, so the assumption was made that it had ceased operations. Of the remaining 233 distilleries that were contacted via email for study recruitment, nineteen responded and completed the survey. Of the additional twenty-eight distilleries, selected via the spatially stratified random sampling process, five additional surveys were completed. Thus, the total number of surveys completed was twenty-four, a response rate of 10.3 percent. A list of all descriptive statistics collected in this study is provided in table 2.

The surveyed distilleries had a wide range of production volume, from under 5,000 proof gallons (a proof gallon is one gallon of distilled spirit that is 50 percent alcohol by volume) to over 50,000 proof gallons per year (Figure 25). Similarly, the range of production for nine liter cases also varied from under 5,000 nine liter cases to over

50,000 nine liter cases per year (Figure 26). What is interesting between these two graphs, however, is there appears to be a discrepancy between proof gallons produced, and nine liter cases produced. This suggests that some of the surveyed distilleries are performing contract distilling operations for other distilleries in addition to producing their product.

Of the twenty-four surveyed distilleries, eighteen stated that local community relationships were extremely important to their distillery. When asked how these relationships are exemplified, many cited that they partner with local farmers, businesses, and restaurants. Several stated that trying to increase local tourism to their area was one of the motivators for working with local groups and businesses. Others partner with non-profits, fundraisers, and charity events to strengthen relationships with those in their local community. Of the surveyed distilleries, twenty-two stated that it is important for customers to visit the distillery in person, most offer tours and/or tastings while some have full bars or restaurants at the distillery. A common theme that emerged when asked why it was important for customers to visit the distillery was it enabled the distillery to tell their story, as one distillery put it, “[n]o one does a better job of telling or story or selling our products than we do”. A few of the surveyed distilleries stated that, although they lack the capability or capacity to host visitors at their distillery, they still make an effort to connect with the local community at farmers’ markets and local events. In addition to tours and tastings, some distilleries offer large events such as concerts or release parties for their limited release products. Eight surveyed distilleries also mentioned that they have space that individuals or groups can

rent for private events. Of the twenty-four surveyed distilleries, fifteen said that the use of local ingredients (within fifty miles of the distillery) were extremely important to their business, another eight said that local ingredients were very important, while the remaining distillery said local ingredients were moderately important. When asked which ingredients were sourced locally, twenty-two specifically mentioned locally sourcing corn for their bourbons. Two distilleries noted that they grow 100 percent of the corn and other grains that they use in making their bourbon.

Of the surveyed distilleries, eighteen said they were either very, or extremely, familiar with the history and heritage of bourbon. However, only twelve surveyed distilleries said that history and heritage was very, or extremely, important in their brand. The majority (n=8) of surveyed distilleries said that the history and heritage of bourbon is moderately important to their product, with four more saying it was slightly important. When asked how the history and heritage of bourbon was expressed in their brand, there was a wide variety of responses. Some distilleries answered the question with a simple “no”, while others explained that while they honor the traditions of bourbon production, the geographic history is not expressed in their brand. This was the most common sentiment among surveyed distilleries, some stating they mention it on tours, but it is not tied to their brand or product at all. While a few others, even outside of Kentucky stated that they do have deep roots to the Kentucky bourbon industry, however, they did not explain if that tie was expressed in their brand. When asked how the history and heritage of bourbon was expressed in their distillery set-up, however, more distilleries indicated that they had some aspect of traditional bourbon production

(n=14). These traditional aspects included pot stills, the use of copper stills, wooden fermentation tanks, historic and rustic décor, the use of heritage grains, and bourbon related artifacts. When asked to self-identify their location as rural, urban, or suburban, the majority (n=17) classified themselves as rural, five described their locale as urban, and two classified their location as suburban.

In addition to the above information, the survey also collected information regarding the date of first bourbon production and bottling. Had more distilleries completed the survey, I had planned to compare the year distilleries had been established and the year they first produced bourbon as a way to estimate if distillers that originally set out to produce a different product were now turning to bourbon as well as it expands its marketshare.

Limitations

The most significant limitation in the study was spatial scale. There were several factors that I would have liked to include within this study that would have been beneficial in understanding the spatial distribution of bourbon distilleries, such as: climate, demographics, and government policy. Had these factors been included, a clearer image of why bourbon distilleries have spread could have emerged. Another limitation was that to maintain manageable data size, the scale of the data used needed to be small. At a larger scale, especially for land cover, there could be more meaningful interpretations to be made. A final limitation was the response rate, having twenty-four distilleries return the survey was far fewer than hoped for; nevertheless, interesting and valid results were still obtained.

6. DISCUSSION

To best assess bourbon's expansion we first need to delineate what we will consider the historical production landscape of bourbon production to be. This discussion will use the above mentioned "bourbon country" as well as the state of Kentucky as the benchmark for bourbon's historical production landscape for several reasons. Primarily because of the fourteen distilleries in the dataset that were opened prior to 2000, ten of them were located within Kentucky, those ten also fell within the fifteen counties of "bourbon country". In addition to the majority of the oldest distilleries being in Kentucky, Kentucky bourbon still dominates the market with 95 percent of bourbon being bottled in Kentucky.

In the geologic data, we see a large difference between the limestone lithology of bourbon distilleries in Kentucky versus outside Kentucky. This suggests that bourbon producers do not take geologic features into consideration when deciding on a location for their distilling site. This, however, may be partially explained (as one distiller from the northeast noted via phone) by the fact that Kentucky has significant coal deposits throughout the state that add sulfur and other undesirable elements for bourbon production to ground water. Thus, given the location of his distillery, there was no need for limestone-filtered water because the water that went into their product is drawn directly from an underground aquifer. There is also a significant difference in the percentage of developed land within one mile of distilleries not-in-Kentucky versus those in Kentucky. While most of the surveyed distilleries identified themselves as being in a rural setting, it appears that many distilleries in the dataset, especially those outside

of Kentucky, were in non-rural areas where developed land comprises the majority of the land-cover within one mile of the distilleries as seen in figure 22. This suggests that there may be some significant difference between the setting of distilleries across the country. With the combined geologic and landcover data, it seems that bourbon producers *do not* try to emulate the landscape of Kentucky when deciding on their location. This is significant because it suggests that bourbon producers are, rather than connecting to the historical narrative of bourbon, choosing to make their own place. If craft bourbon producers continue to follow what craft beer producers modeled, as demonstrated by Gatrell, Reid, and Steiger (2017), then what we may see is an increase in local branding and local authenticity coming from craft bourbon producers around the U.S..

One factor that all surveyed distilleries agreed upon was the importance of sourcing local ingredients, even though there was some disagreement on what qualified as local ingredients. When asked specifically about which ingredients are local, many made statements about sourcing in-state or sourcing within a few hundred miles. One distillery in particular elaborated on this, stating that it is quite rare to find the ingredients you would need within a fifty-mile radius of your distillery and that they use as local as they can get.

From this research it appears that bourbon distilleries, for the most part, have adhered to Hagerstrand's theory of spatial diffusion in that there have been more urban distilleries than rural distilleries (Figure 27). Further research could analyze this with greater detail, the maps in figures 7-12 show that the early distilleries were located

mainly near cities. Visually inspecting the landcover extractions around each distillery (an example of both an urban and rural distillery is provided in figures 28 and 29), that the fourteen distilleries before the year 2000 were evenly split, seven in urban and seven in rural locations (Figure 7). Of the distilleries that opened between 2001 and 2005, four were urban and three were rural (Figure 8). From 2006 to 2010, thirty-three urban distilleries opened while only sixteen rural opened (Figure 9). From 2011 to 2015, eighty urban distilleries were opened; in the same time frame, forty-one rural distilleries were founded (Figure 10). From the beginning of 2016 to when the dataset was collected in late 2016, seven urban distilleries opened versus four in rural areas (Figure 11). As the expansion of bourbon is still relatively new, it is expected that more rural distilleries will open over time. It is difficult to predict, however, when this transition from urban to more rural distillery openings will take place.

When assessing the most influential or most explanatory factor in the way that bourbon distilleries have spread across the U.S. this study shows that the distribution is not related to either limestone geology or finding land cover similar to that of “bourbon country” and Kentucky. From previous works on the spread of craft beer one factor that has been identified as significant was that of the creative class (Reid et al. 2014, Reid and Gatrell, 2017). Creative class, however, was not included in this study as accurately estimating the creative class in all cities in which a bourbon distillery is located would require a study of its own. While estimating the creative class is outside the scope of this project, previous research has identified some factors that are positively associated with the creative class that can be used to provide additional insight. One factor that Reid

and others (2014) identified as being associated with the creative class is the “locovore” movement. Wherein individuals seek out products that are both locally sourced and whose producers are responsible members of the local community. From the survey data we see that 75 percent of the distilleries identified that local community relationships were extremely important to them. In addition to this, twenty-two of the surveyed distilleries noted that locally sourcing their ingredients is important to them. This may suggest that distilleries are responding to the presence of the creative class, or that the distilleries are owned by members of the creative class, seeking to draw more creative class individuals to their business.

Other possible explanatory factors that were explored post-hoc were population density and population. Population density was used because previous studies have shown strong positive correlation between population density and the creative class (Tiruneh, 2014). Population was used because the U.S. Census Bureau uses population metrics to delineate rural and urban areas (U.S. Census Bureau, 2010). For cities with bourbon distilleries in the dataset, forty-five had population densities less than 500 persons per square mile per the 2010 U.S. census. Another twenty-five cities had population densities greater than 5,000 persons per square mile. The majority of distilleries (n=176) were located in cities with population densities between 500 and 5,000 persons per square mile. This may suggest that distilleries are situating themselves along the fringes of urban centers where property values may be lower but are still accessible to those living in the urban centers.

When assessing whether bourbon's history and heritage as a rural product has influenced the ways in which it has spread across the U.S., it is important to not only consider the spatial and physical aspects of each bourbon distillery site, but, also the distillers' mindset about their product. This study demonstrates that more distilleries are situated in urban areas than in rural, however, there were some distilleries surveyed whose roots are steeped in the tradition and history of Kentucky bourbon despite their distillery being situated in an urban area. Alternatively, there are distilleries, specifically in the Northeast, that claim a history and heritage that goes back farther than the name bourbon itself, since whiskey in the U.S. was first distilled in the Northeastern rye and wheat growing regions of Pennsylvania and New York – well before many people moved to what is now Kentucky and started growing corn. Several surveyed distilleries from that region specified that they draw their history from that narrative rather than the history and heritage of bourbon, even though they do now produce bourbon.

7. CONCLUSION

Over the past twenty years, bourbon distilleries in the U.S. have increased and spread from fourteen distilleries in five states in 2000 to 233 distilleries in forty-five states in late 2016 (Figure 12). This expansion, as this study demonstrates, has been mostly consistent with the first part Hagerstrand's spatial diffusion theory, in that, there have been more urban distilleries than rural distilleries that have opened. This, however, does not exactly follow Hagerstrand's theory because there has been a steady increase in both rural and urban distilleries since 2000.

This study also highlights the place making capability of bourbon production in a way that is consistent with craft beer production as demonstrated by Gatrell, Reid, and Steiger (2017). Rather than what was initially hypothesized (that bourbon distillers would connect to the broader historical narrative of bourbon), distillers are connecting to their immediate place and drawing from local history. This finding is consistent with the work of Holtcamp, Lavy and Weaver (2020) on bourbon marketing strategies. The connection of bourbon distillers to local place is significant because it opens new avenues of research that can be done in the sphere of craft bourbon, as well as craft spirits as a whole, that seek to answer similar questions as existing research done on craft beer. In addition, it suggests that existing theories and methods that have been shown to work with craft breweries may be transferrable to craft spirits opening up avenues for future research on these products and the *fermented landscapes* that they produce.

Future Research

As this study is largely an exploratory study, there are many opportunities for future research that can be identified from the results of this work. First would be to replicate this study using higher resolution data. As mentioned above, due to the small scale size of the dataset, there may be significant factors that were not evident using the NLCD data which uses a 30m resolution. Similarly, future research might analyze a subset of bourbon distilleries within large metropolitan areas to see how they are spreading around population hubs. From this study it appears that distilleries are first opening closer to city centers, as Hagerstrand theorized, but, future research could examine this in greater detail by examining several cities and studying the dispersion patterns around the city. This more focused approach may also allow for the inclusion of additional data such as demographics and economic data that would shed additional light on the distribution patterns of bourbon distilleries in and around cities. Future research should also consider the effects of local and state public policy regarding distillation as this may be a significant factor in the way bourbon distilleries have spread.

In addition to using similar metrics at a larger scale to detect more subtle aspects of the change in distribution of bourbon distilleries future research should inspect more closely the relationship that the creative class has played in the dispersion of bourbon distilleries. An additional area of future research would be to more closely examine the pre-bourbon history of whiskey in the U.S. to further assess the number of distilleries that are drawing from that narrative. Finally, future research might further examine the relationship of decisively rural distilleries outside of Kentucky to those in Kentucky. In

this research, one distillery in particular mentioned that they have ties to, and therefore, emulate the atmosphere of Kentucky distilleries in their distillery. As Myles et al. (2020) point out when discussing the production of wine county in central Texas there is simulacra present in the creation of place for wine producers that may also be present in bourbon producers.

8. FIGURES

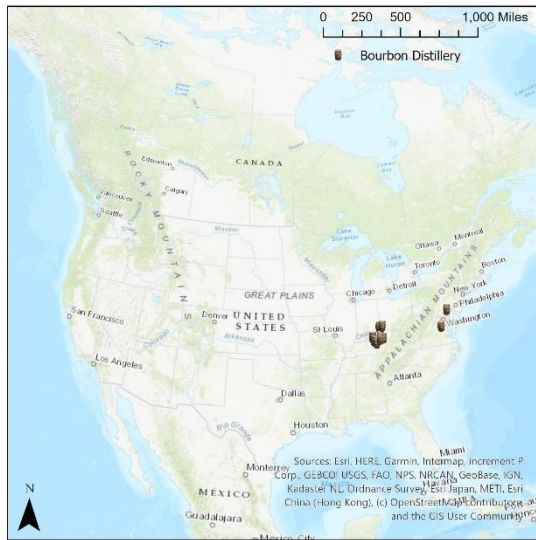


Figure 7: Bourbon distilleries established prior to 2000

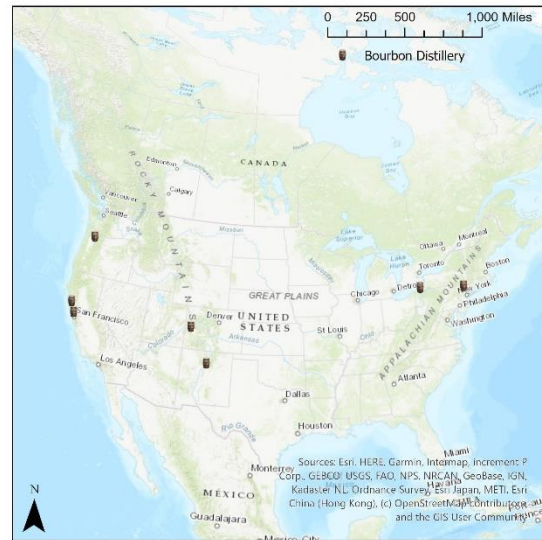


Figure 8: Bourbon distilleries established from 2001-2005

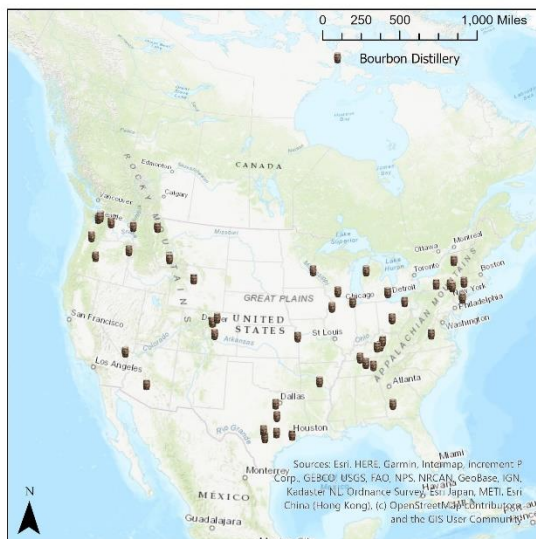


Figure 9: Bourbon distilleries established from 2006-2010

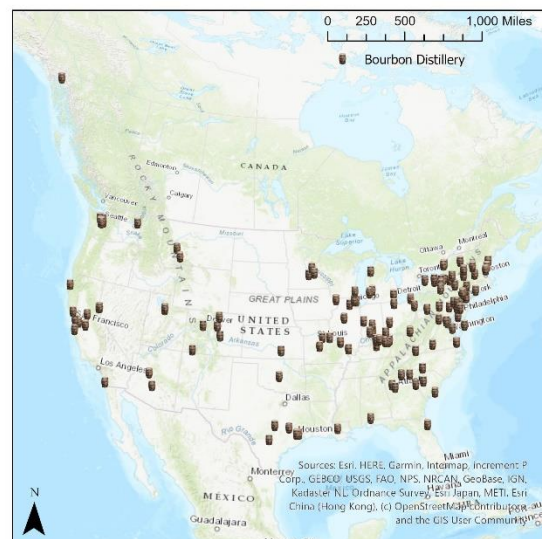


Figure 10: Bourbon distilleries established from 2011-2015

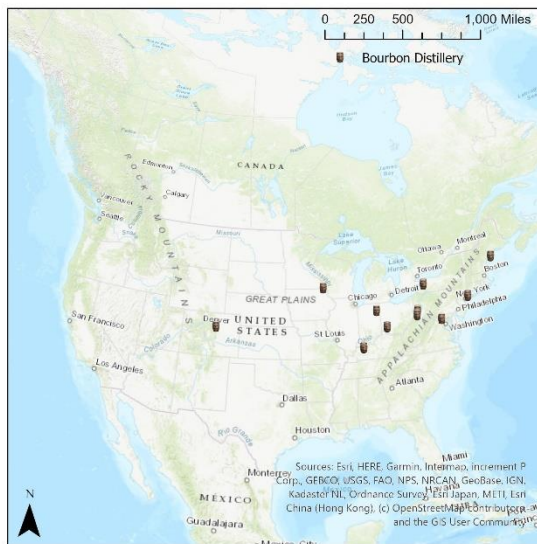


Figure 11: Bourbon distilleries established in 2016 or 2017

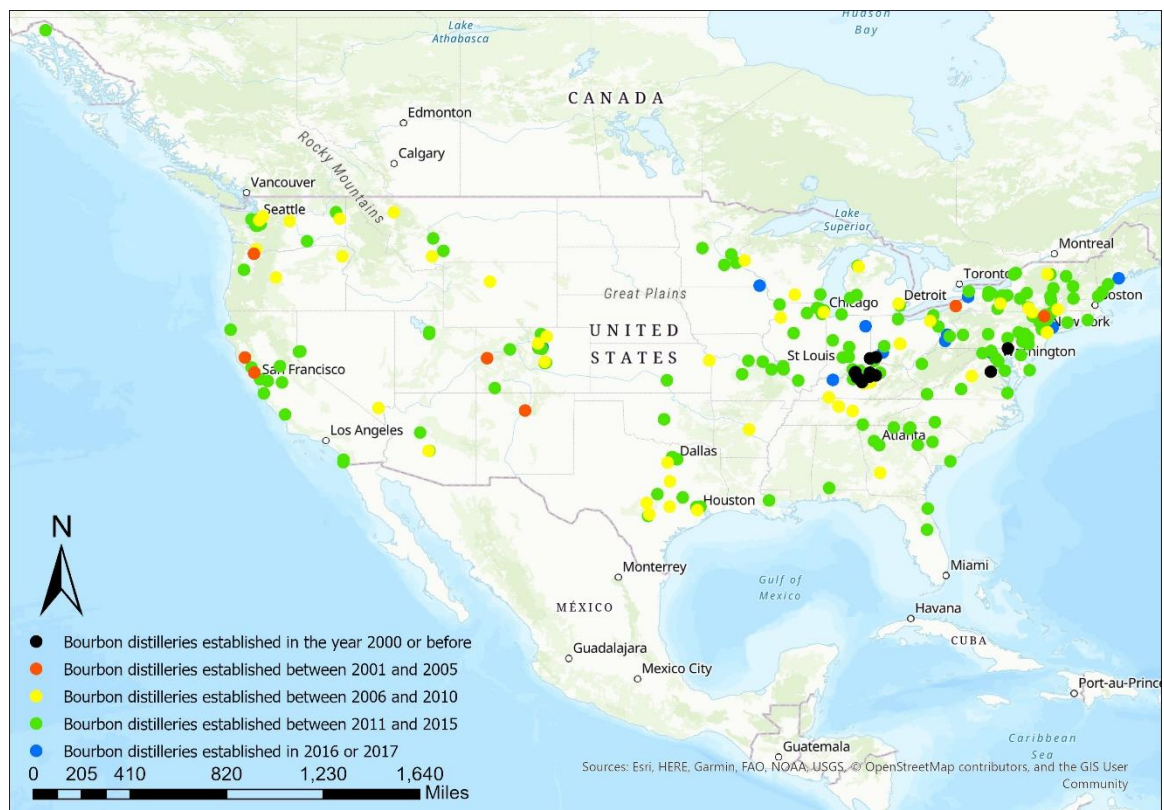


Figure 12: Cumulative distribution of bourbon distilleries in the United States

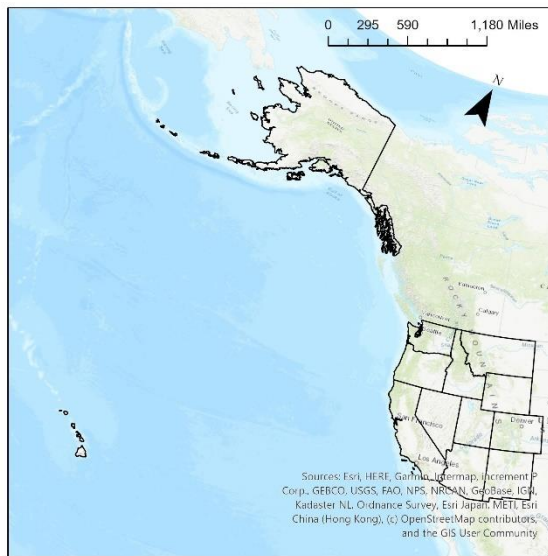


Figure 13: West region for the additional spatially stratified random sampling. This region contained fifty-four bourbon distilleries



Figure 14: Central region for the additional spatially stratified random sampling. This region contained forty-three bourbon distilleries

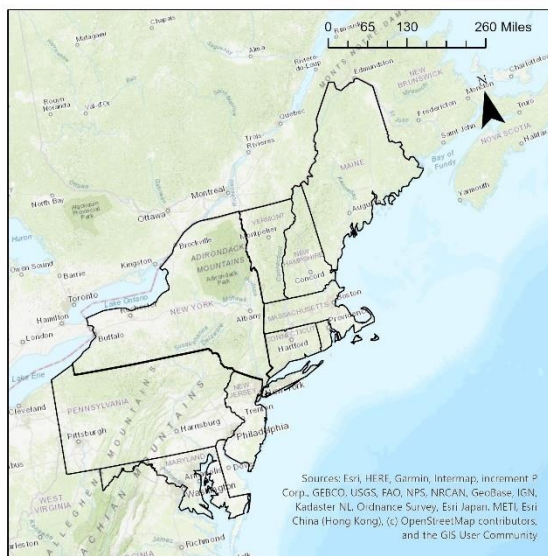


Figure 15: Northeast region for the additional spatially stratified random sampling. This region contained fifty-one bourbon distilleries



Figure 16: Southeast region for the additional spatially stratified random sampling. This region contained fifty-five bourbon distilleries

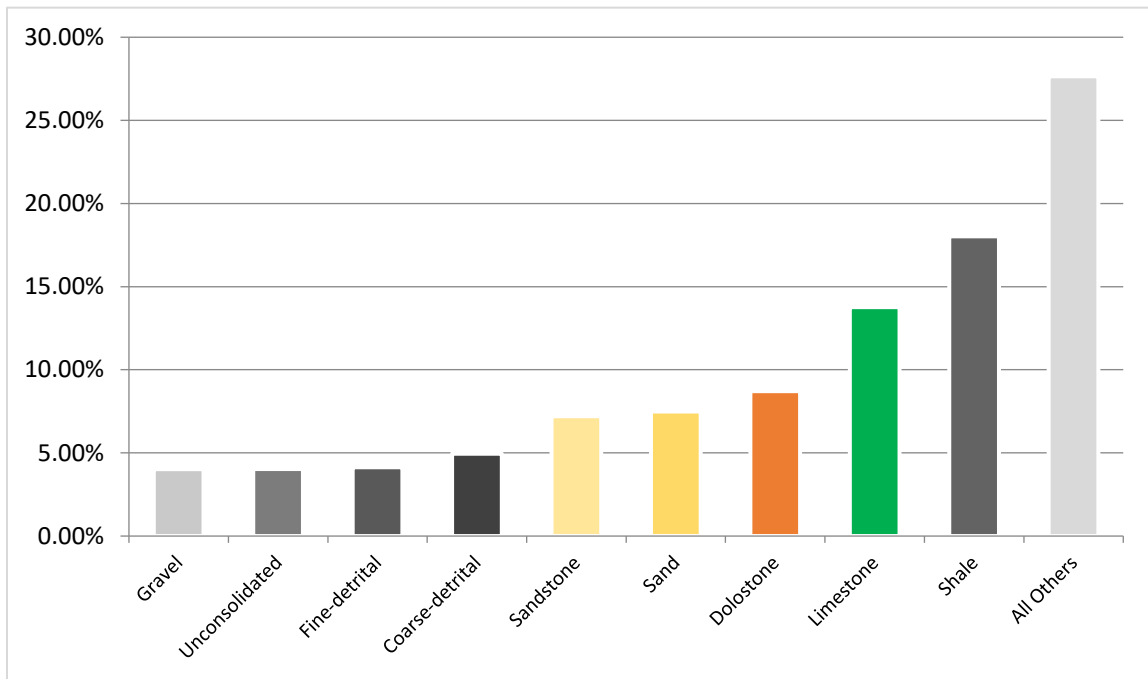


Figure 17: Main geologic structure composition within a one mile radius of all bourbon distilleries in the U.S.

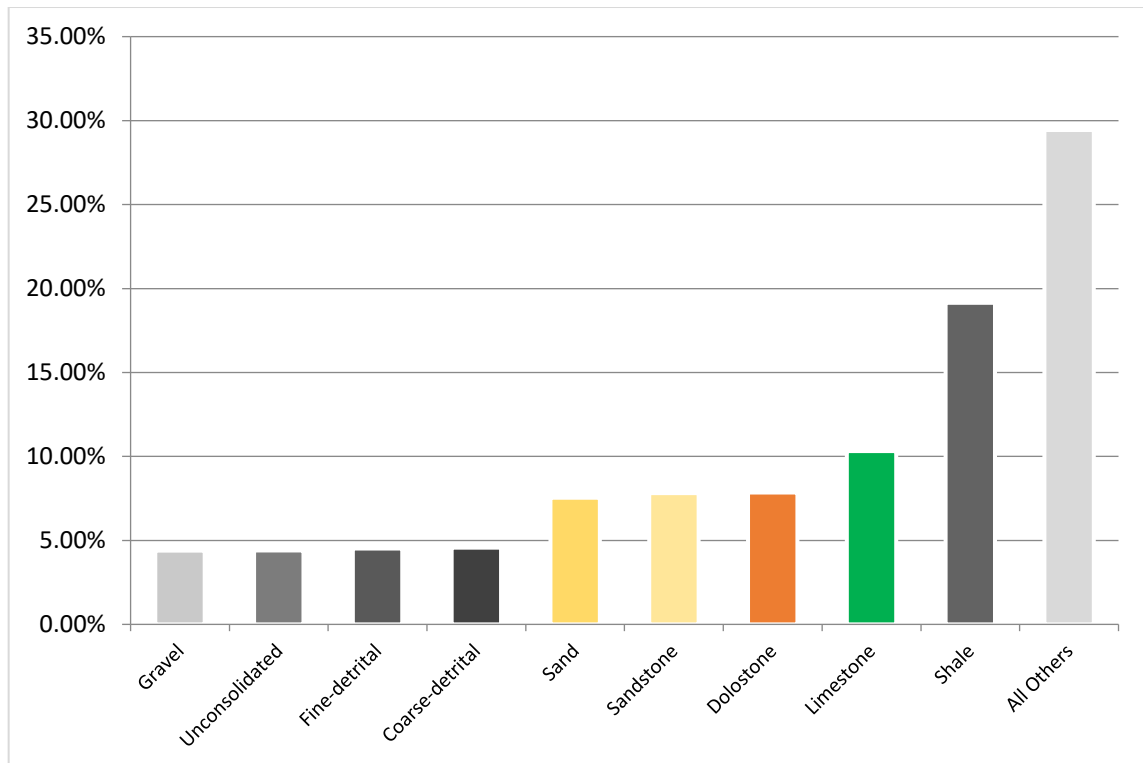


Figure 18: Main geologic structure composition within one mile of bourbon distilleries in the U.S. **EXCEPT** for distilleries within the state of Kentucky

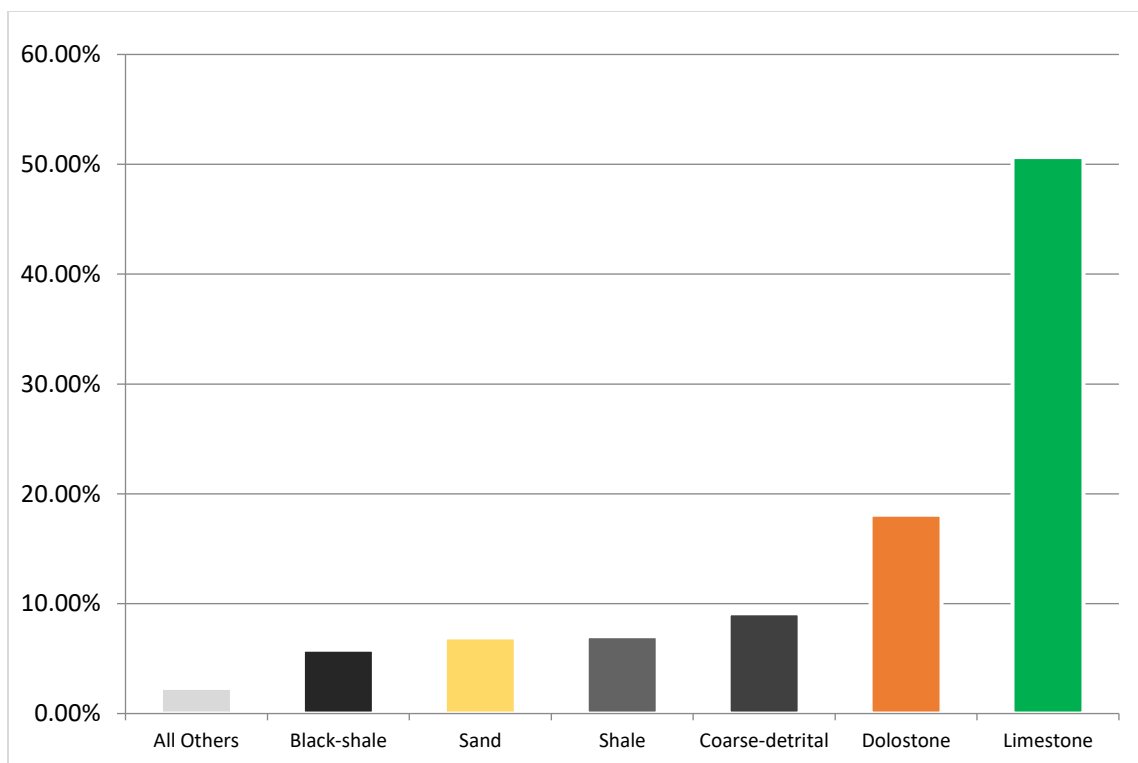


Figure 19: Main geologic structure composition within one mile of bourbon distilleries within the state of Kentucky

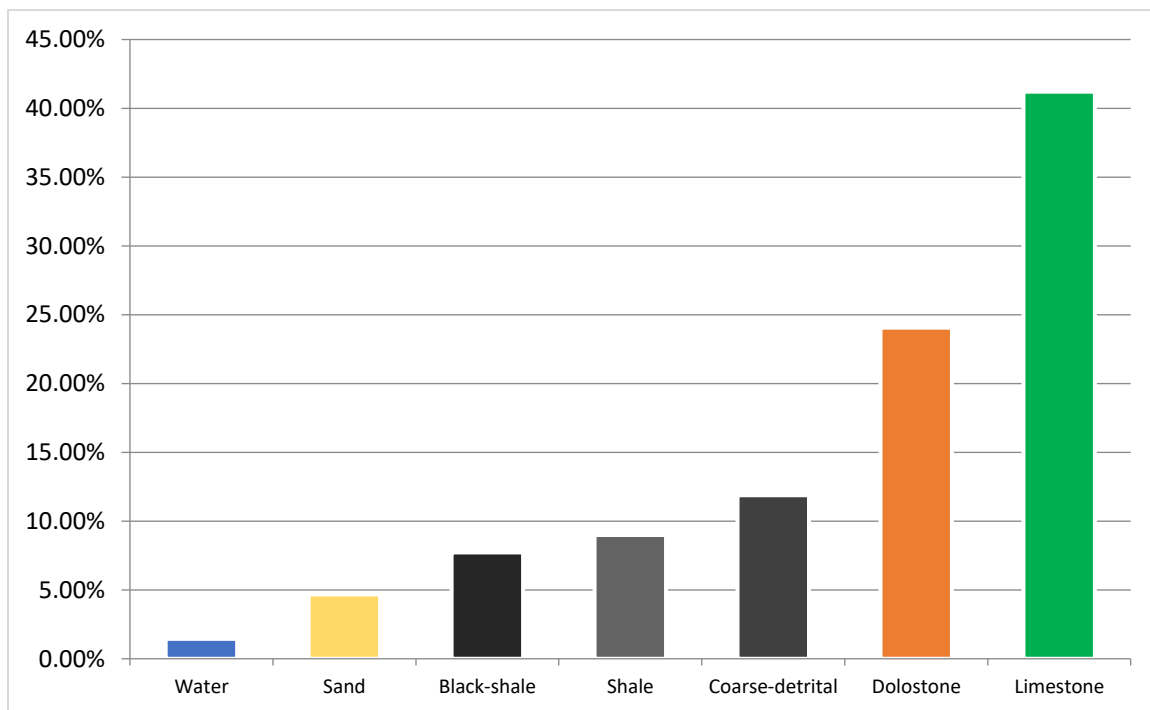


Figure 20: Main geologic structure composition within one mile of bourbon distilleries within "bourbon country"

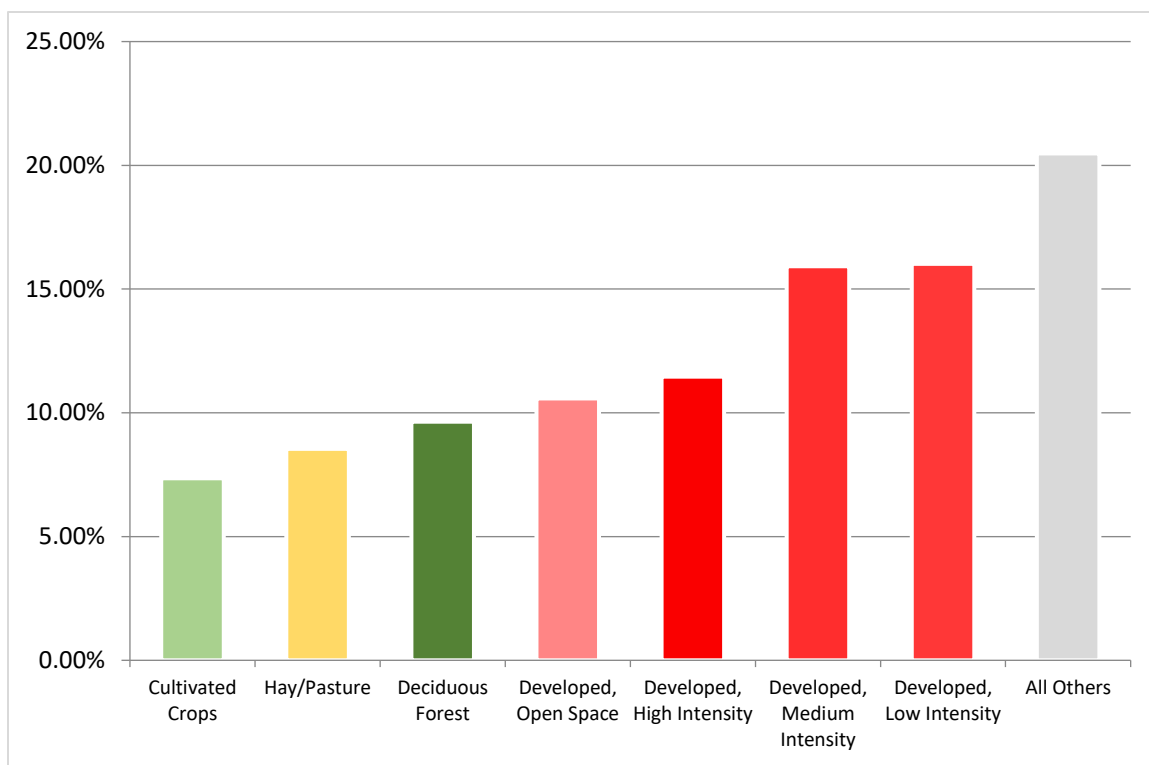


Figure 21: Land cover within one mile of all bourbon distilleries in the U.S.

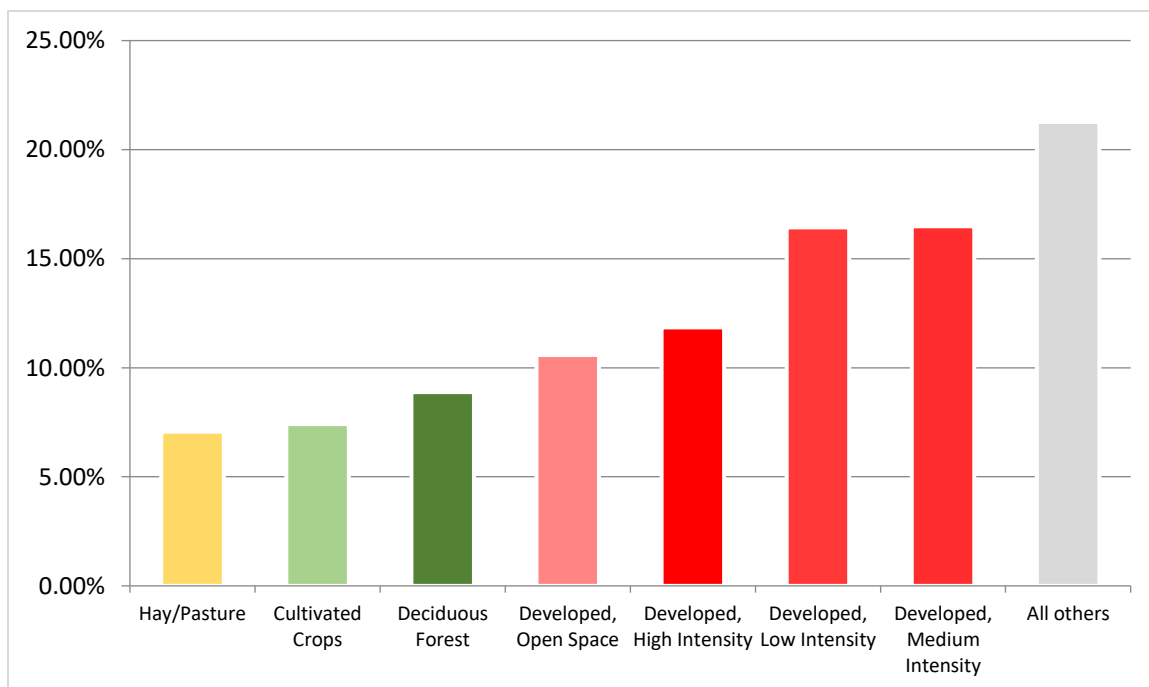


Figure 22: Land cover within one mile of bourbon distilleries in the United States **EXCEPT** for distilleries located in the state of Kentucky

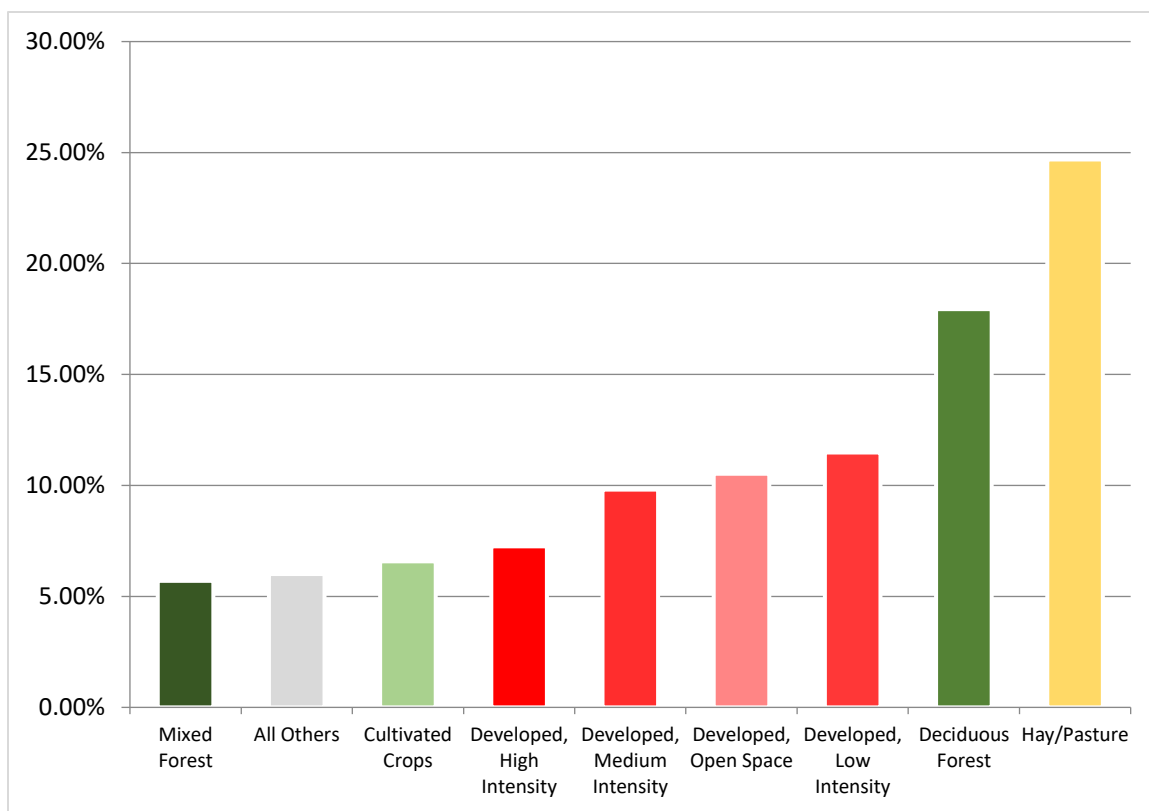


Figure 23: Land cover within one mile of bourbon distilleries within the state of Kentucky

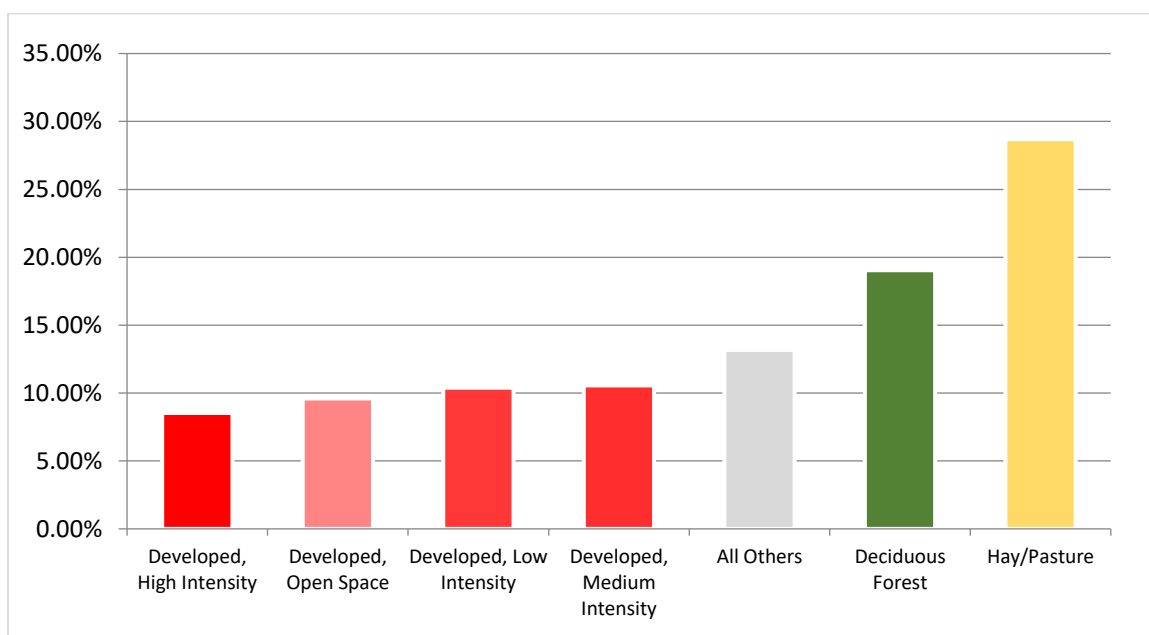


Figure 24: Land cover within one mile of bourbon distilleries within bourbon country

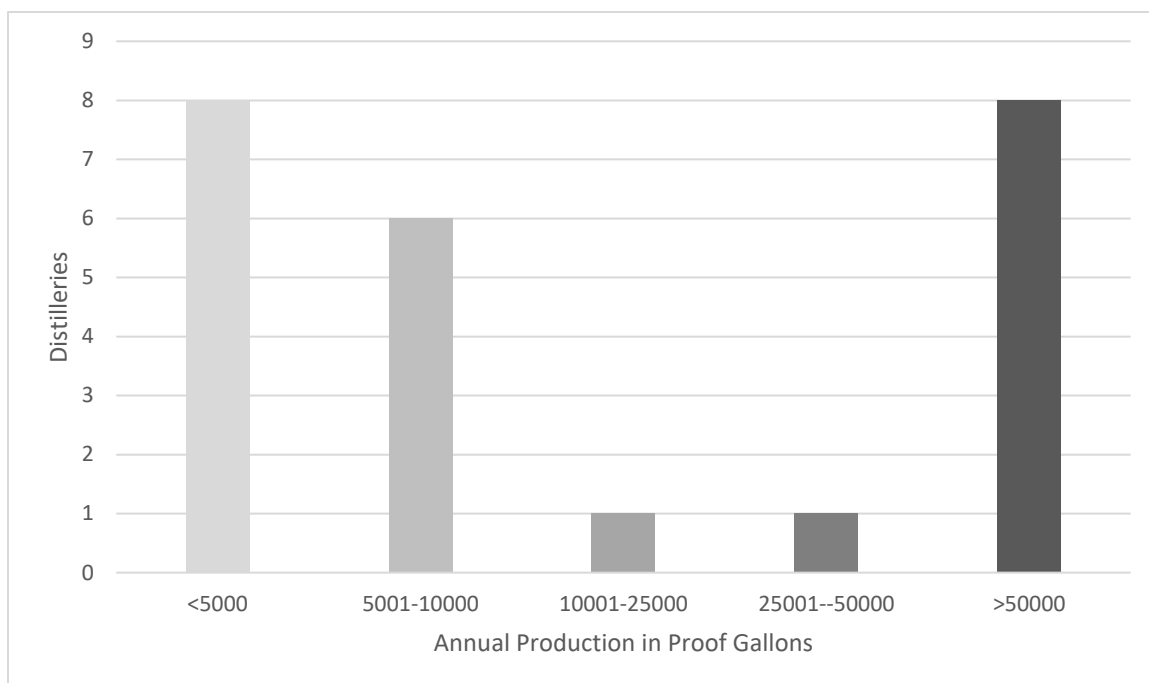


Figure 25: Annual production of surveyed bourbon distilleries in proof gallons per year

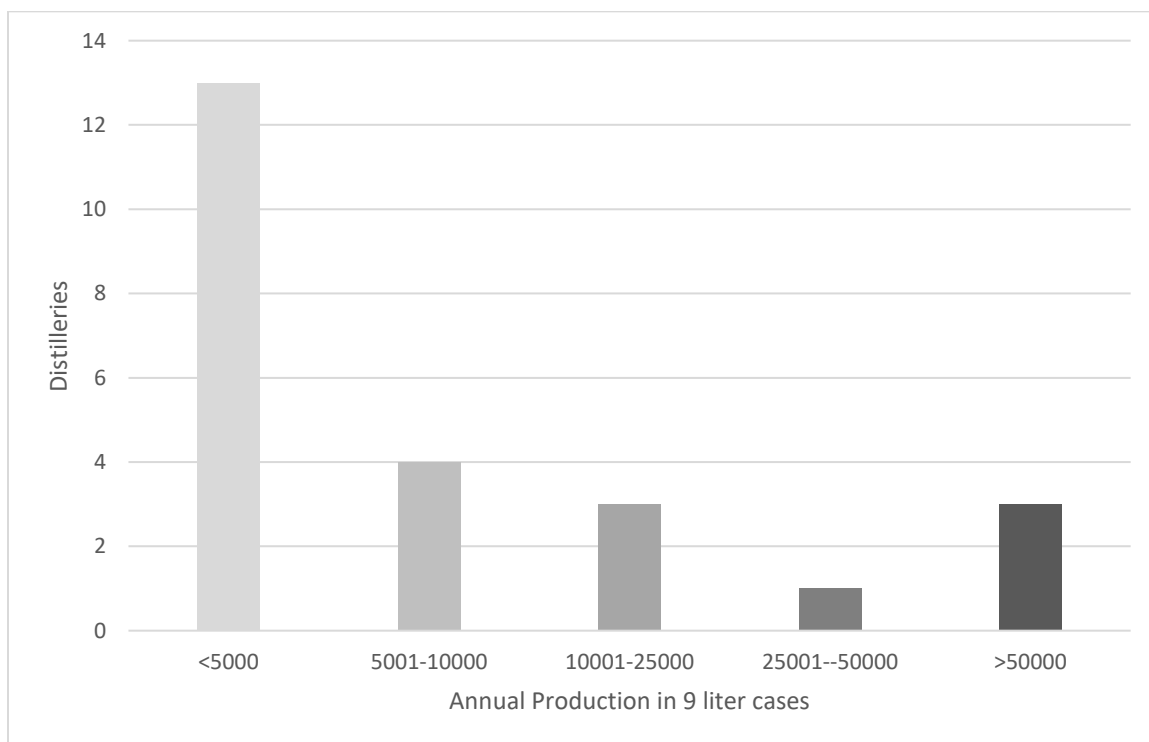


Figure 26: Annual production of surveyed distilleries in 9 liter cases per year

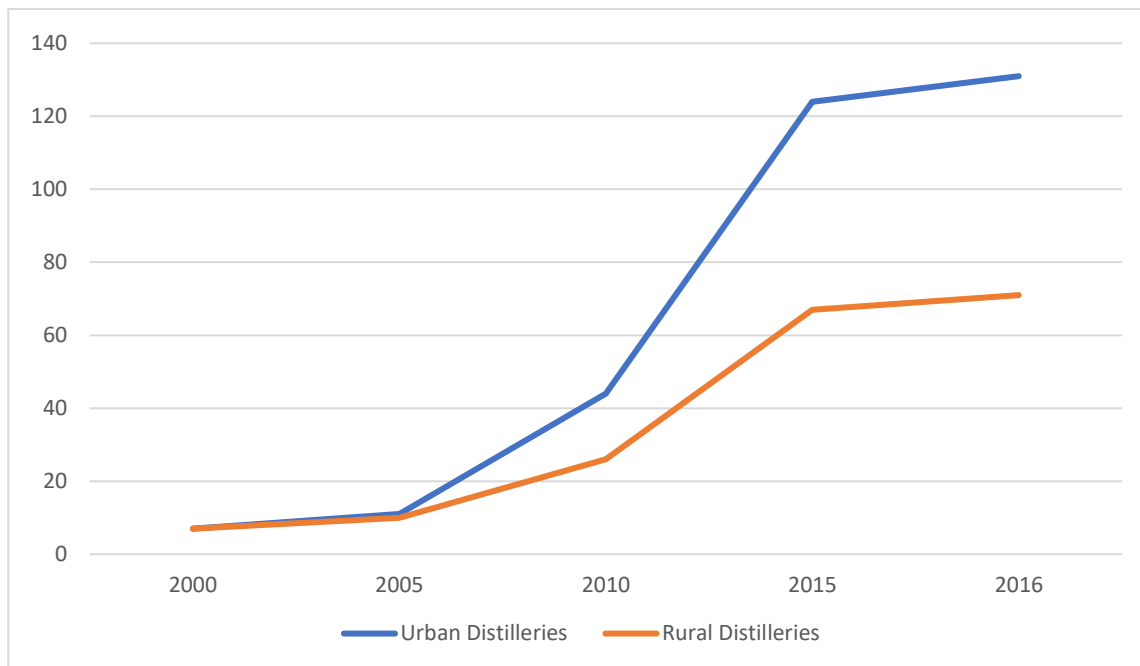


Figure 27: Cumulative change in number of urban and rural distilleries from 2000 to 2016



Figure 29: Example of an urban distillery land use buffer, within the NLCD dataset red is used to denote developed land, the darker red, the more intense the development

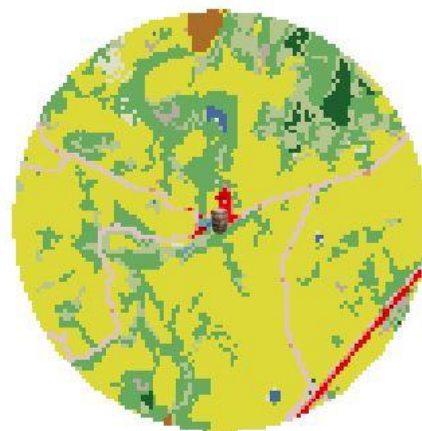


Figure 28: Example of a rural distillery land use buffer, within the NLCD dataset, light green is used to denote deciduous forests and yellow is used to denote hay/pasture

APPENDIX SECTION

A. APPENDIX A.....	46
B. APPENDIX B.....	50

APPENDIX A

The following is the previously written, unrevised survey that was never deployed.

Bourbon

Start of Block: Default Question Block

Q14 This brief survey is being conducted to determine a baseline of the spatial and temporal distribution of Bourbon distilleries. The information gathered will be used by faculty and graduate students from Texas State University. The information will be used only for academic uses, and for the interest of the Bourbon distillers.

Q1 Name of distillery?

Q2 Date Bourbon production started?

Q3 Date went on sale or projected date of sale?

Q4 How important are local community relationships to your Bourbon/distillery?

	Extremely important (1)	Very important (2)	Moderately important (3)	Slightly important (4)	Not at all important (5)
Select 1 (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q5 How do you express that?

Q6 How important are local ingredients (esp. corn)?

	Extremely important (1)	Very important (2)	Moderately important (3)	Slightly important (4)	Not at all important (5)
Select one (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q7 How do you express that?

Q8 How important is the connection to Bourbon heritage/history to you?

	Extremely important (1)	Very important (2)	Moderately important (3)	Slightly important (4)	Not at all important (5)
Select one (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q9 How do you express that?

Q12 What is the projected annual production?

	< 5,000 9 liter cases annually (1)	5,001 - 10,000 9 liter cases annually (2)	10,001 - 25,000 9 liter cases annually (3)	25,001 - 50,000 9 liter cases annually (4)	> 50,000 9 liter cases annually (5)
Annual production (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q10 Would you like be notified of the results of this research?

	Yes (1)	No (2)
Select one (1)	<input type="radio"/>	<input type="radio"/>

Q11 If so, please provide an email address for notification.

Q13 Thank you for taking time to fill out this survey. This survey has been granted an IRB waiver.

End of Block: Default Question Block

APPENDIX B:

The following is the survey that was used in the study and was granted Texas State IRB approval for request #6710.

Bourbon Survey

Start of Block: Default Question Block

Q1 Name of distillery?

Q2 Date of first bourbon barreled?

Q3 Date of first bourbon bottled? (or projected date?)

Q4 How important are local community relationships to your bourbon/distillery?

- ☐ Extremely Important (1)
- ☐ Very important (2)
- ☐ Moderately important (3)
- ☐ Slightly important (4)
- ☐ Not at all important (5)

Q5 How are those relationships played out? Can you provide an example?

Q6 How important is it that customers visit the distillery in person?

Q7 What kind of activities/events, if any, are available at your distillery?

Q8 How important are local ingredients (produced within 50 miles of your distillery) to your business?

- ☐ Local ingredients not used (1)
- ☐ Extremely important (2)
- ☐ Very important (3)
- ☐ Moderately important (4)
- ☐ Slightly important (5)
- ☐ Not at all important (6)

Q9 Which ingredients used are sourced locally?

Q10 How familiar are you with the history and heritage of bourbon?

- ☐ Extremely familiar (1)
 - ☐ Very familiar (2)
 - ☐ Moderately familiar (3)
 - ☐ Slightly familiar (4)
 - ☐ Not familiar at all (5)
-

Q11 How important is the history and heritage of bourbon to your brand?

- ☐ Extremely Important (1)
 - ☐ Very important (2)
 - ☐ Moderately important (3)
 - ☐ Slightly important (4)
 - ☐ Not at all important (5)
-

Q12 How are the history and heritage of bourbon expressed in your brand, if at all?

Q13 How are the history and heritage of bourbon expressed in the set-up of your distillery, if at all?

Q14 What is your distillery's approximate annual production of bourbon (in proof gallons)?

- ☐ (1)
 - ☐ 5,001-10,000 (2)
 - ☐ 10,001-25,000 (3)
 - ☐ 25,001-50,000 (4)
 - ☐ >50,000 (5)
-

Q15 What is your distillery's approximate annual production of bourbon (in 9-liter cases)

- ☐ (1)
 - ☐ 5,001-10,000 (2)
 - ☐ 10,001-25,000 (3)
 - ☐ 25,001-50,000 (4)
 - ☐ >50,000 (5)
-

Q16 How would you best describe the location of your distillery (E.g. Rural, Urban, Suburban, etc.)?

Q17 Would you like be notified of the results of this research?

☐ Yes (1)

☐ No (2)

Q18 If so, please provide an email address for notification.

End of Block: Default Question Block

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