Mapping Big Game Harvests in Maine

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Abstract

Maine's big game are harvested each year all across the state. Hunters have relished the opportunity to bag a deer, moose or bear for years and this project sought to find the best location to hunt if someone wanted to harvest each species. Using 2016 harvest data, the locations of these successful hunts were mapped and then combined to create an overall ranking. This combined data was put into RStudio and analyzed to explore the significance of the data. No significant results were found at the township scale, but analysis of Wildlife Management Districts yielded a result that Wildlife Management District 14 was significantly better for hunting all three species than the least productive districts.

Introduction

Maine has a rich history of hunting and fishing. For thousands of years the state's woods and waters have provided people with food in the form of wild game. Across Maine, different species are often found in different regions, moose are more prevalent in the north, and white tailed deer are more prevalent in the south. (Living Off the Land & Sea, 2018) With the regulated and recorded statistics of harvests for each species, we have a unique view of the harvested big game resources within the state of Maine in recent years. This project aims to explore the distribution of harvests of moose, black bear, and white tail deer in the state of Maine during the 2016 hunting seasons. In particular I asked which regions in Maine a hunter could be most likely to find success no matter the big game species he or she planned to hunt.

Methods

I obtained data from the Maine Department of GIS (Maine Office of GIS, 2018) and obtained 2016 harvest data files from the Maine Department of Inland Fisheries and Wildlife (Harvest Information, 2018). I created a ranking of harvests within each township in excel and joined this data in ArcGIS. After joining these data to the Wildlife Management Districts, I analyzed the harvests of each species in the townships of Maine to see which Wildlife Management District had the largest harvest of big game. I ranked the townships by the amount of each species killed to give the ranking for moose, deer, and bear. I deemed 1% of the deer harvest across the state equal to 1% of the bear harvest, despite large differences in the number of individuals there. When ranking in excel, if there was a tie for the first 10 values, they were all ranked as one, then the next would be 10, despite it having the second highest value. While processing in GIS, I chose a one to many spatial join using the intersect for to aggregate the township data into Wildlife Management Districts, which did not provide perfect totals as it left townships undivided. These values were added together to create a total rank of all around harvest productivity. In RStudio, I created a set of boxplots and scatterplots and ran an analysis of variance to analyze the data sets.

Results

The most successful moose kills take place in the northern regions of Maine (Figure 1). For Deer, it is nearly the inverse, with most Deer kills in central or southern Maine (Figure 2). Bear are much more dispersed but primarily are killed around the edges of the state, but not much in central Maine or along the coast (Figure 3). When the sum of the rankings were mapped the pattern is not quite as defined, but the more productive towns stretch across the West and Southwest of Maine, and the Northeast of Maine (Figure 4.) The only significant visual was that of the total ranking by Wildlife Management District. Median ranks for Wildlife Management Districts 17 and 14 were high, and median ranks for Wildlife Management Districts 4 and 1 were very low.

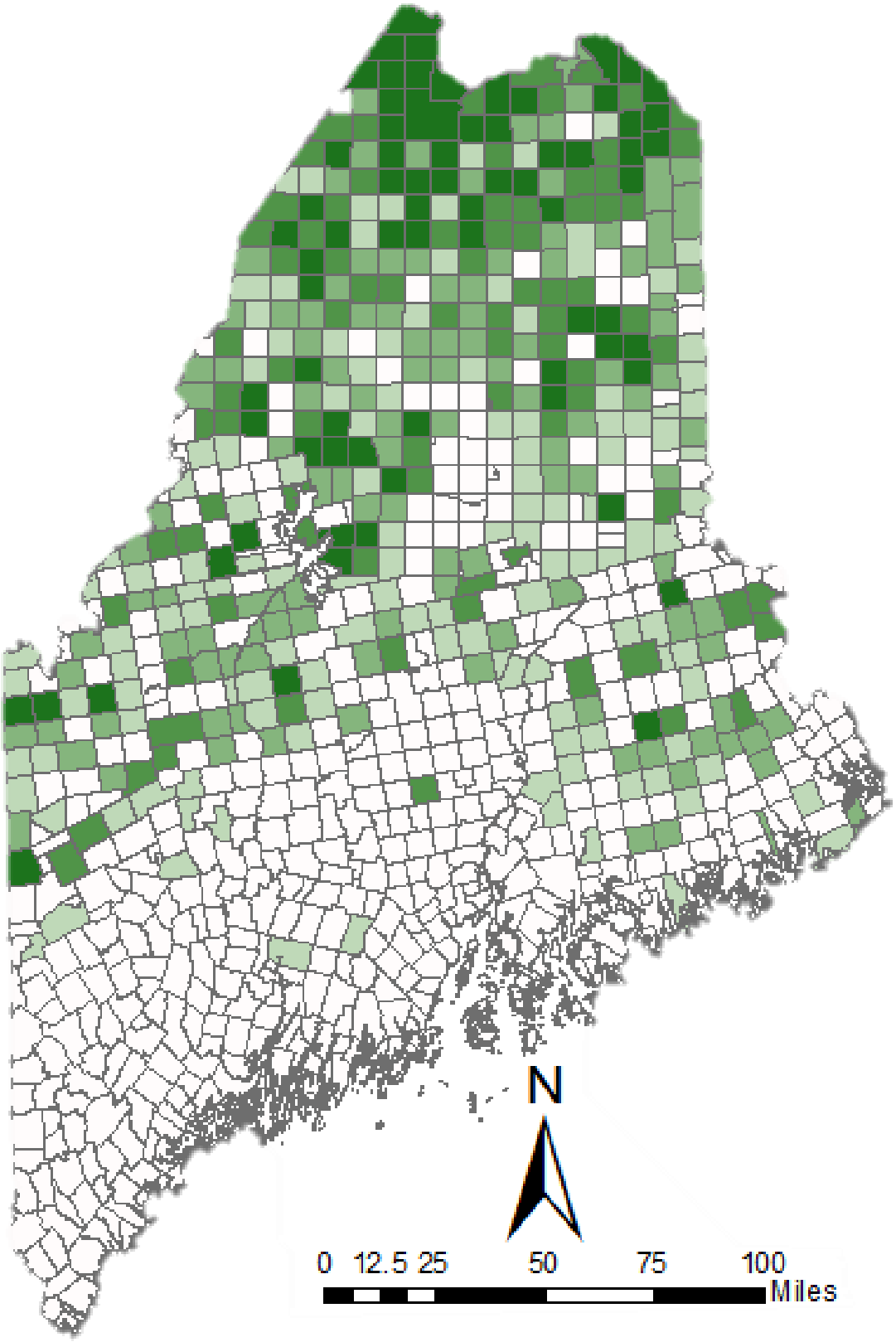

Figure 1. Ranked moose harvests in Maine with white representing lowest harvests and dark green representing greatest

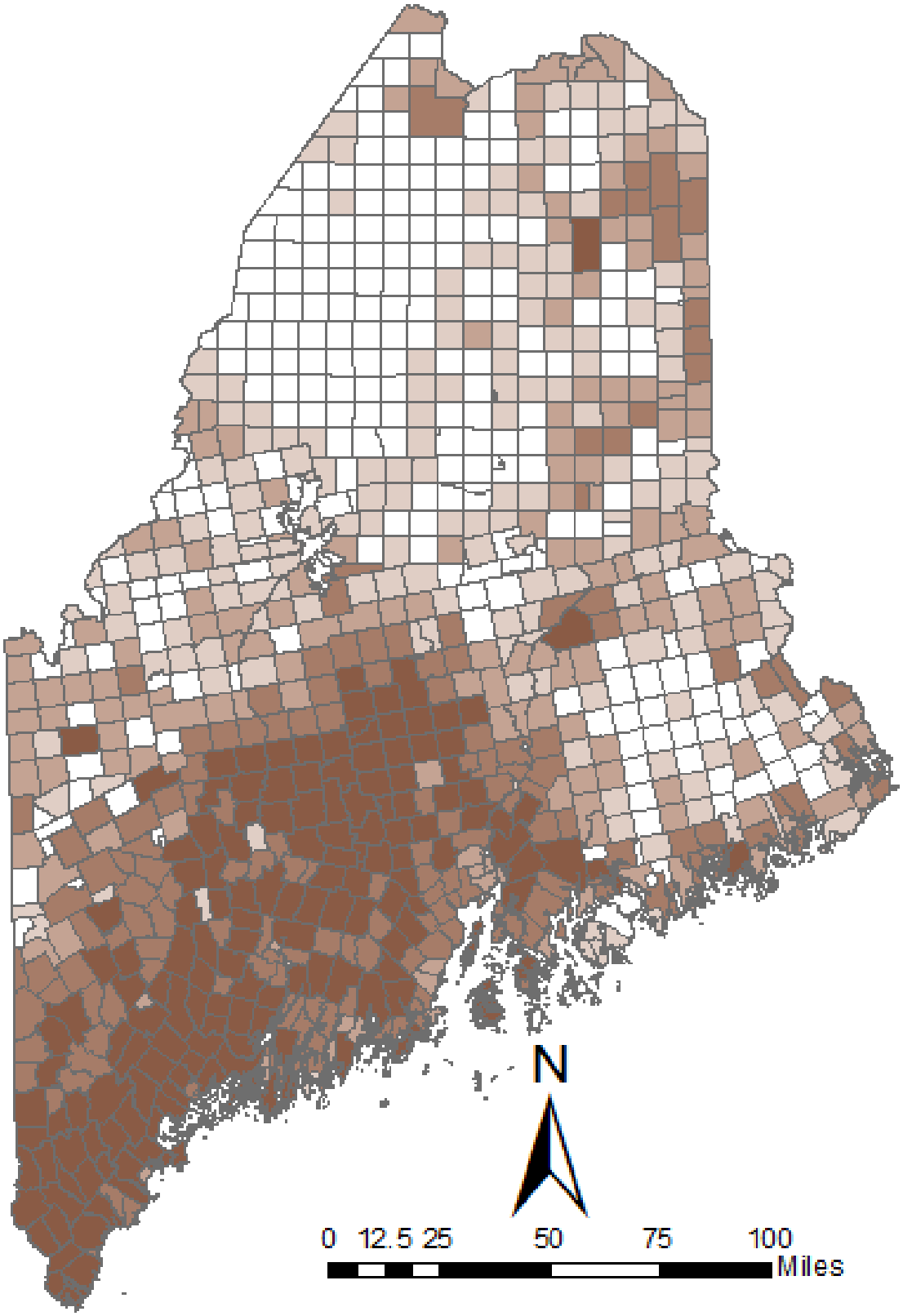

Figure 2. Ranked deer harvests in Maine with white representing lowest harvests and brown representing greatest

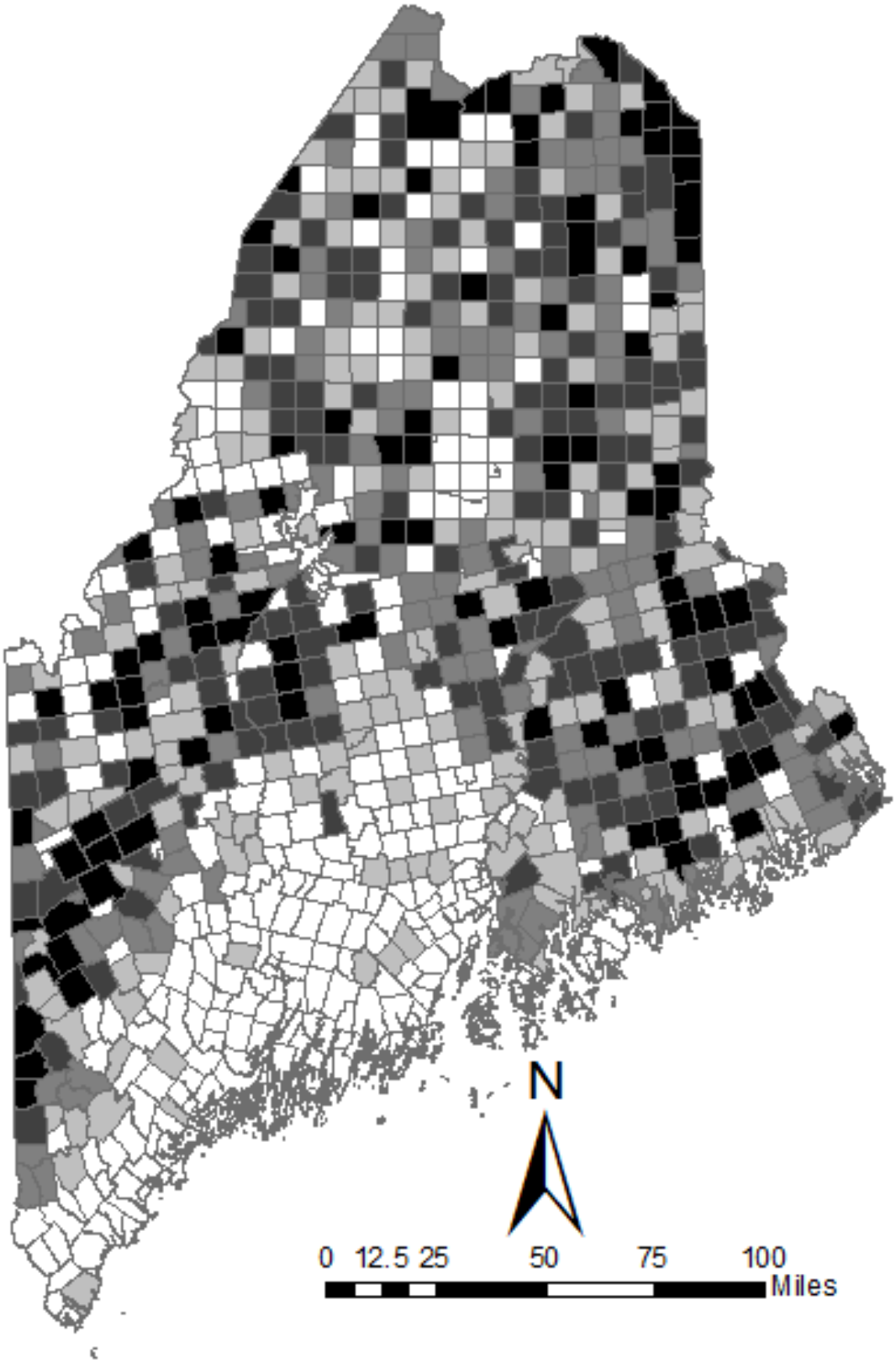

Figure 3. Ranked bear harvests in Maine with white representing lowest harvests and black representing greatest

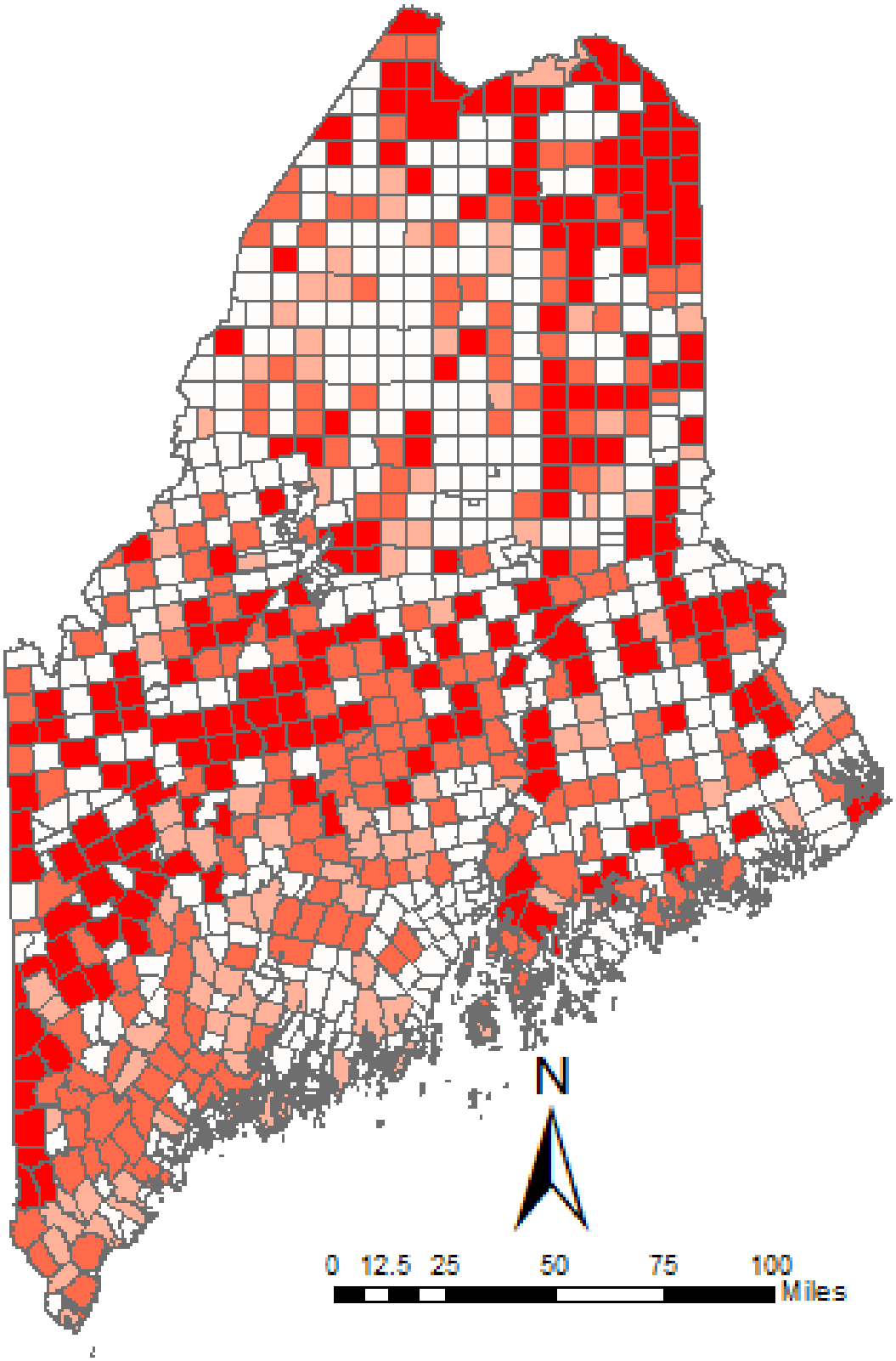

Figure 4. Ranked overall harvests in Maine with white representing lowest harvests and red representing greatest

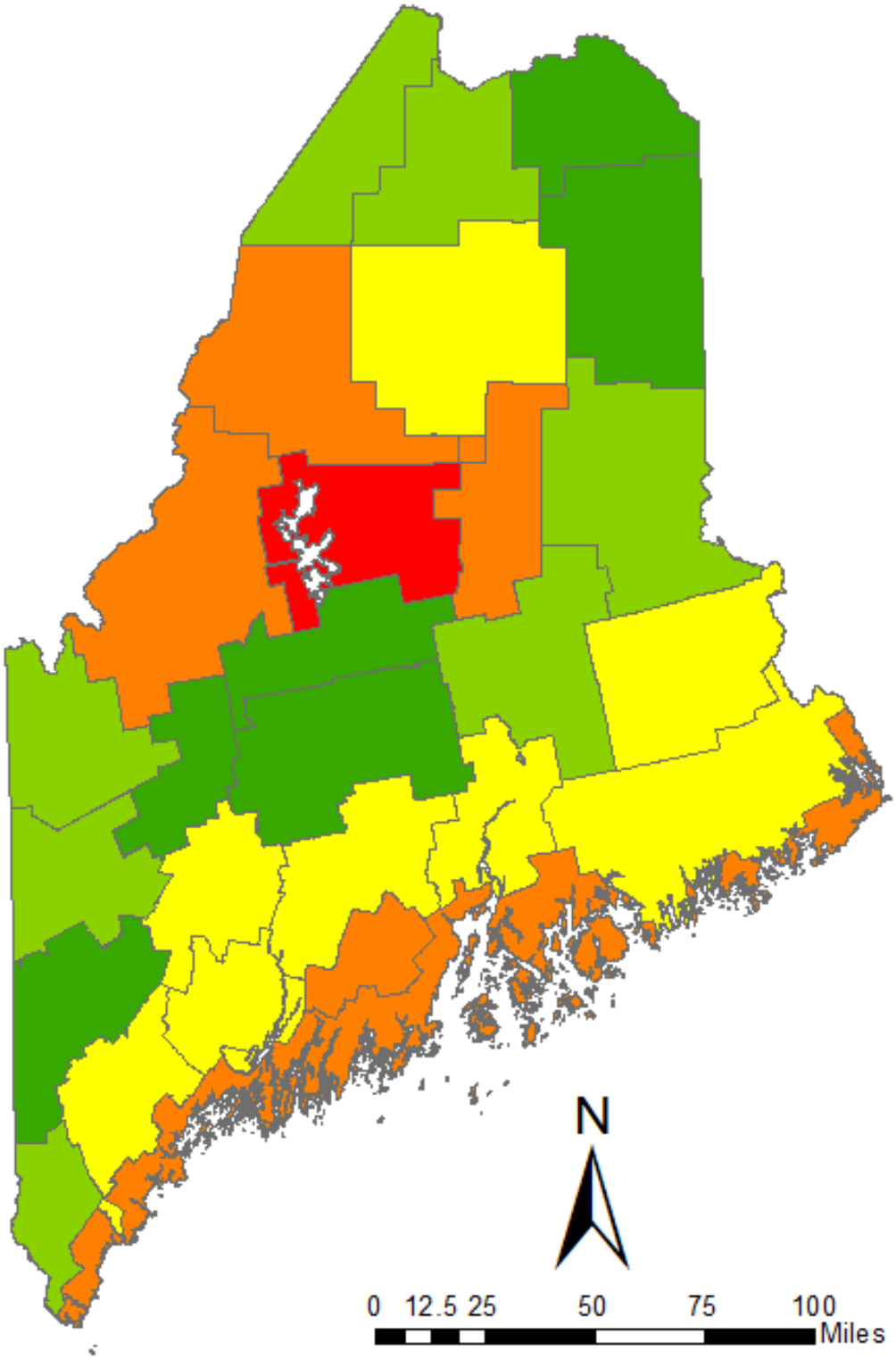

Figure 5. Wildlife Management District ratings ranging with from dark green for the best rating to red for the worst rating.

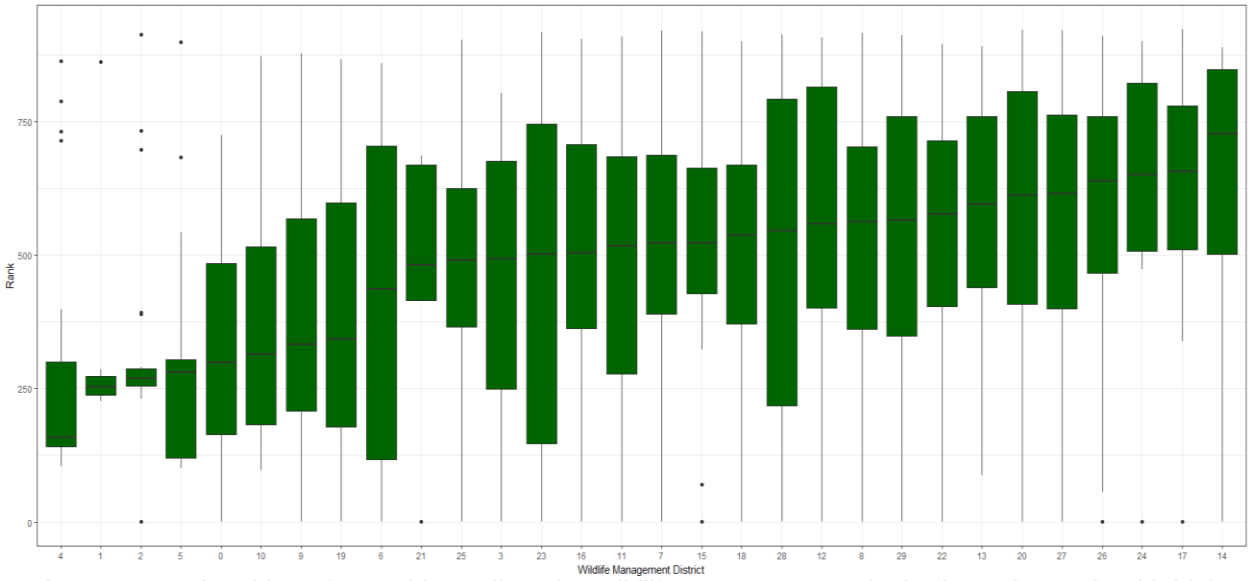

Figure 6. Total ranking of townships split up by Wildlife Management District (see Figure 7), with high values for Rank representing the greatest all around hunting harvests.

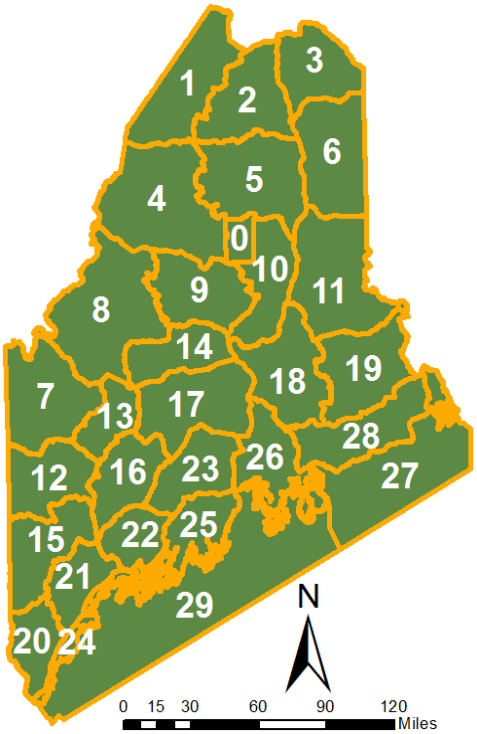

Figure 7. Wildlife Management Districts of Maine labeled

	Df	Sum Sq	Mean Sq	F value	Pr(>F)	
maindata$WMD	1	4136021	4136021	60.62	1.86e-14	***
Residuals	921	62843881	68234			

Figure 8. Results of ANOVA with most prominently an extremely small P-Value of 1.8 e -14.

Discussion

The most important results are that Wildlife Management Districts 1, 2 and 4 are much worse for all around hunting than 24, 17 and 14, which are the best. The middle boxplots ultimately are not significant because the data vary so much. The results of this show that one of the smallest Wildlife Management Districts is the third best for harvesting big game, which is unlikely because no moose were attained there and few bear. This project was limited by the data and method. The spatial join I performed seemed like the best way to minimize error because dividing townships into smaller data points that were not available could prove problematic. I chose not to account for area, because of this incorrect representation of the true Wildlife Management District Shape, although this could have given a more refined answer. The timing of this project limited me to a small sample size of just one year and the process of converting a visual map with harvest data on it into a spreadsheet by hand is not the most efficient or precise. Knowing the time spent by hunters in each region would also be a piece of data that could provide a more meaningful result. Processing several years of data would provide a more sound result, because it would be less vulnerable to being skewed by outliers.

Conclusion

Maine has distinct regions that are better than others when you single out one species to hunt, but when looking at what regions are best for all around big game hunting, Wildlife Management District 14 has a far higher median ranking, and the best Wildlife Management Districts are significantly better than the worst for big game hunting. Despite this, there seems to not be a large difference for most regions of Maine, many of the inter-quartile ranges overlap greatly due to similar values. There was a significant result, but only between the very best and the very worst regions for all around big game hunting.

Acknowledgements

Thank you to Dr. Philip Nyhus and Wesley Zebrowski for the help and guidance with GIS and refining my research. Thank you to Dr. Manny Gimond, Thomas Griffith, Wesley Zebrowski and Jimmy O'Donnell for help in statistical analysis using R.

Sources

Harvest Information. (n.d.). Retrieved May 1, 2018, from https://www.maine.gov/ifw/hunting-trapping/harvest-information.html

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