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A Comparison of Trout Streams

Examining the reasons for angler visitation to certain counties around North Carolina

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Abstract

Recreational fishing is a popular and profitable sport for states across the country (Ditton et al., 2002). Mountain trout angling provides as much as 174 million dollars annually to the state of North Carolina (NCWRC, 2009). This number shows that recreational trout fishing is an important economic factor for North Carolina. The goal of this project is to determine what variables correlate to the popularity of a county among trout anglers. Through personal experience, academic articles, and interviews with fly fishermen a list of variables was created in order to compare two streams in different counties. These variables include household median income, accessibility, proximity to fishing stores, and sex, age, and gender. The results show that some of these variables may in fact correlate to the popularity of a county among anglers in North Carolina. My findings may be helpful in the ability to predict the popularity of a trout stream when designating new trout water.

Introduction / Lit Review

Mountain trout contain renowned sporting and culinary qualities, cultural significance, and beauty that resonates with the general public, making trout among the most widely recognized and popular freshwater fishes (Williams et al., 2007). The North Carolina Wildlife Resource Commission (NCWRC) conducted a study in 2009 that analyzed the economic impact of mountain trout fishing in North Carolina. The results indicated that mountain trout fishing has a significant effect on the North Carolina economy. The results from the study also indicate which counties in North Carolina anglers visited most frequently. These counties included Transylvania, Watauga, Haywood, Cherokee, Henderson, Jackson, and Ashe (NCWRC, 2009). In addition, they study assessed three different types of designated trout water. The three types of waters were hatchery supported trout water, delayed harvest trout water, and wild trout water. Hatchery supported waters were the most popular and contributed the most to the North Carolina economy, followed by wild trout water, then delayed harvest trout water (NCWRC, 2009). A study conducted in 2000 indicated that fishermen are more likely to go to a hatchery supported trout stream than any other water (Ahn et al., 2000).

I spent the summer interviewing fly fishermen for my senior thesis. In doing so, I was able to obtain knowledge about the social, economic, and ecological impacts of the sport. The interviews concluded that the average fly fisherman is a white male between the ages of 45 and 65. While talking to local fly fishermen I learned that some rivers have a large economic impact on the surrounding area. This led me to ask fishermen why they fish certain places more than others. According to Hunt and Ditton, anglers go to recreational sites with particular expectations and desires for particular types of satisfaction (Hunt and Ditton, 1997). Anglers look for a river that meets their expectations. The Davidson River is one river that draws people from all over the southeastern United States, which may explain its high economic impact. Tourists stay in hotels, eat at local restaurants, consume gas, and support local tackle shops. This intrigued me to investigate as to what makes one area more popular among anglers than others. Exploring the conditions that make a popular trout fishing area might help generate more money in less popular fishing areas.

This study compares 4 streams. These streams included the Davidson River in Transylvania County, Jacob's Fork in Burke County, the Watauga River in Watauga County, and Burningtown Creek in Macon County. Through personal experiences as an angler, interviews with North Carolina fishermen, and academic journals, a list of factors were created that may correlate with these certain expectations and desires. The purpose of this study was to use 4 different streams in order to find out whether or not these variables correlate with the county popularity.



III. Methodology

Using the information found in the 2009 NCWRC study I created a choropleth map that showed the counties that were most frequently and least frequently visited by anglers. Using these results I then streams that had different popularity among anglers. I have had the opportunity to fish three out of the four streams, therefore I knew where fishermen were mostly likely going to access the river. Coordinates were taken at these access points in Google Maps, made into an excel spreadsheet, transferred into ArcMap, and then transformed into XY data. Once the coordinates were in ArcMap, a range was created using the Drive Time Tool. The tool takes the point that marks river access and creates a specific range based on driving time for that point. I knew from interviewing fishermen this summer that resident anglers will drive about an hour to go fishing, therefore the drive range time was set to 60 minutes. All other demographic data was compared within these driving ranges. Next I used Community Analyst to obtain data on age, sex, gender, and income. A map of population density of white males between the ages of 45 and 65 was created in Community Analyst. The drive time polygons created in ArcGIS desktop were imported to Community Analyst so that data was only found within the drive times of each river. I then organized the data into census tracts. I transferred the map to ArcGIS Online and then to ArcMap Desktop. This same process was done with the median household income map for North Carolina. I then transferred both population and income maps into shapefiles and made two separate choropleth maps. Lastly, I did a search for all the fly fishing shops near the 4 rivers of interest. The coordinates were recorded and points were made on ArcMap that showed all the nearby fly fishing stores within the driving range of the rivers. Some of my maps had been found through ArcGIS Online. These included the county boundaries and the designated trout water. The designated trout water was provided by the North Carolina Wildlife Resource Commission. All map projections were Geographic Coordinate System WGS 1984.

IV. Results and Discussion

A total of 5 maps were created. Figure 1 shows the percent of fishermen in the study that stated they fished x county the most often in North Carolina. For example, if a county is marked with a 6, then that means that 6% of the anglers in the 2009 study went to that county the most to go trout fishing. In 2008, the most frequently visited county was Transylvania County, with 24% of anglers visiting that county the most. The 8 least visited counties were 2 to 3 percent of the angler population. Figure 2 depicts the designate trout water within the western North Carolina Counties. Red indicates hatchery supported water, blue indicates delayed harvest water, and green indicates wild trout water. Figure 3 shows the driving times for each river as well as the number of fly fishing stores that are within the driving range. Jacob's Fork had the largest drive time with an area of 4,375 square miles. Burningtown Creek had the smallest drive time with an area of 1,463 square miles. The rivers with the greatest number of fly fishing stores were the Davidson River and the Watauga River. Figure 4 depicts the household median income per census track within the drive time range of both streams. The data is shown in census tracts. The Davidson River had the highest median household income within its drive range, followed by Jacob's Fork, Burningtown Creek, and the Watauga River. The final map, figure 5, shows the total number of white males per census track between 45 and 65 years old that are within the one hour driving range of the river's access point. The river with the largest population was Jacob's Fork, followed by the Davidson River, then the Watauga River, and then Burningtown Creek.

Table 1. Table 1 shows a summary of each variable.

	Davidson River (Transylvania County)	Watauga River (Watauga County)	Burningtown Creek (Macon County)	Jacob's Fork (Burke County)
Percent of anglers that visited the county the most in one year	24	9	6	3
Number of fly shops within drive time	6	5	3	1
Drive time in square miles	3,593.03	3,934.77	1,463.93	4,375.27
Total white males between 45 and 65 within drive time	126,033	72,147	21,808	173,999
Median household income within drive time	43,746	34,618	35,832	38,811

V. Conclusion

From these results its hard to make any definite conclusions that drive time, income, and white males between 45 and 65 correlate with popularity of a stream. This is because Jacob's Fork, which is found in one of the least popular counties among anglers has the largest drive, the largest population of while males, and the second largest household median income.

I expected to see Transylvania county with both the largest population of white males and the largest household income. However, the lack of white males as compared to Jacob's Fork may be due to the fact that Jacob's Fork has a larger drive time area. This led me to believe that the larger drive times might be increasing the two demographic variables. However, even with its relatively large size at 3,934 square miles, the Watauga River does not have a large population of white males. This may be due to the fact that a large university, Appalachian State University, is located in close proximity to the Watauga River. The large amount of fly shops found within the range of the Davidson River and the Watauga River may indicate that fly shops do in fact correlate with county popularity. Jacob's Fork had the second highest income but that is most likely due to its proximity to a major city, which is Charlotte NC. Income and white males may still be correlated with county popularity but the way they are correlated may be more complex than a 60 minute drive time from the river access point. In conclusion, the Davidson River still stands as a supportive example for my original hypothesis because it has a relatively large drive time area, a large household median income, and a large population of white males.

For states that contain a large amount of trout water, fly fishing can be a significant economic factor. In addition, the money produced through fly fishing expenditures will go back into the protection of trout waters (NCWRC, 2009). Trout are good indicators of stream and watershed condition, therefore protecting the environments for which trout live in will also protect the biodiversity of the surrounding watershed (Williams et al., 2007). Understanding which counties are visited most frequently and why some counties are visited so often is important in the economic and ecological management of trout fishing (Williams et al., 2007; NCWRC, 2009). Counties that want to attract more anglers can evaluate the factors described in this project in order to make their waters more popular and more productive. By using this information, counties may be able to predict the popularity of a new designated trout stream and therefore predict the economic impacts that a trout stream may have on the local economy.

Figure 3

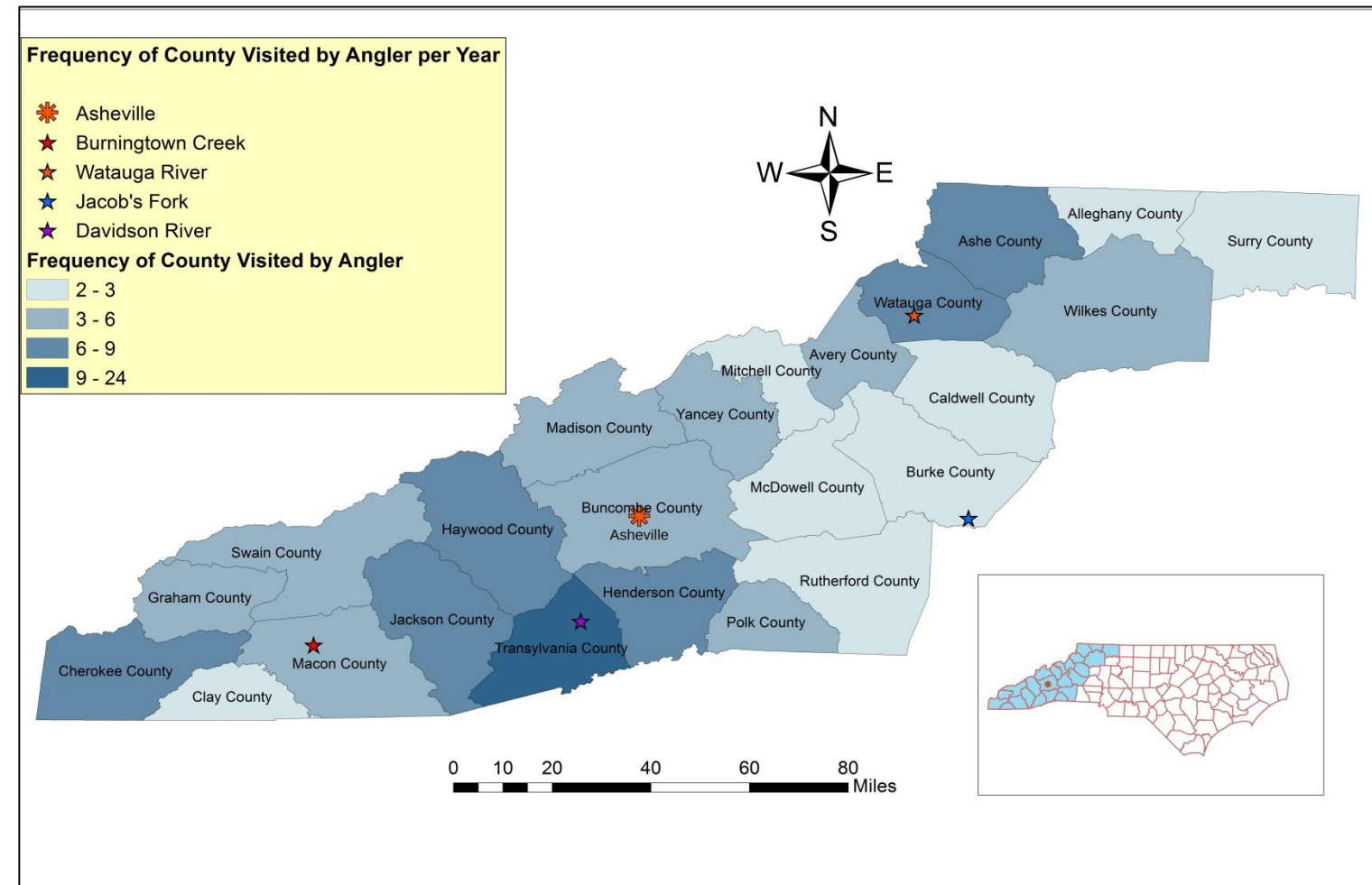
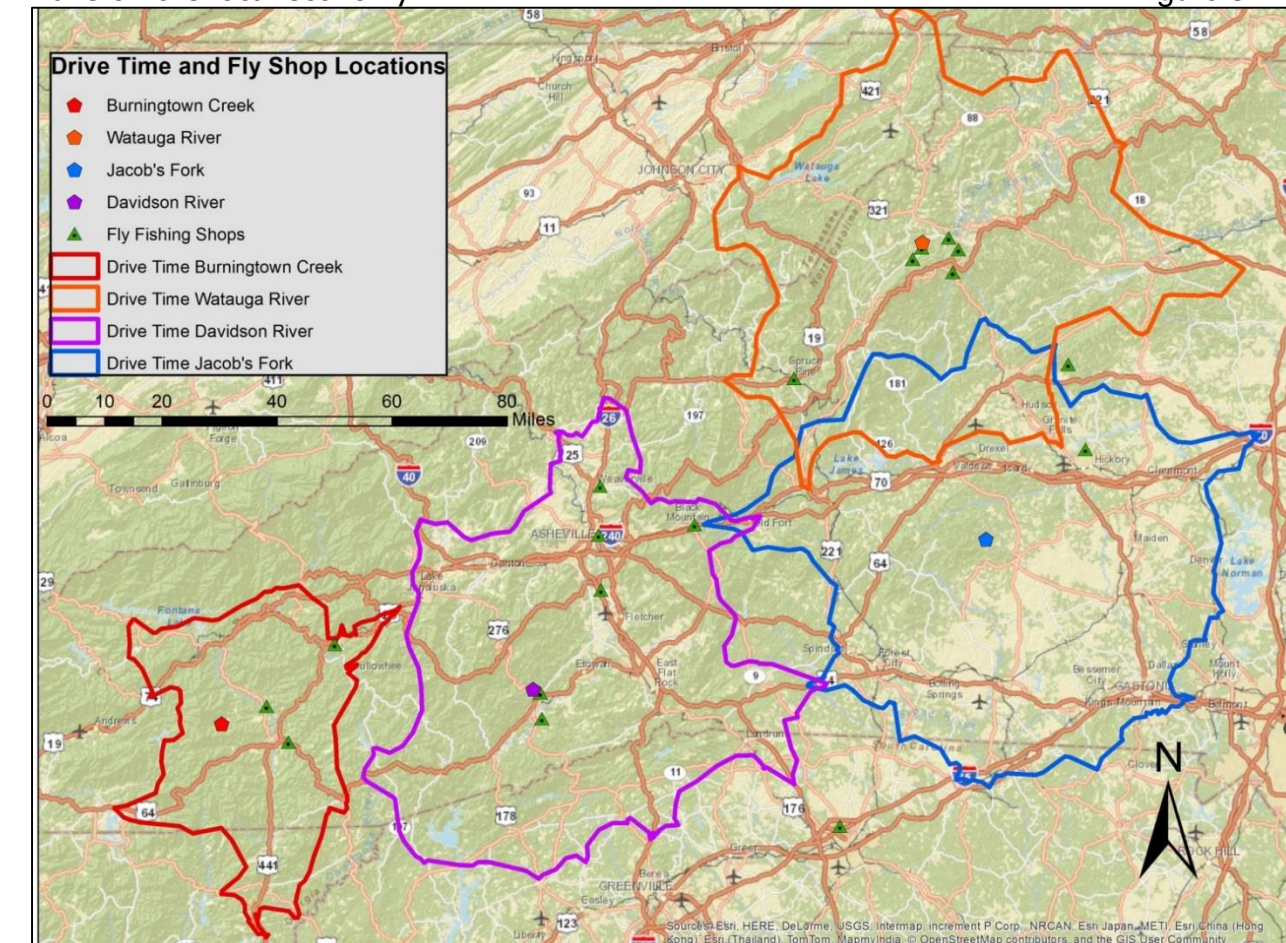


Figure 1

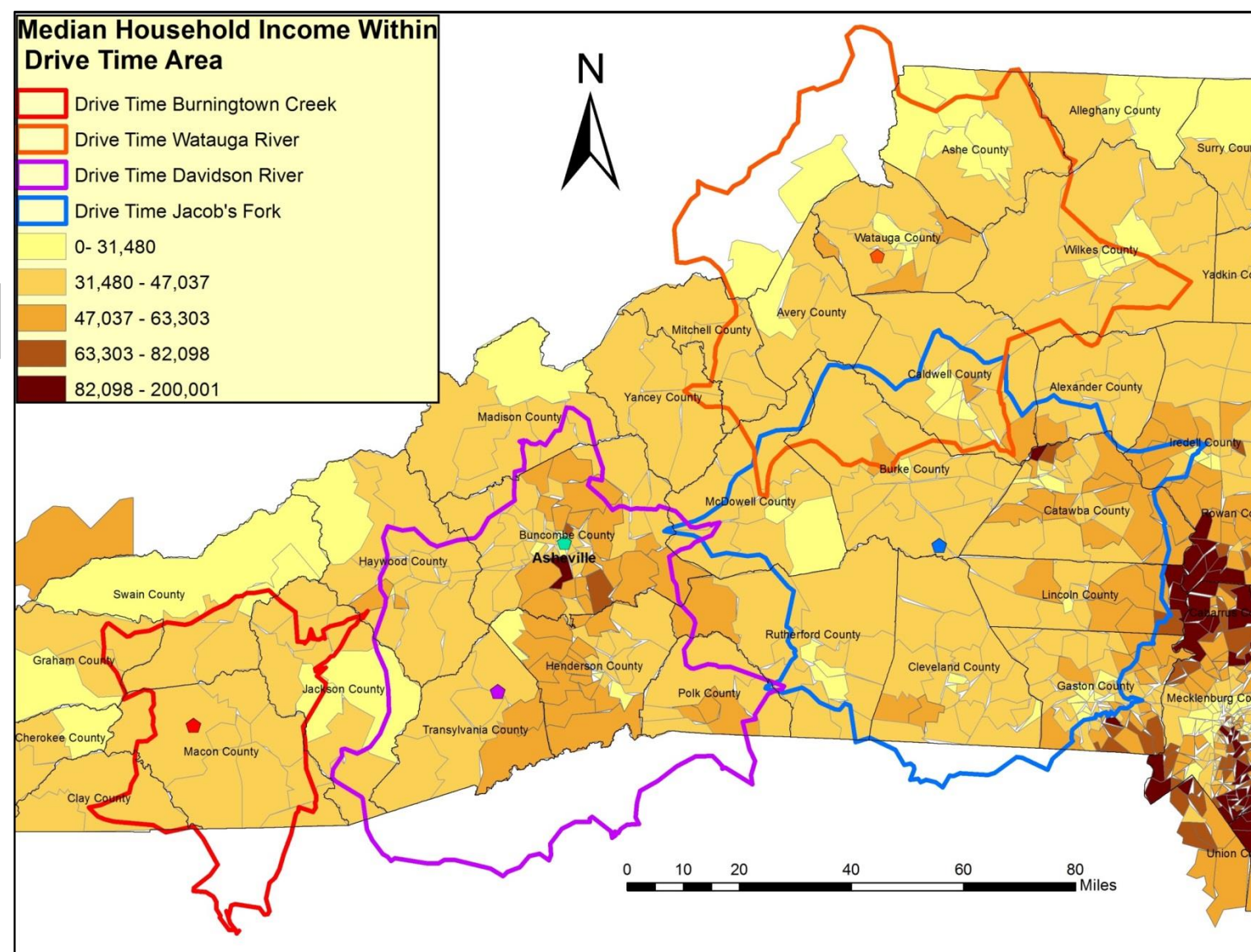


Figure 4

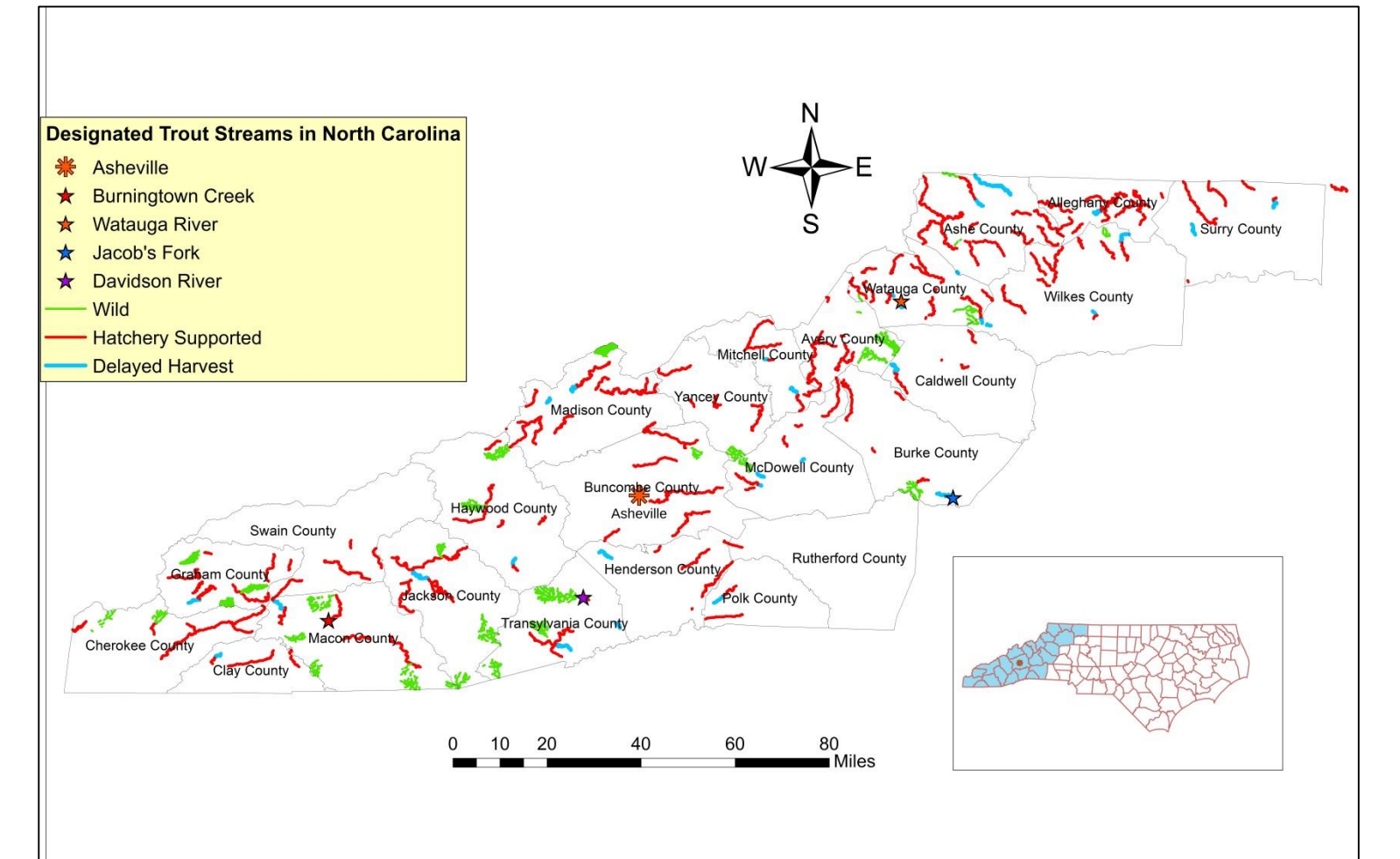


Figure 2

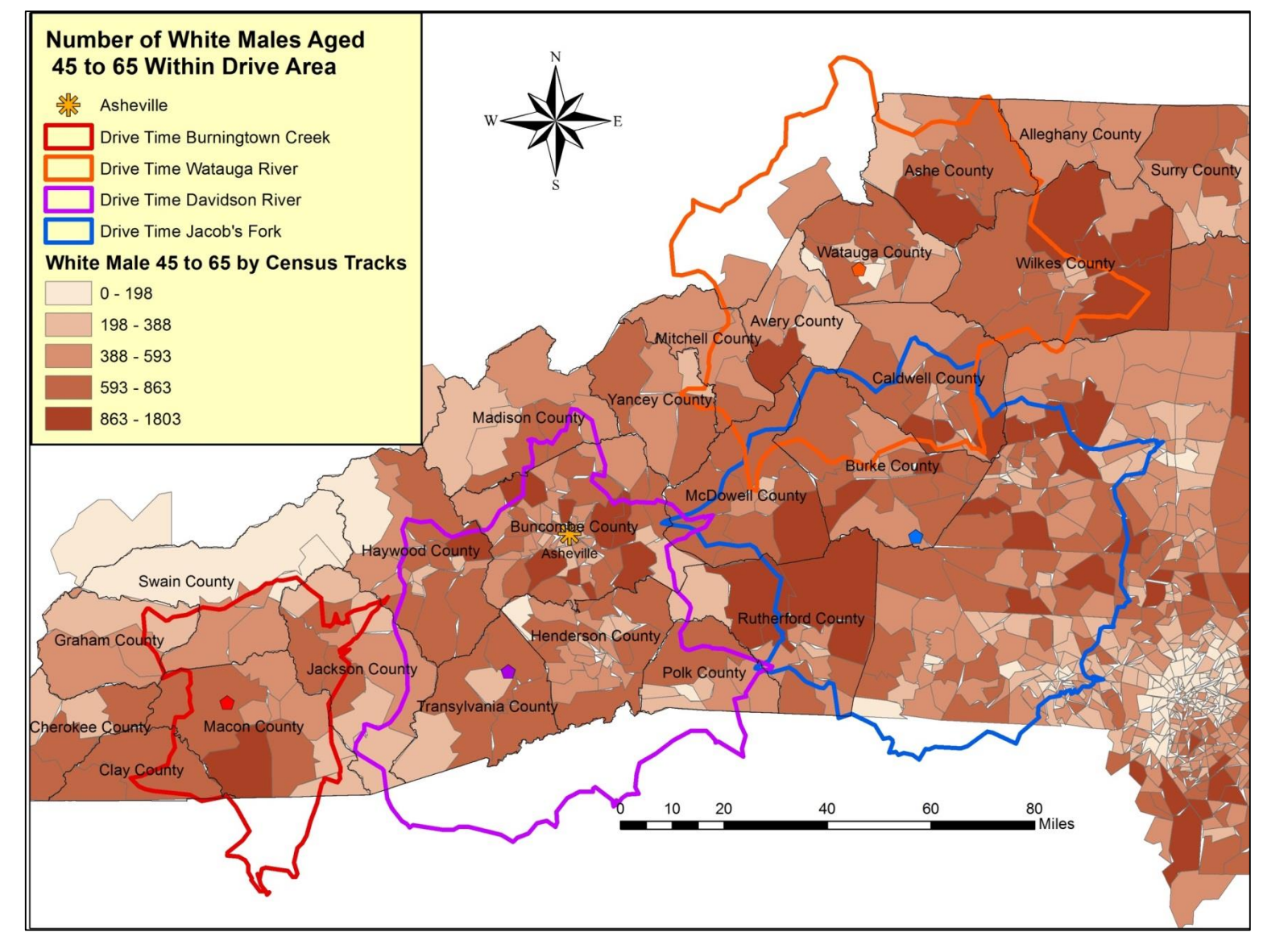


Figure 5

V.I. Future Research

It would be interesting to include more variables for future research. Other important variables may include the number of restaurants in close proximity to the river and an average catch rate and average catch size of a river. Restaurants may have an affect on popularity of a stream for non-residents, who typically spend more time and money on fishing trips (Dalton et al., 1998). Based on previous research, a large contributor to fishermen preference is catch rate and average size (McCormick and Porter, 2014). Research should be conducted to obtain data on catch rate and average size of trout in certain streams. Data on water quality should also be collected because the study done by Ahn et al. concluded that fishermen are drawn to rivers that have a high water quality (Ahn et al., 2000).

VII. References/ Data Sources

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Figure 1 Data Sources: 1) Western North Carolina county boundaries created by the author using a 2014 shapefile from the Department of Transportation (NCDOT). 2) Frequency of county visited from North Carolina Wildlife Resource (NCWRC) Commission in 2009.

Figure 2 Data Sources: 1) Designated trout stream waters is from a shapefile provided by NCWRC in 2013.

Figure 3 Data Source: Basemap for North Carolina provided by Community Analyst <http://communityanalyst.arcgis.com>

Figure 4 Data Sources: Median household income by census track provided by Community Analyst <http://communityanalyst.arcgis.com>

Figure 5 Data Sources: Population of white males between 45 and 65 provided by Community Analyst <http://communityanalyst.arcgis.com>

VIII. Acknowledgements

Thank you Mike Winiński for providing me with the necessary knowledge in order to complete this project. Also, thank you to the North Carolina Wildlife Resource Commission for their extensive research on economic data and the trout stream map.