Geographic Information Systems Analysis of Red Lobster Restaurant in La Crosse, Wisconsin for the Creation of a Site Suitability Analysis Model

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Abstract

Surveying of clientele frequenting the Red Lobster restaurant in La Crosse, Wisconsin, was performed to identify key customer characteristics to aid in the determination of future restaurant placement. Geographic Information Systems (GIS) analyses and investigation of existing Red Lobster markets' physical and demographic attributes, coupled with clientele surveys and demographic census data, led to the production of very specific and highly accurate maps. These maps portray areas containing characteristics matching various analysis criteria leading to a potentially successful future Red Lobster location.

Introduction

In 1968, Red Lobster opened its doors for business in Lakeland, Florida (Red Lobster, 2005). Over three decades of continued success has resulted in hundreds of locations nationwide. One of these locations is in La Crosse, Wisconsin, and was the focus of this study. Red Lobster in La Crosse, Wisconsin has been conducting business for over 14 years. The clientele is drawn from a broad and diverse area that includes customers from as far away as Montana and New Mexico. The restaurant's close proximity to U.S. Interstate 90 makes it a highly trafficked area.

The main objective of this study was to collect primary data about existing Red Lobster restaurants and its customers. This data was used to perform multiple analyses. Using GIS, common characteristics of Red Lobster's clientele were identified and a site suitability analysis model was performed to recommend potential future Red Lobster locations. This study identified which demographic characteristics of Red Lobster's clientele help to determine the potential success or failure of a restaurant.

Expanding Industry in need of GIS

The United States has more than 844,000 dining establishments. This number is on the rise as people continue to spend more money on food away from home.

Food sales have risen from 4.5% in 1999 to 5.2% in 2000. In 2000, dining establishments sold $358 billion worth of food and drinks, excluding alcoholic drinks. In 2001, 47% of the money spent on food, was spent on food

away from home. By the year 2010 it is projected that dining establishments will capture 49% of the food dollar (Price, 2002). In an industry of this size that generates revenues of this magnitude, restaurants cannot afford to establish new stores in the wrong locations.

As the market becomes more saturated with dining establishments, lasting competitive advantages are of dire importance. While menu, service, atmosphere, management, and pricing remain major advantages, often they are short-lived. Location, on the other hand, provides a more long-term advantage. GIS can help facilitate that lasting competitive edge.

Utilizing GIS to identify clientele characteristics within target markets could potentially minimize the risk of expansion and also create an opportunity for ultra-efficient marketing and advertising strategies. By only targeting areas that contain "likely" customers, a restaurant could eliminate the majority of risk that is involved when opening a new location.

A study performed by Ohio State University discovered failure rates of restaurants in their first three years of operation were 59% for independent restaurants and 57% for franchised restaurants (American City Business Journals, 2003). With an average starting investment of $250,000 to $500,000 (Writers Write, Inc., 2005) and high failure rates, this industry has much to gain from GIS analyses.

In 2000, Red Lobster had just shy of $2.1 billion in sales. Although that amount is staggering, it constitutes a small portion of the $400 billion total restaurant sales in 2001 (Price, 2002). Red Lobster's utilization of GIS would result in capturing a larger percentage of dining revenue.

Given the extreme importance of target markets' to the success or failure of almost any business, an efficient and accurate method of identification has never been more essential. GIS technology can rationally and systematically save businesses' money by identifying potentially successful market locations.

GIS's ability to see through "'spatially tinted' spectacles, revealing the hidden geographical dimension to the wealth of data that retailers have access to" separates GIS from more traditional site suitability analysis (Bennison & Hernandez, 1998).

The range of abilities that GIS possesses at times only seems limited by the amount of data available. Regardless of which venture a business has chosen, possible GIS applications range from simple market mapping to customer profiling, and even to complex spatial modeling (Bennison & Hernandez, 1998).

Methods

Technology

The technology required for the conducting of this study was computer-based. To accomplish the goals of this study, ArcGIS 9.0 and the Spatial Analyst extension, ArcView 3.3 and the Geoprocessing Wizard and Spatial Analyst extensions, Microsoft Word and Excel, as well as the internet all played critical roles through out the entire lifespan of the project.

Projection

All data analyzed in this study was projected using the following projection:

Projected Coordinate System: USA Contiguous Lambert Conformal Conic
Projection: Lambert Conformal Conic
False Easting: 0.00000000
False Northing: 0.00000000
Central Meridian: -96.00000000
Standard Parallel_1: 33.00000000
Standard Parallel_2: 45.00000000
Latitude of Origin: 39.00000000
Linear Unit: Meter (1.000000)
Geographic Coordinate System: GCS_North_American_1983
Datum: D_North_American_1983
Prime Meridian: 0

This projection was decided upon specifically for this project. The projection best preserved the shape of the local geographic area being studied.

Data Acquisition and Manipulation

Data collected for this project was mostly primary. Initial elements were collected from the United States Census Bureau website (www.census.gov). Four shapefiles were obtained and they contained the Minnesota, Wisconsin, Iowa, and Illinois ZIP Codes (Figure 1). These shapefiles were then merged into one using the Geoprocessing Wizard in ArcView 3.3. This newly created shapefile contained all four states and acted as a foundational element for analysis within this study.

The other physical data component collected was the U.S Major Roads shapefile from ESRI. This shapefile contained all major roads throughout the entire United States. To make this data useable, it was clipped in ArcView 3.3 using the Geoprocessing Wizard. This process resulted in a major roads shapefile for the four-state area under investigation. A query was performed on the four-state roads shapefile to identify and select all interstates. Once selected, an interstate shapefile was created (Figure 1). This data allowed for an interstate proximity analysis.

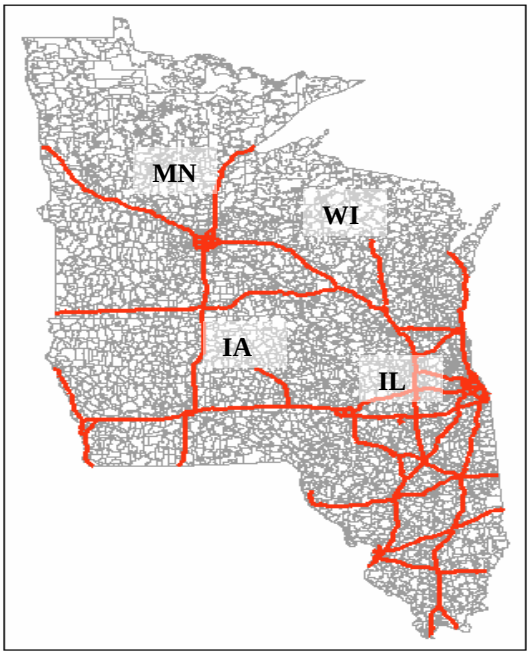

Figure 1. Shapefile of the ZIP Codes in Minnesota, Wisconsin, Iowa, and Illinois displayed with U.S. interstates.

Customer data was collected from a survey administered by the researcher. The survey was conducted at random to Red Lobster patrons at the La Crosse location. Understandably, Red Lobster limited the nature of the questions to protect guests' privacy. A total of 250 surveys were administered between November 1, 2004 and December 30, 2004.

The survey collected primary data from dining Red Lobster customers about broad demographic characteristics. These characteristics included: current residential ZIP Code, time traveled to dine at Red Lobster, desired location for a future Red Lobster restaurant, frequency of dining in a 4 month span, job classification, salary level, and also single or dual income (Appendix A).

Upon the completion of survey collection, all responses were entered into an Excel spreadsheet. Once all records were entered, the spreadsheet was converted into a database file, DBASE IV format. The database file was geocoded to a shapefile using the ZIP Code attribute (Table 1 and Figure 2).

Table 1. Sample of the records geocoded into the customer shapefile.

Zip Code	Travel Time	Customer Desired Location
54656	15-30	Sparta, WI
55987	30-45	Winona, MN
52172	45-60	Waukon, IA
60104	Less than 15	Maywood, IL

The next task was to prepare the survey customer desired restaurant location response for analysis. The customer desired restaurant location response was mapped into the ZIP Code area. To accomplish this, the United States Postal Service website (www.usps.com) was consulted. The ZIP Code locator allows users to enter a city and state, it then returns the ZIP Code of the users search (Table 2).

Table 2. Sample of ZIP Codes collected for the customer desired restaurant location survey question.

Customer Desired Location	State	ZIP Code
Tomah	Wisconsin	54660
Maywood	Illinois	60153
Northfield	Minnesota	55057
Dubuque	Iowa	52001

Collecting the ZIP Codes of all customer desired restaurant locations provided uniform data for ease of analysis. Next, a second shapefile was created based on the ZIP Code of the customer desired restaurant location (Table 2) for a future restaurant. This shapefile was also geocoded using the ZIP Code column in Table 2 (Figure 3).

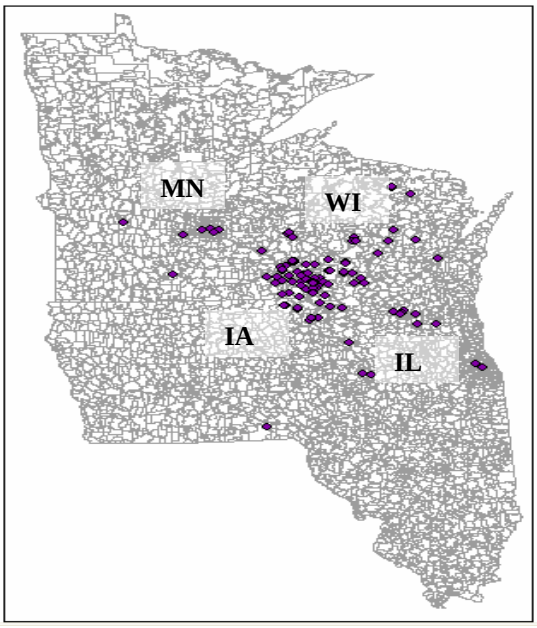

Figure 2. Customer shapefile geocoded by current residence ZIP Code.

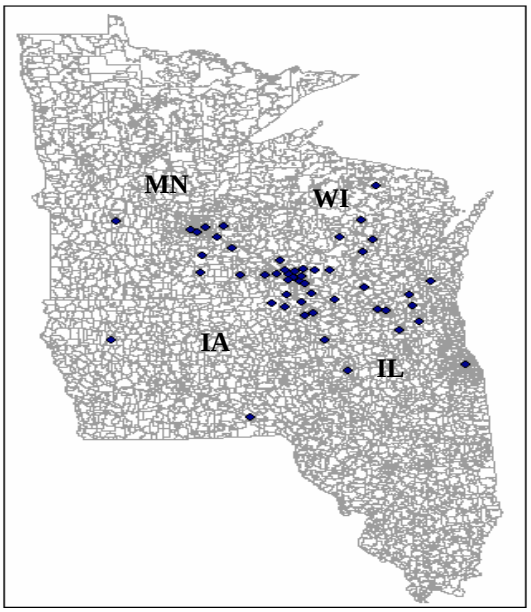

Figure 3. Customer shapefile geocoded by customer desired restaurant location ZIP Code.

Building a profile of existing Red Lobster locations in Minnesota, Wisconsin, Iowa, and Illinois meant first

locating all restaurants. To accomplish this task, the Red Lobster website (www.redlobster.com) was consulted. This site has a restaurant locator feature allowing users to enter a city and state, which triggers the return of all locations within a certain proximity of the entry.

To ensure that no locations were overlooked, an overlapping location search method was utilized. The information obtained was entered into an Excel spreadsheet and this included city, state, and ZIP Code (Table 3).

Table 3. Sample of the records collected for the Red Lobster current location shapefile.

City	State	ZIP Code
La Crosse	Wisconsin	54601
Bloomington	Minnesota	55431
Chicago	Illinois	60632
Davenport	Iowa	52807

Once all locations were entered into a spreadsheet, the spreadsheet was converted into a database file, DBASE IV format. The database then was geocoded into a shapefile (Figure 4).

The completion of data acquisition was realized after one final task. Elements were identified and mapped into the corresponding ZIP Code areas in order to build a profile of the current Red Lobster locations. The ability to identify the characteristics of successful, existing Red Lobster restaurants provided vital information for building a site suitability model.

The data this study was interested in obtaining dealt with food dollars spent away from home. Food away from home "includes expenditures for meals at restaurants, carry-out orders, food purchased on out-of-town trips, school lunches, and meals as pay" (University of Wisconsin-Milwaukee, 2005).

The data collected by each ZIP Code area included population and restaurant earnings (Table 4). This ZIP Code data was collected for both existing Red Lobster restaurant locations and also the customer survey customer desired restaurant locations.

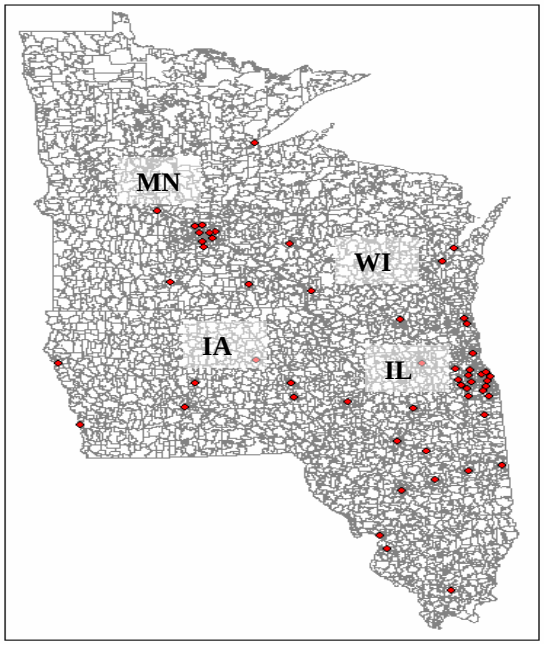

Figure 4. Red Lobster location shapefile geocoded by restaurant ZIP Code.

The University of Milwaukee Business Activity website (www.uwm.edu) was consulted to acquire the food away from home ZIP Code data. This data was acquired from a Consumer Expenditure Survey performed in 2002 by the University of Milwaukee. Multiple tables were derived from this data. These tables followed the same protocol for creation as the customer data tables.

Lastly, one additional element was desired to complete a Red Lobster restaurant profile. This study desired to create a dollars spent per person attribute in the profile. This data was not originally available, but was derived

from other data previously collected. To attain this data, the ZIP Code restaurant earnings (ZIP Earnings in Table 4) were divided by the population (Population in Table 4).

Table 4. Sample of the elements used to build a profile of current Red Lobster locations.

ZIP	ZIP Earnings	Population
54601	$24,867,560.00	48733
54701	$19,264,807.00	35765
53704	$27,956,347.00	43429
54915	$22,190,814.00	37795

The results provided data about the average number of dollars each resident of a ZIP Code was spending on food away from home (Table 5). This process was again performed using the same protocol on the customer desired restaurant location data from the survey.

Table 5. Sample of the annual dollars spent per person on food away from home within ZIP Codes that contain a Red Lobster restaurant.

ZIP	ZIP Earnings	Population	Spend Person
54601	$24,867,560.00	48733	$510.28
54701	$19,264,807.00	35765	$538.65
53704	$27,956,347.00	43429	$643.73
54915	$22,190,814.00	37795	$587.14

Data Analysis

The process of building the existing Red Lobster restaurants profile involved the creation of multiple grids. These grids were created using Tables 4 and 5 as the information source. The profile created was based on data from the ZIP Code block in which the restaurant was located. The data was not from the actual restaurant itself.

The objective of creating the Red Lobster restaurant profile was to identify "suitable" characteristics. The "suitable" characteristics were derived by analyzing the nine Equal Interval classifications that were created from each grid. A median density value was calculated for all grids. At least 28 of the 55 existing Red Lobsters' fell below the median value.

For this study, restaurant characteristics above the median value were considered useful for further analysis. These benchmark values were used to eliminate the values below the median of existing Red Lobster restaurant locations for each grid created. The remaining density values above the cutoff point were deemed as "suitable". The "suitable" densities were vital components in formulating the site suitability model.

A distance grid was created first. This grid portrayed the distance between Red Lobster locations (Figure 5) (Appendix B). A visual analysis of the distance grid revealed that, with the exception of metropolitan areas such as Minneapolis and Chicago, other Red Lobster restaurants were largely located between 24 – 48 miles from one another. The relevance of this grid to the site suitability model was the determination that future Red Lobster locations should be at least 24 miles from existing sites.

The next element that was analyzed through the creation of a grid was the ZIP Code annual restaurant earnings. This grid identified the levels of gross annual earnings restaurants obtained in ZIP Code areas that contained a Red Lobster restaurant (Figure 6) (Appendix B).

It was deemed for this study that ZIP Codes containing an annual restaurant earning density of $23,002.22 per square mile of the ZIP Code area or more were a "suitable" component of the site suitability model.

A grid containing the population density within ZIP Codes featuring a Red Lobster was also created (Figure 7) (Appendix B).

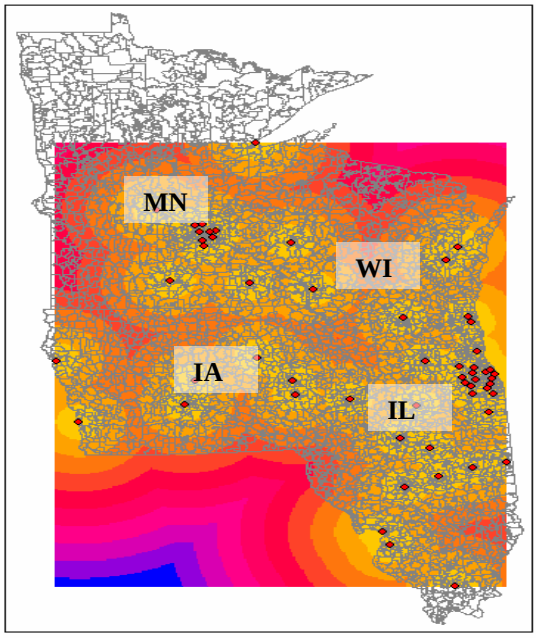

Figure 5. Red Lobster location distance grid. The light orange zone represents a "suitable" distance of 24 – 48 miles.

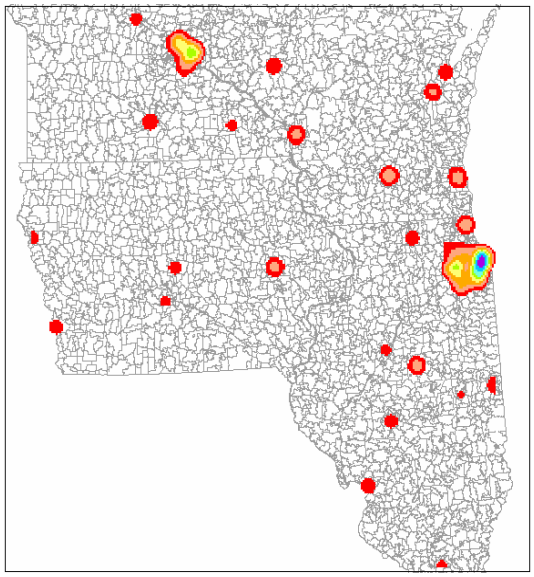

Figure 6. The grid of annual restaurant earnings within the ZIP Codes that contain a Red Lobster. The red areas contain the "suitable" restaurant earning density.

This presented the opportunity to investigate whether or not high-populous areas should be considered as part of the site suitability model criteria. ZIP Codes that contained a population density of 59.62 people per square mile of the ZIP Code area or more were considered "suitable" for the site suitability model.

The spending grid was the final grid created from the Red Lobster restaurant profile table (Table 5). This grid was the true measure of the success restaurants were having within each ZIP Code. The spending grid was derived from the number of dollars the average person spent annually on food away from home (Figure 8) (Appendix B).

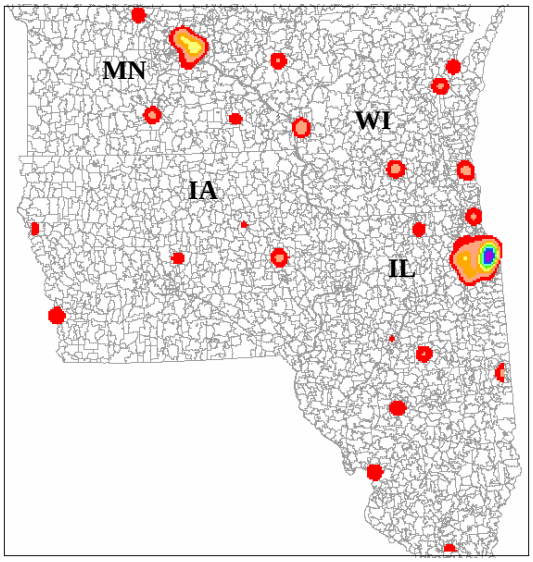

Figure 7. The population density within the ZIP Codes that contain a Red Lobster. The peach colored areas contain the "suitable" population density.

Regardless of population or income, this grid provided unbiased and accurate results as it depicted what each person was spending on food away from home. This grid was also not skewed by the higher gross earning densities that typically accompany more populous areas. It was determined that a spending

density of $614.16 per square mile of the ZIP Code area or more was considered "suitable" for the site suitability model.

The final grid created, which completed the Red Lobster profile, was a proximity to interstates grid. This grid depicted the distance that each Red Lobster was from the nearest interstate (Figure 9) (Appendix C). It was found that no existing Red Lobster was located more than 29 miles from an interstate and that only 3.63% existed more than 7 miles away.

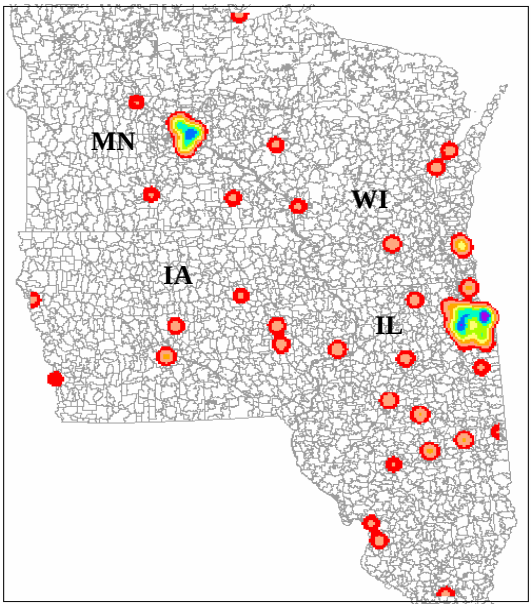

Figure 8. The spending density grid of ZIP Codes that contain a Red Lobster. The orange areas contain the "suitable" spending density.

With all of the grids created and the profile of current Red Lobster locations complete, similar analyses were performed on the customer data.

Elements for money spent on food away from home were collected for the ZIP Codes of the customer desired restaurant locations on the surveys (Table 6). Table 6 became the source of the analyses that were performed to identify areas that matched the "suitable" Red Lobster restaurant profile.

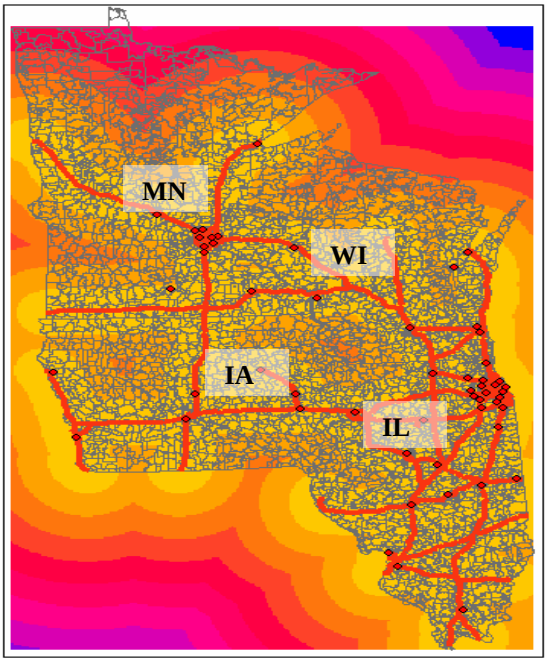

Figure 9. The interstate distance grid. The yellow area represents the "suitable" 0 – 29 mile zone.

Table 6. Sample of the records used to match the "suitable" Red Lobster profile.

ZIP	ZIP Earnings	Population	Spend Person
50588	$5,426,033.00	12215	$444.21
52001	$21,511,905.00	43965	$489.30
52101	$6,443,263.00	13752	$468.53
52172	$2,981,984.00	6290	$474.08

The process of identifying areas that matched Red Lobster's profile again began with the creation of grids. The grids were created and had the same Equal Interval classifications of density. The densities that were greater-than or equal-to the "suitable" densities were the areas that matched. These areas were used were used for the site suitability analysis.

The first grid created was the ZIP Code earnings for the customer desired restaurant location from the survey

(Figure 10) (Appendix C). Next, the customer desired restaurant location, ZIP Code population density grid was created (Figure 11) (Appendix C).

The final grid created from the customer data was the customer desired restaurant location, spending density grid (Figure 12) (Appendix C). This grid again depicted what the average person spends annually on food away from home.

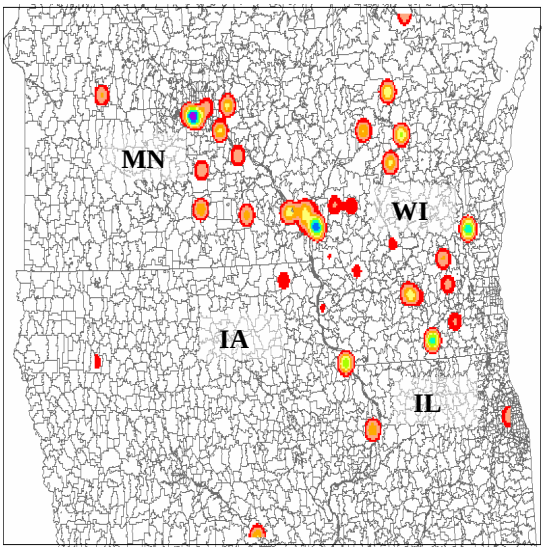

Figure 10. The customer desired restaurant Location and ZIP Code restaurant earning density grid. The peach colored areas contain the restaurant earning density that matched the "suitable" density.

With all customer desired restaurant location grids complete, a detailed map query in ArcView 3.3 was performed. The Spatial Analyst extension was used to execute the map query. The map query utilized the restaurant location, ZIP Code grids and interstate distance grids. Using the "suitable" profile that was created for existing Red Lobster locations, this study was able to identify locations that look promising for future Red Lobster restaurant sites.

Results

Site Suitability Analysis Model

Based on the data collected from the Consumer Expenditure Survey, the United States Census Bureau, and the customer survey' an in-depth analysis was performed on existing Red Lobster locations. Identification of current Red Lobsters' profile and the characteristics customers in the customer desired restaurant areas possess were the keys to building not only a successful, but also a replicable site suitability model. With the ability to collect primary data and supplementary census and consumer expenditure data, "suitable" location areas were identified utilizing ArcGIS 9.0, ArcView3.3, and their Spatial Analyst extensions.

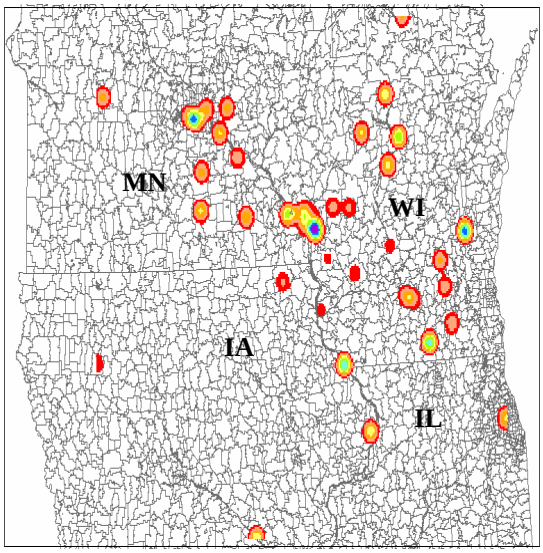

Figure 11. The customer desired restaurant Location and ZIP Code population density grid. The orange areas contain the population density that matched the "suitable' density.

The results found that a total of 11 areas matched the profile derived from the existing Red Lobster restaurants (Figure 13) (Appendix D). The Red Lobster ZIP Code profile that

these areas matched included the following attributes:

- Distance from an existing Red Lobster restaurant greater than 24 miles
- Restaurant Earning Density greater than $23,002.22 per square mile of the ZIP Code area
- Population Density greater than 59.62 people per square mile of the ZIP Code area
- Spending Density greater than $614.16 per square mile of the ZIP Code area
- Distance away from an Interstate of less than 29 Miles

Based on the criteria this study used, all 11 of these locations should theoretically support a Red Lobster restaurant.

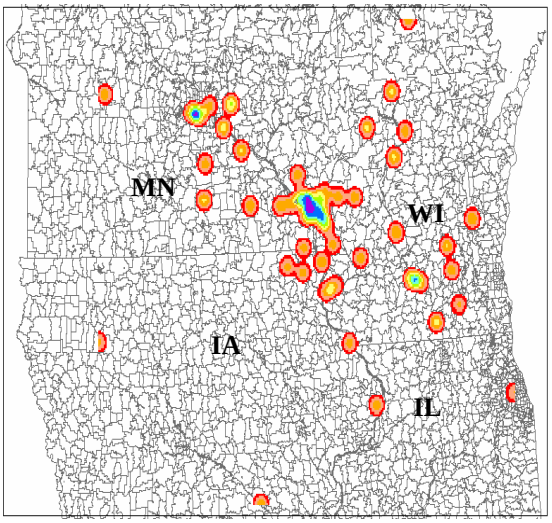

Figure 12. The customer desired restaurant Location and ZIP Code spending density grid. The orange areas contain location spending density that matched the "suitable" density.

Survey Analysis

The ability to incorporate customer survey information allowed for one additional component to be added to the site suitability model. This was the identification of clientele characteristics and opinions, as determined by customer survey responses.

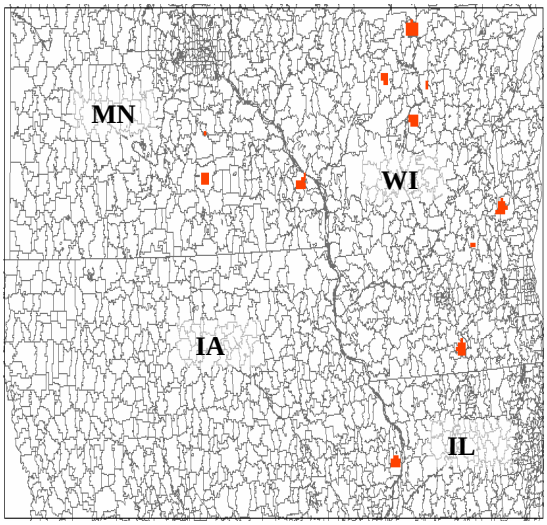

Figure 13. Grid of areas that matched the existing Red Lobster's "suitable" profile.

To accomplish this final analysis, the survey data was again consulted. One last additional grid was created based on the number of selections that each ZIP Code received from survey participants (Figure 14) (Appendix D). The final analysis likely was affected by customer bias. The survey data used for this analysis could have been influenced by a large number of customers drawn from a single area.

Locations that received at least 2 selections of different ZIP Codes within a 26 square mile area had a customer desired restaurant location density that was deemed high. The Customer desired restaurant location density grid was analyzed in conjunction with the matching areas grid to identify which of the 11 locations best fit the site suitability model.

After completion of the final query only one location met all the "suitable" criteria of the site suitability model. An area within the Winona,

Minnesota ZIP Code was the single best location using the parameters of this study (Figure 15).

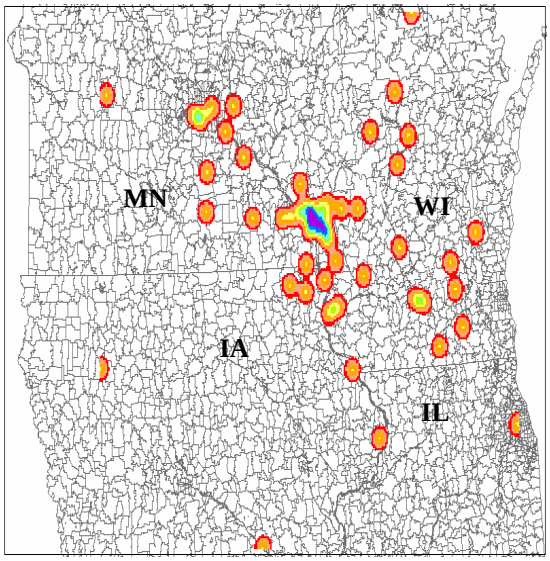

Figure 14. Customer desired restaurant location ZIP Code density grid. The green areas contain the desired value that matched the "suitable" density.

Figure 15. Area next to Winona, Minnesota, that was "suitable" after the site suitability analysis was performed.

After the discovery of the Winona, Minnesota location, the attributes of the people that live within that ZIP Code as well as those survey participants who nominated it on the survey were investigated. A total of 40 out of the 250 (16% of surveys) fit this description. Nearly 1/5 of all customers surveyed had a response that involved Winona, Minnesota.

From the 40 responses of those recommending or living within Winona, Minnesota, it can be inferred that Red Lobster's primary clientele possess the following characteristics:

- Are willing to travel an average of 37.88* minutes to dine at Red Lobster
- Dine at Red Lobster an average of 2.4* times in a 4 month span
- 51.7% have a single income, 48.3% have dual incomes
- 55% have professions considered to be white collar, 25% are retired, 15% have professions considered to be blue collar, and 5% are students
- Have an average annual household income of $45,937.50*

(*Note: These numbers were derived by taking the median value in all range questions. Example: if the range was 2 - 4, a value of 3 was used for analysis.)

Conclusion

The objectives of this study were to identify key characteristics of primary clientele as well as to develop a site suitability analysis model for Red Lobster. The ability to complete both these objectives gives any business a very powerful marketing tool.

In the instance of this study, inferences can be drawn from the data collected to represent much larger populations. Red Lobster could utilize GIS in many of the same applications as this study. This study collected characteristics about one Red Lobster's clientele. The more in-depth and specific the data, the more accurate the products of the analysis will be.

The limitations of this study deal primarily with data sensitivity, collection, and formulation. The general nature of the survey data only allowed for a broad customer profile to be established. While ZIP Codes functioned adequately for locating customers and restaurants, more specific data levels are available if given the opportunity. The survey itself had responses left blank by participants for various, unknown reasons.

Red Lobster's ability to apply this information to future site suitability models could prove to be invaluable. Not only would Red Lobster know exactly what kind of market they sought, they could identify the type of clientele to target within that market. Once a potential clientele base is identified, both marketing and advertising applications could be strategic, customized, and efficient, increasing the chances that a new restaurant will succeed.

Acknowledgements

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References

American City Business Journals Inc. 2003. Study: Restaurant Failure Rate Lower than Thought. Retrieved March 15, 2005, from http://boston.bizjournals.com/baltimore/stories/2003/09/08/daily23.html

Bennison, D., Hernandez, T. 1998. Explaining Retail GIS. Retrieved March 15, 2005, from http://indigo.ie/~issprs/pdfs/sils_5.pdf

Price, C. 2002. Food Service. Retrieved March 15, 2005, from http://www.ers.usda.gov/publications/aer811/aer811f.pdf

Red Lobster. 2005. Retrieved August 9, 2005, from http://www.redlobster.com/

University of Wisconsin-Milwaukee. 2005. ETI Purchasing Power, Business Activity, and Workforce Density Profiles for All Residential ZIP Codes in U.S. Retrieved August 2, 2005, from http://www3.uwm.edu/Dept/ETI/Etizip.cfm

Writers Write Inc. 2005. New Magazine Targets Restaurant Startups. Retrieved March 15, 2005, from http://www.writenews.com/2004/072304_restaurant_startup.htm

Appendix A. The survey that was used to gather Red Lobster restaurant clientele data.

Hello, my name is Andy. I am conducting this survey as a part of my graduate research project. I am currently in the process of obtaining my Master's degree in Geographical Information Science (GIS) from Saint Mary's University. Simply put, GIS combines layers of data and projects them into highly specialized and accurate maps. My goal is to produce a map that essentially identifies Red Lobster's clientele. Your participation in this survey is entirely voluntary, and also is GREATLY appreciated. I sincerely thank you.

Directions: Answer questions to the best of your ability, then seal in the provided envelope. (All participants and their responses will remain completely anonymous)

1) What is the zip code at your current residential address?
Answer:

2) What is the maximum amount of time, in minutes, that you are willing to travel to come and dine at this Red Lobster? (Please circle the answer that best fits your response.)

A) Less than 15 min. B) 15-30 min. C) 30-45 min. D) 45-60 min. E) More than 60 min.

3) If you could choose, where would you like to see a future Red Lobster built? (ie: a city or a general location)
Answer:

4) In a 4 month span, on average, how often do you dine at this Red Lobster? (Please circle the answer that best fits your response.)

A) 0-1 time(s) B) 2-4 times C) 5-7 times D) 8-10 times E) 11 times or more

5) Please indicate what you would classify your job as. (Please circle the answer that best fits your response.)

A) Blue Collar (ie: factory, construction, service industry)
B) White Collar (ie: business, professional, technical)
C) I am retired
D) I am currently unemployed / between jobs
E) I am unsure of my job classification (please indicate job if this is the case)_____

6) *OPTIONAL:* Please circle the range, in dollars, in which your yearly income falls. (If you are currently unemployed or retired, please indicate the yearly income of your most recent job)

Less than 25,000 25,000-50,000 50,001-75,000 75,001-100,000 More than 100,000
*******Please circle: single income or dual income

Disclaimer
This survey is being conducted independent of Red Lobster and Saint Mary's University. All participants and their responses will remain completely anonymous. The results will be used to formulate a graduate research project. Participants will not be contacted or solicited in anyway as a result of participating in this survey.

Appendix B. Grids used to create the Red Lobster restaurant site suitability model.

Figure 5. Red Lobster location distance grid.

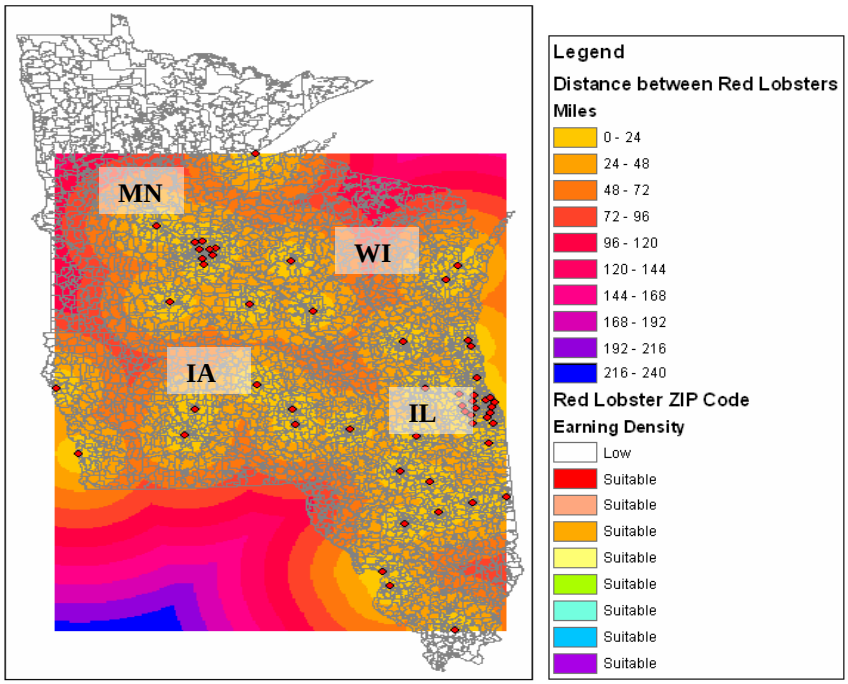


Figure 6. The density grid of annual restaurant earnings within the ZIP Codes that contain a Red Lobster.

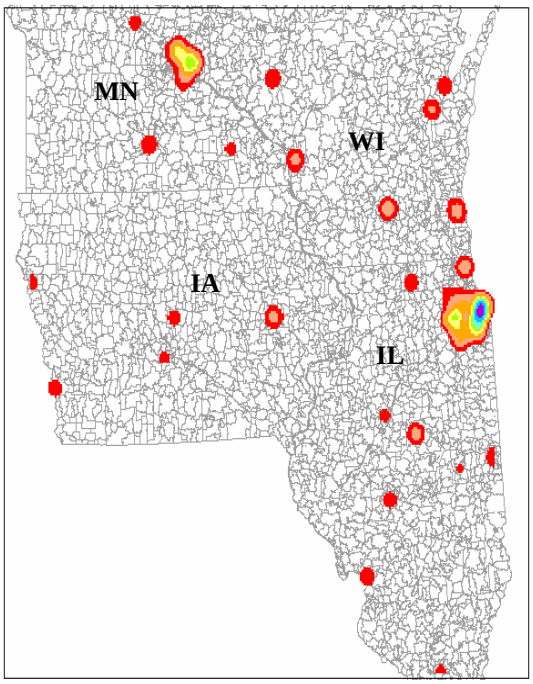


Figure 7. The population density within the ZIP Codes that contain a Red Lobster.

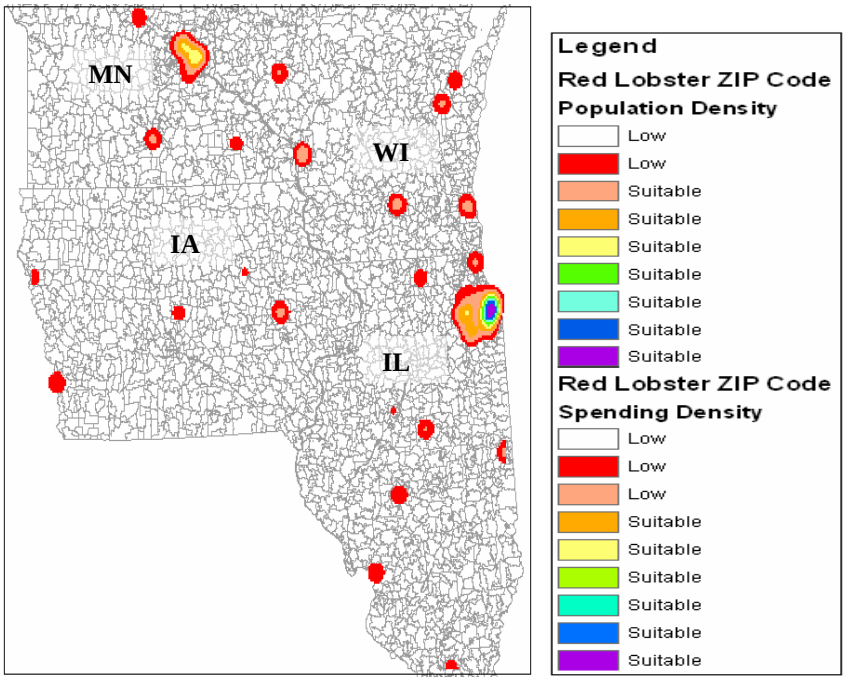
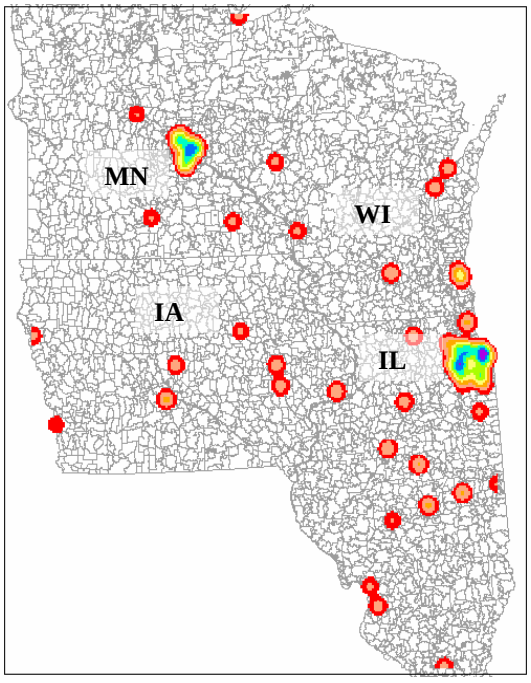


Figure 8. The spending density grid of ZIP Codes that contain a Red Lobster.



Appendix C. The final grid used to create the Red Lobster restaurant site suitability model (Figure 9) and three customer desired restaurant location grids used for analysis.

Figure 9. The interstate distance grid.

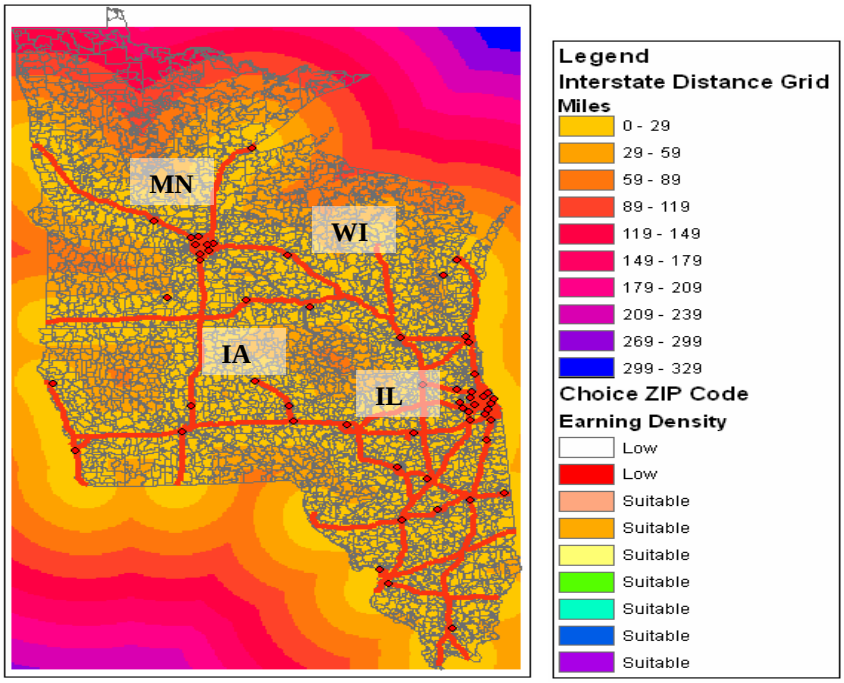


Figure 10. The customer desired restaurant location, ZIP Code

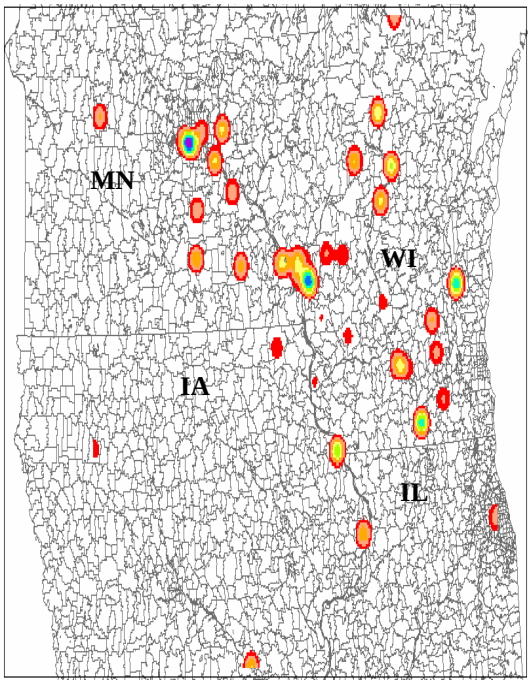


Figure 11. The customer desired restaurant location, ZIP Code population density grid.

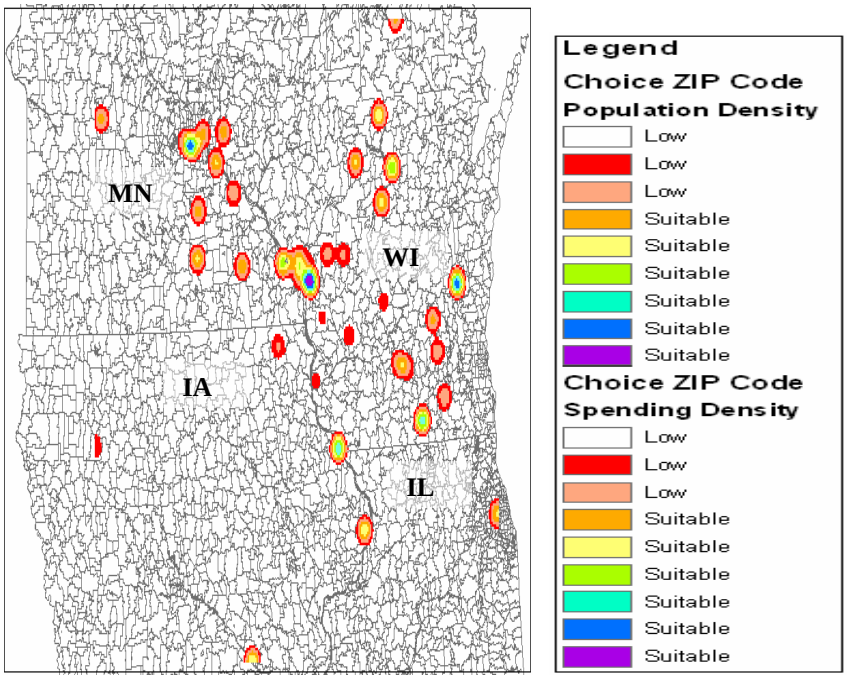
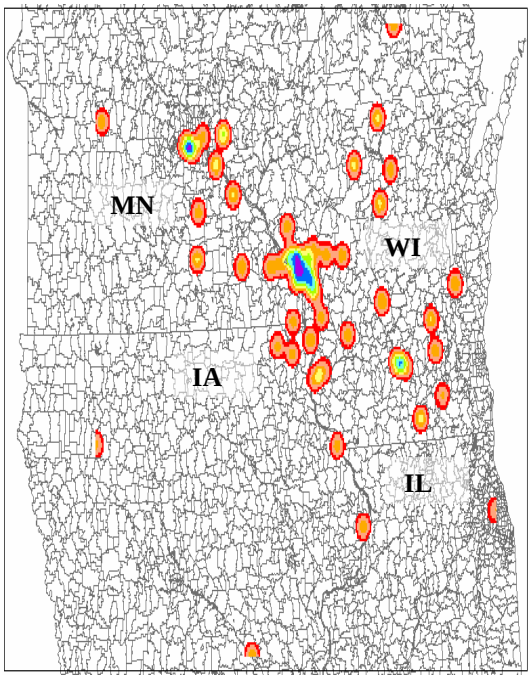


Figure 12. The customer desired restaurant location, ZIP Code spending density grid.



Appendix D. The final output grid of the site suitability analysis and also a grid depicting the density at which each customer desired restaurant location was chosen.

Figure 13. Grid of areas that matched the existing Red Lobster's "suitable" profile.

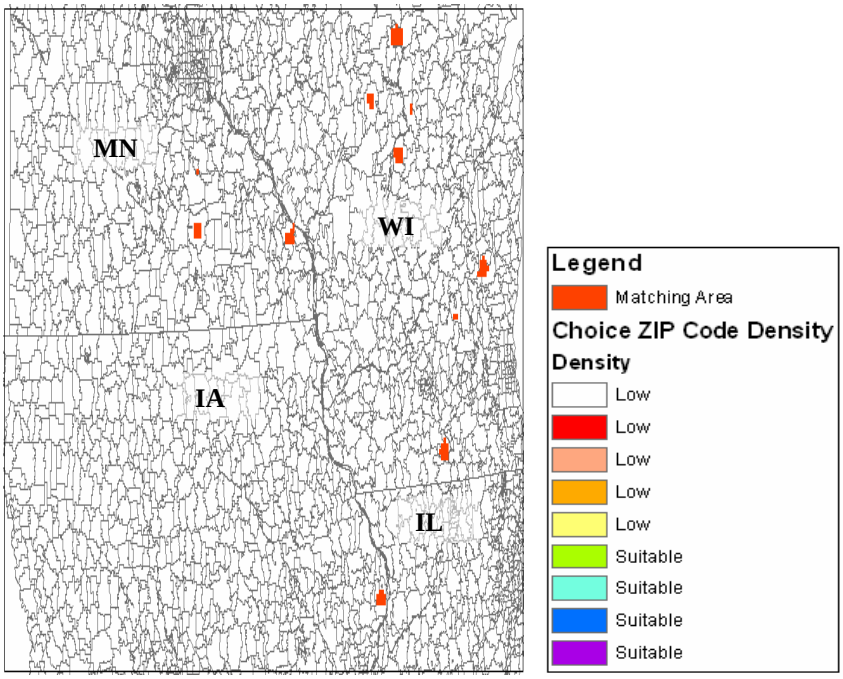


Figure 14. Customer desired restaurant location ZIP Code density grid. The green areas contain the choice density that matched the "suitable' density.