

Is there a correlation between shopping centers size and highways in the metropolitan area of Minnesota?

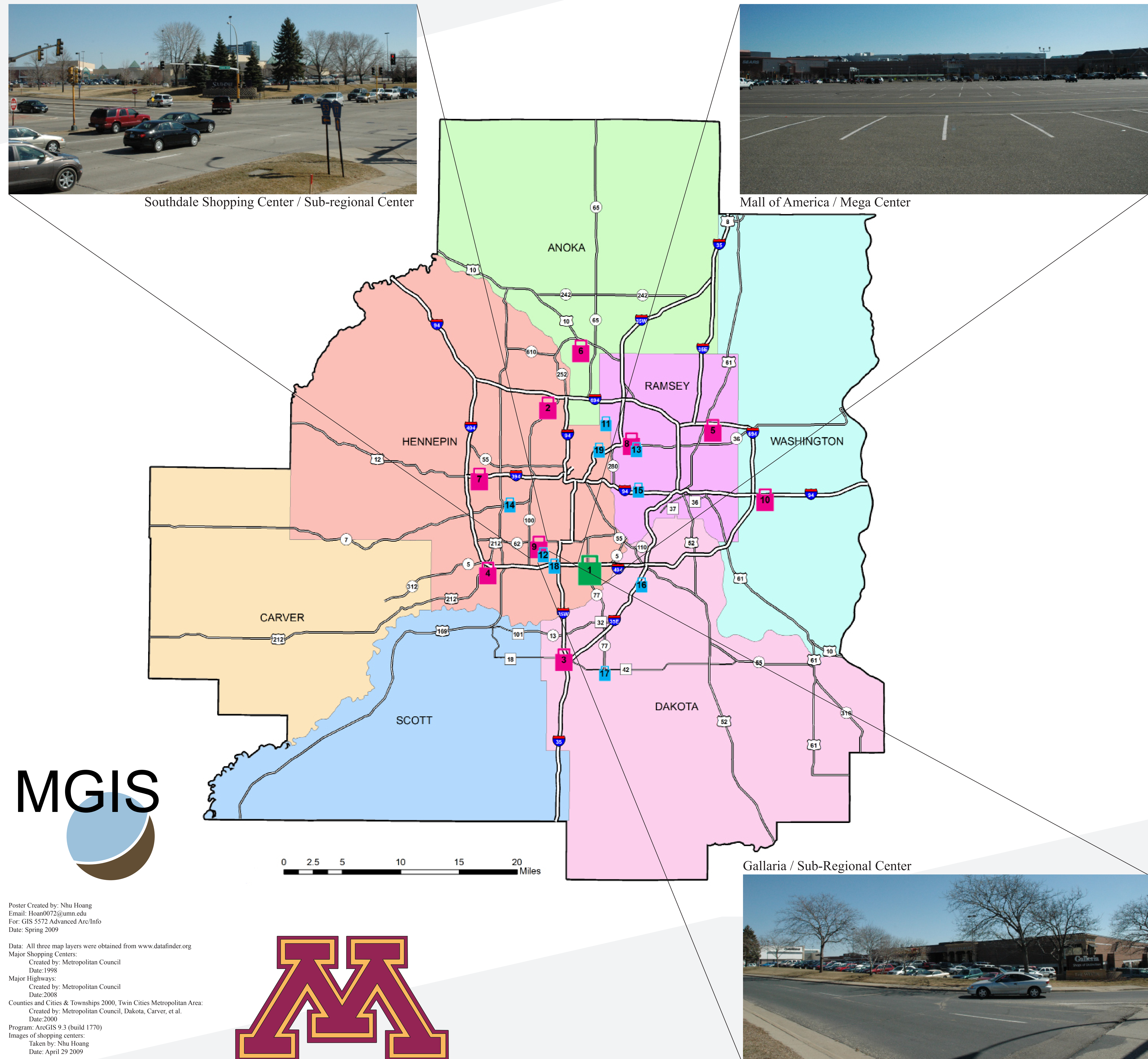
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Lets begin

Consumer spending is estimated at 70% of the gross domestic product (GDP) for the United States. A place where consuming spending often takes place is at shopping centers, where multiple retail stores are aggregated into one building. The problem that faces urban planners and developer is finding the most efficient way to get consumers to these shopping centers. Although there are various methods for a consumer to arrive at a shopping center, this poster will focus on the automobile and the highways that they are transported on. By examining how established shopping centers and highways function, new insight might be obtained for future placement of shopping center.

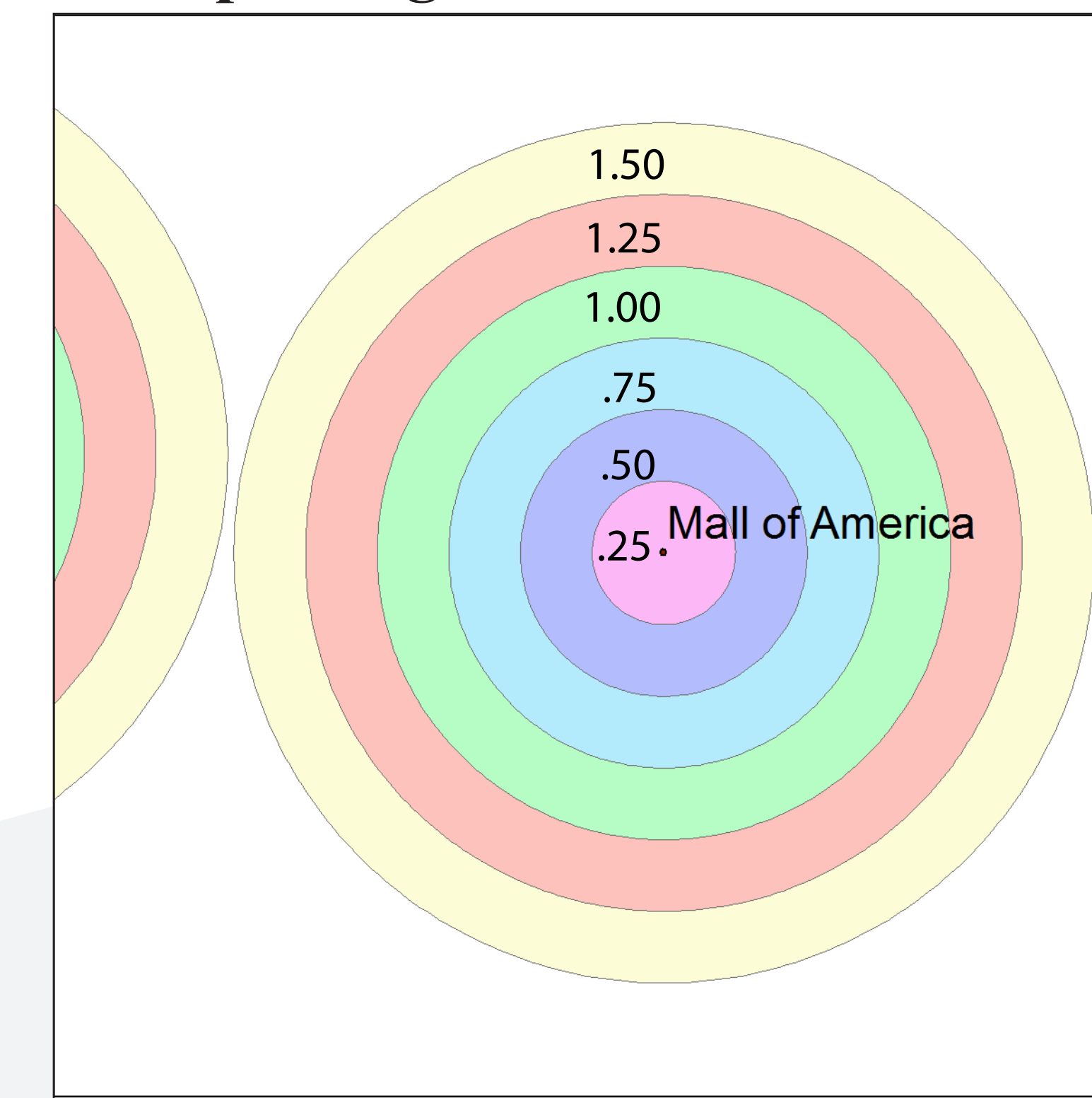
The goal for the study is to distinguish if there is an actual correlation between shopping centers size and the amount of highways that are around them. The study was done using ESRI's ArcMap and data produced by the Minnesota Metropolitan Council. The process of the study consisted of running tools in ArcMap and manually counting highways around the shopping centers. The results from the process are two values for each shopping center. The first value is the total number of highways in a 1.5 mile radius of the shopping center. While the second value is weighted, factoring in the distance between the highways and the shopping center.

Map of the Twin Cities with Shopping Centers and Highways

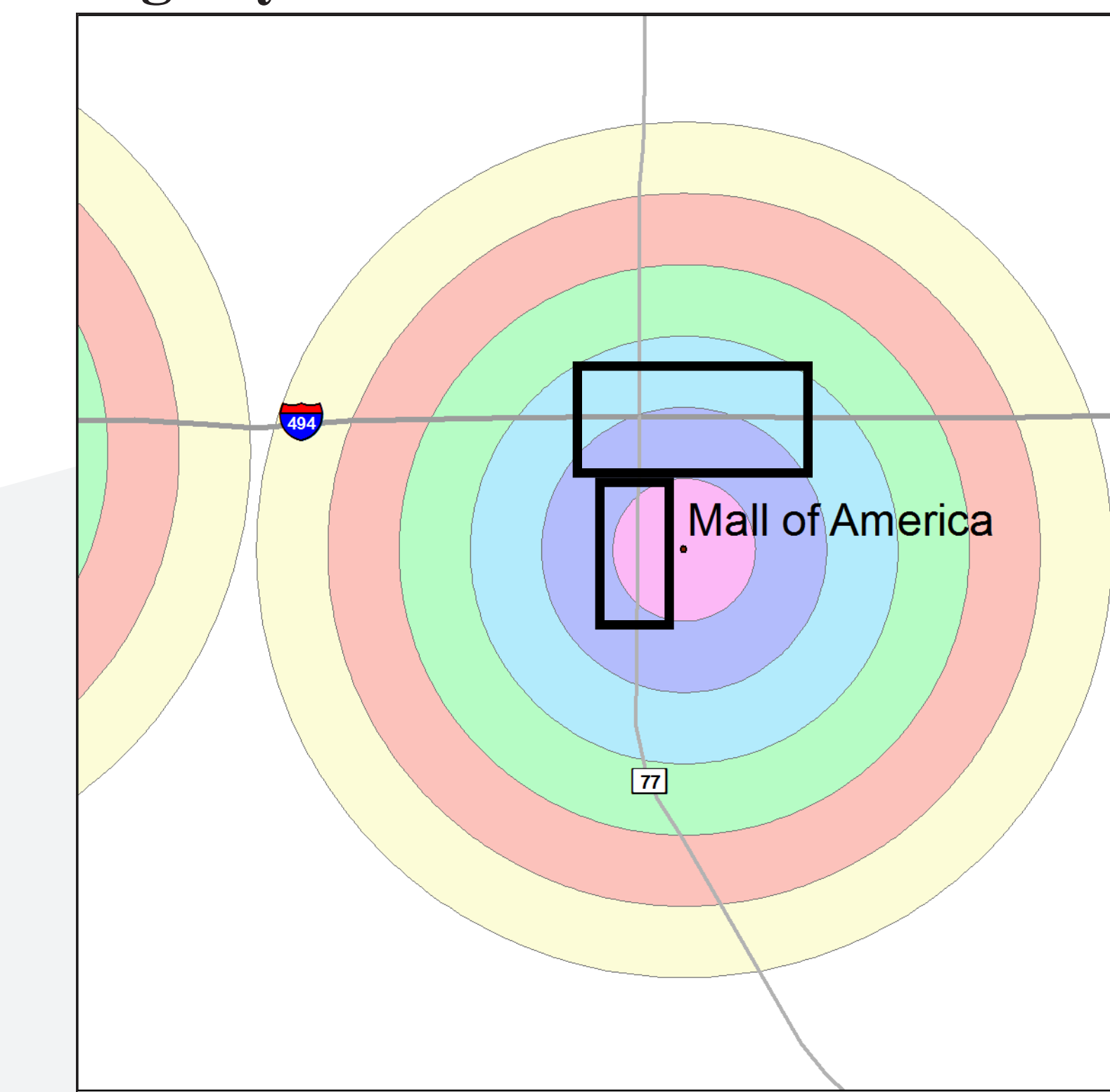


Processing data with ArcMap

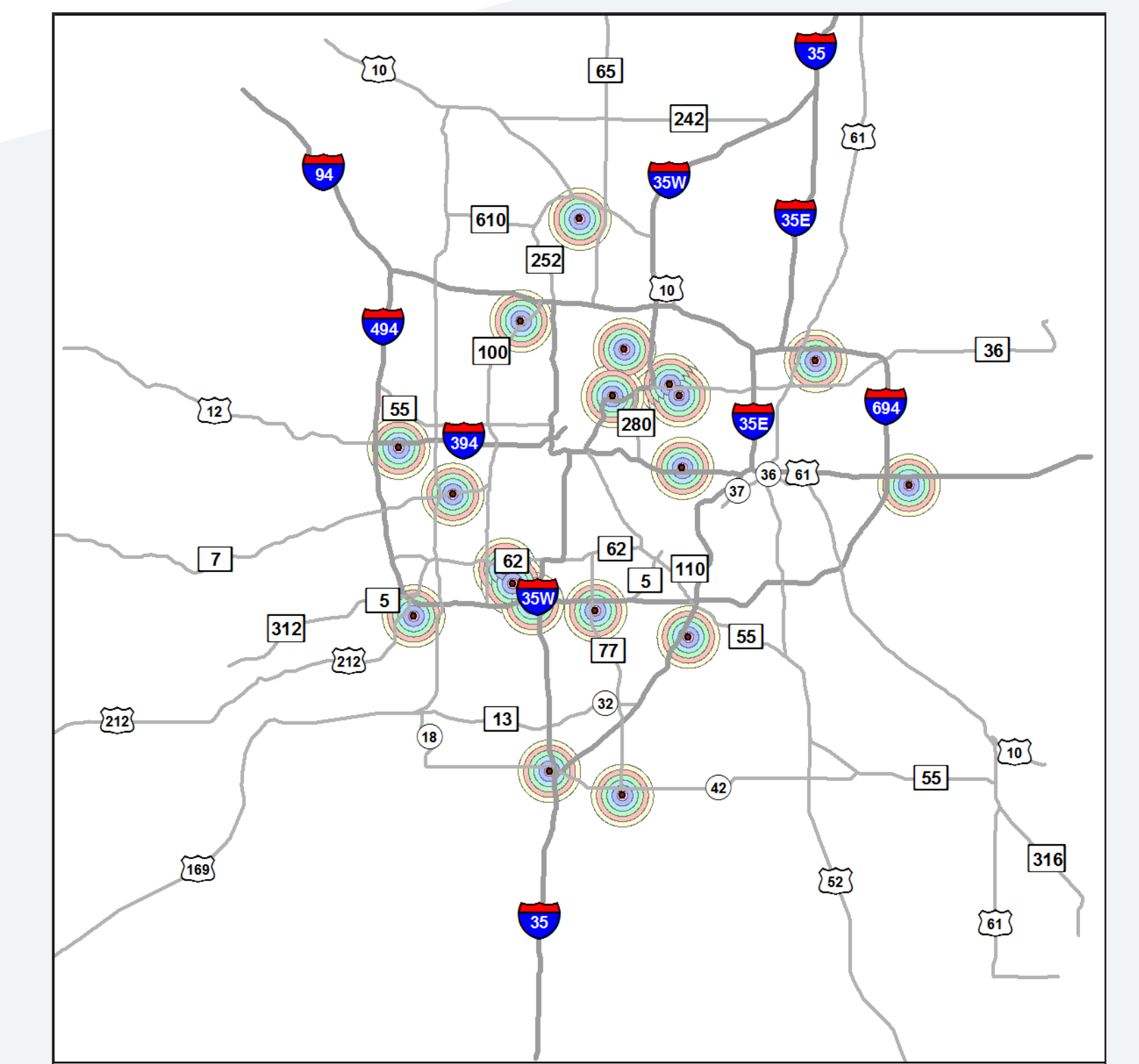
Multiple ring buffer



Higways overlaid on buffered area



Overview of variables



The multiple ring buffer tool in ArcMap was used to create quarter mile (6 in total, totaling a 1.5 mile extent) buffers for each shopping center, as seen above. There was no dissolving involved in the process because each buffered shopping center would be examined individually.

For this instance, the Mall of America received a count of two highways (interstate 494 and state highway 77). The lower black box shows that highway 77 is in the first buffered area (.25 mile radius) so the MoA received a weighted value of 6. While the upper black box shows Interstate 494 in the second buffered area (.50 mile radius), this gives another 5 points to the MoA. The final weighted score for the Mall of America is 11.

The focus of this study is to determine the relationship between shopping center sizes and highways, not individual shopping center and highways. This means that the final step was to find the average count and weighted count for each shopping center size. This was done by adding up each shopping center in their respected category size and averaging it out. For example, the regional center size received a total average count of 2.77 and an average weighted value of 10.33.

Final figures and thoughts

Shopping Center Name	Highways in buffered area					
	0.25	0.5	0.75	1	1.25	1.5
1 Mall of America	C77	I494				
2 Brookdale	C100				I94	
3 Burnsville Center	C42	I35W +I35E				
4 Eden Prairie Center		C212	I494		C169+C5	
5 Maplewood Mall			I694		C61	C36
6 Northtown Mall					C10	C65 +C610
7 Ridgedale	I394				I494	C12
8 Rosedale Shopping Center	C36				I35W	
9 Southdale Shopping Center	C62				C100	
10 Tamarack Village		I94				I494 +I694
11 Apache Plaza						I35W
12 Galleria					C62+I494	C100+I35W
13 Har Mar Mall		C36				I35W
14 Knollwood Mall	C7	C169				
15 Midway Marketplace	I94					
16 Shoppes at Promenade			I35E			
17 Southport Center			C42 +C77			
18 Southtown Shopping Center	I494	I35W				
19 The Quarry	I35W					

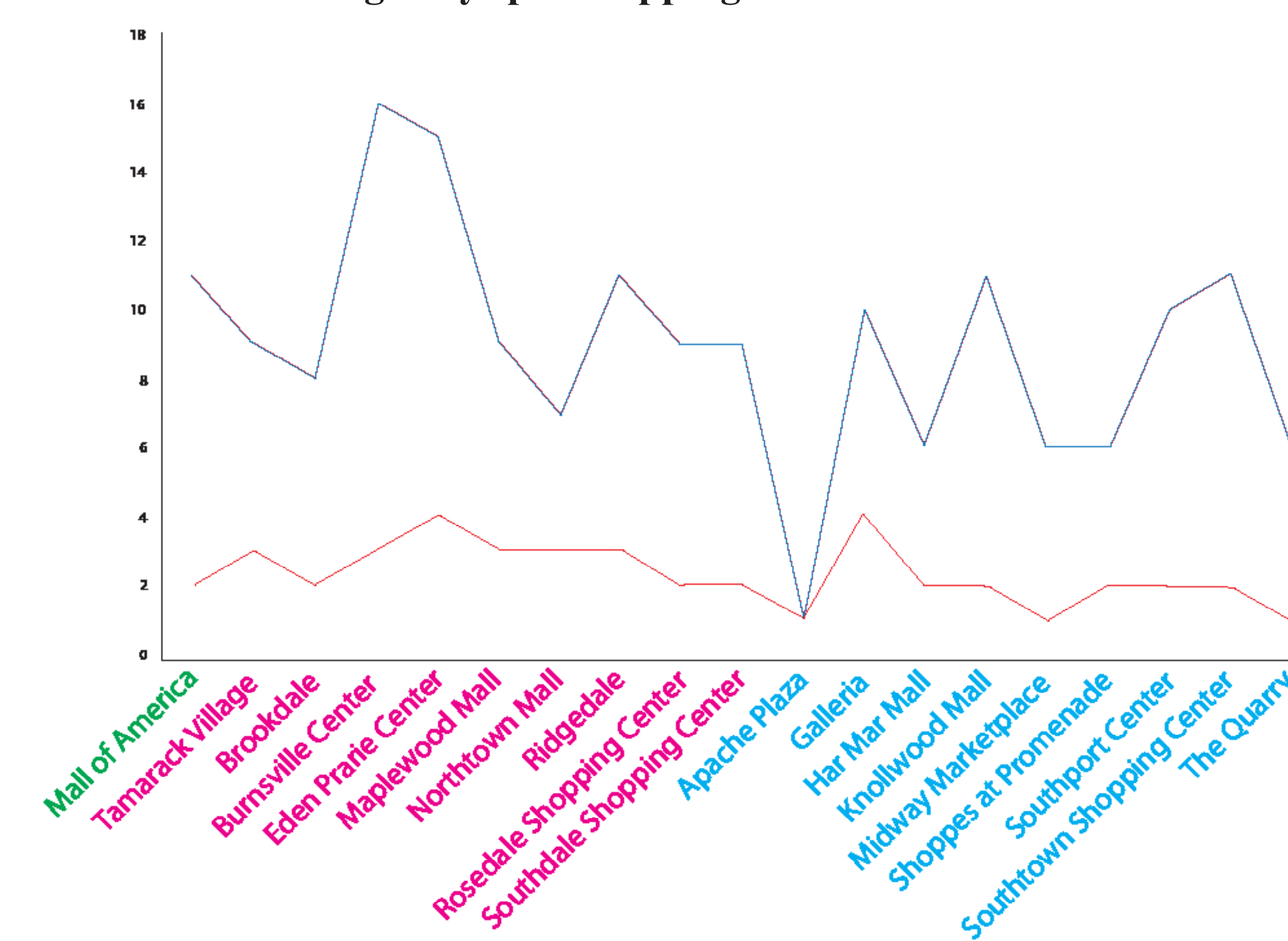
Conclusion

This study demonstrated a small sample of shopping centers in the metropolitan area of Minnesota. In reality, there are more than three sizes of shopping centers to distinguish from. To assess that there is an actual correlation between shopping center size and the amount of highways around them, more research would definitely need to be done. But for this specific location and study, there is evident that there are more highways located around larger shopping center.

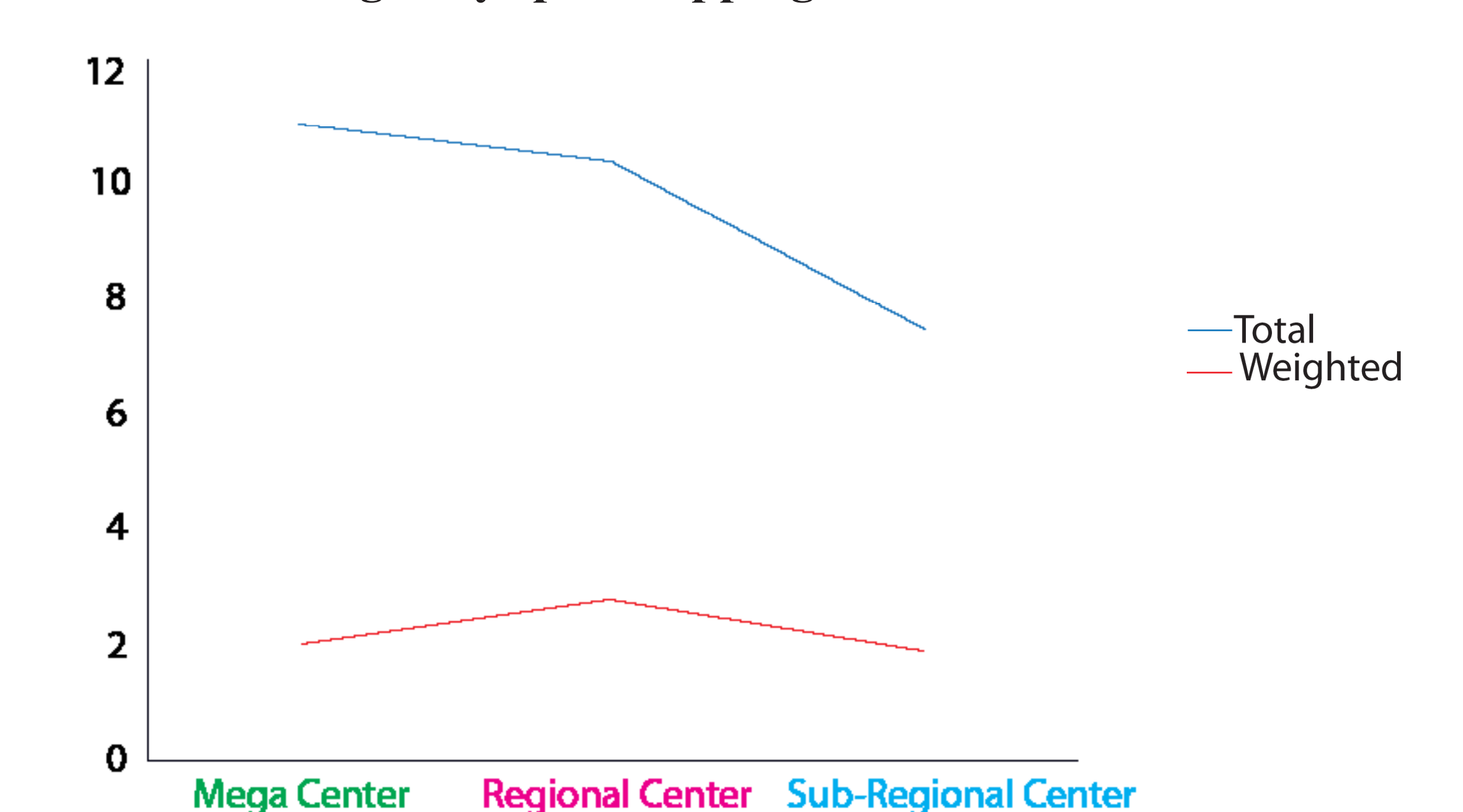
Thanks for spending time on my poster, if you have any comments or suggestion, contact me at Hoan0072@umn.edu

-Nhu Hoang

Number of highways per shopping center



Number of highways per shopping center size



Poster Created by: Nhu Hoang
 Email: Hoan0072@umn.edu
 For: GIS 5572, Advanced ArcInfo
 Date: Spring 2009

Data: All three map layers were obtained from www.datafinder.org
 Major Shopping Centers:
 Created by: Metropolitan Council
 Date: 1998

Major Highways:
 Created by: Metropolitan Council
 Date: 2008

Counties and Cities & Townships: 2000, Twin Cities Metropolitan Area
 Created by: Metropolitan Council, Dakota, Carver, et al.
 Date: 2000

Program: ArcGIS 9.3 (build 1770)
 Images of shopping centers:
 Taken by: Nhu Hoang
 Date: April 29 2009

