A GEOGRAPHICAL ANALYSIS OF THE IMPACTS OF POPULATION ON U.S. GOLF COURSE CONSTRUCTION, 1989-1995

By

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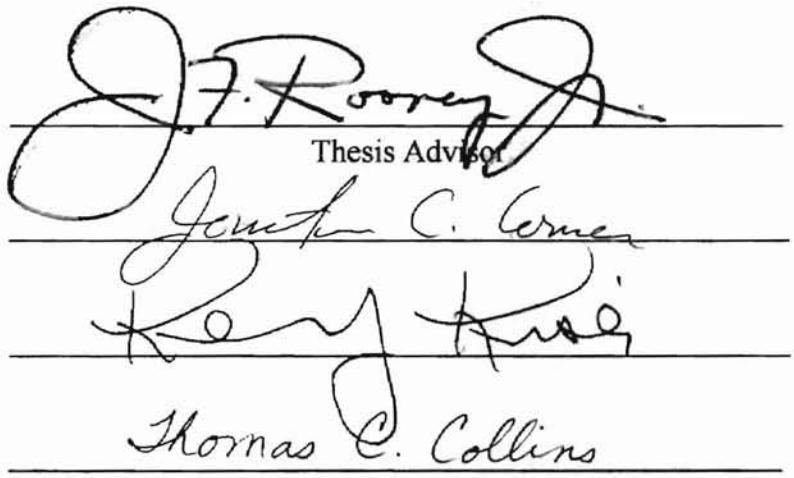

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CHAPTER I

INTRODUCTION

Golf was enormously popular in the British Empire during the 1880's and it was just a matter of time before the game's popularity caught on in the United States. Golf was played in the United States before 1888, but that was the year that the first American golf club was organized. Its name was St. Andrews Golf Club.

The first course was laid out in the pasture of one of the original members. It had three holes. From there the course was moved to a 30-acre pasture where six holes were constructed. Another move was made to an apple orchard on Palisade Avenue, after which the golfers became known as the "Apple Tree Gang". Not long after that, the club made another move on May 11, 1894, to Grey Oaks, where they laid out nine holes and had twenty members. In August of 1897 the club made its final move to Mt. Hope in Westchester County, New York.

Once golf caught on in the U.S. it flourished. Although the majority of courses were located in the eastern United States early on, there were over 1,000 courses in the U.S. by 1900. It also saw great growth in the 1920's. But the emergence of the PGA Tour in the 1950's and '60's was a key factor in the rise of interest in golf. The play of such professionals as Arnold Palmer, Jack Nicklaus, and Lee Trevino increased golf's exposure and popularity. The number of facilities being constructed jumped dramatically in the '60's, the period when Palmer dominated golf.

Presently, areas that have the highest levels of participation include the Midwest

and the Northern Midwest as compared to the rest of the nation. These areas have always enjoyed high participation rates since the start of golf in the U.S. At first glance, many believe that golf is a warm weather sport that thrives only in mild climates with the accessibility of plush resorts. But, as Rooney and Adams (1989) demonstrated, golf has several distinct regions and each region has its own history in relation to golf, as well as varying participation rates.

The geography of sport is concerned with the regional variations in the games people play and are identified with. It is also concerned with the amount of emphasis that characterizes these games in different areas (Rooney, 1974). Sports geography has become a popular new discipline. The extreme influence that sports has in America, and the big business that sports have become, has solidified the place of sports geography in today's society. The nature of golf makes it a game that can be successfully and effectively examined geographically.

Problem Statement and Hypothesis

This study will utilize the concepts and idealogies of sport geography to determine the impacts of population on course construction from 1989 to 1995. The hypotheses that I will examine within this study are:

1) There is a correlation between population growth and golf course facility growth.
2) Growth occurred in states with the highest number of people per hole to alleviate shortage.

Justification of Research

Early works by sport geographers like John F. Rooney and John Bale demonstrated the effective combination of geography and sports. Today, with sports being the multi-billion dollar business that it is, the geographical awareness in sports is allowing many to prosper in the sports field. Likewise, golf has become one of the largest money generating sports with more money being spent on golf per year than any other sport. This kind of growth and the spread in the popularity of the game demonstrate the need for more facilities for more types of players.

A perfect example of the spread in the popularity of the game of golf and the need for sports geography principles to be applied is the fellowship program between the New York Times Company Magazine Group Sports and Leisure Division and Oklahoma State's geography department, and specifically John F. Rooney. The New York Times company publishes Golf Digest, Golf World, and Golf Shop Operations. This fellowship allows graduate students within the department to work with the New York Times in the development of the Database of Golf in America. It is the goal of the Database of Golf in America to track the expansion and development of all the golf courses in the U.S., existing and new. It is from this vast database that I will be able to gather a large portion of my data to include in the study.

CHAPTER II

LITERATURE REVIEW

The literature review will begin with a background discussion on the geography of sport. In particular, topics discussed will include the various sporting regions throughout the United States, golf's regions in the U.S., as well as the geography of golf will be addressed.

Sports Geography

Geography is a discipline concerned with the relationships between places and their spatial arrangement and organization on the earth's surface. Simply put, geography investigates the question of why things are located where they are. The subdiscipline of sports geography analyzes the sports and games that people play and identify with. It also looks at the geographical areas in which these games are played and how these areas characterize respective sports.

Perhaps the most influential person in the field of sports geography has been Dr. John Rooney of Oklahoma State University. The Geography of Sport (1974), was the first significant work on the subject of sports geography and introduced many to the concept of Sports Geography. It analyzed spatial behavior and locational analysis within the realm of sports in the U.S. In his book, Rooney illustrates the effectiveness of applying geography to the sporting world and its various aspects. The book discusses the origins and diffusion of different games and their players, different areas across the U.S.

and the games that are influential in each region, and also the effects that the sporting culture has had in America. The result of this book has been a dramatic rise in the interest of sport geography.

Another book written by Rooney, The Recruiting Game (1980 and his revised edition in 1987), analyzes the act of intercollegiate recruiting over a span of thirty years. This work looks at the business of recruiting athletes in major college football and basketball. It gives a spatial look at recruiting in intercollegiate athletics. The spatial perspective had never been looked at in recruiting before. The book shed new light on how recruiting is done and where the greatest numbers of athletes come from in the respective sports. It explains how the business of recruiting has changed over such a short time because of the competitiveness of college sports and the development of college athletics into big business.

Recruiting has become the lifeblood of any college athletic program. The recruitment of the best athletes possible mean national exposure and success for each athletic team. Success means national exposure. This, in turn, generates greater revenue for the school and, almost always, the coaches prosper as well through various way, like shoe contracts and television shows. Rooney's work illustrates the spatial variation in areas throughout the nation and identifies different "hot spots", or areas that are known to produce quality athletes in football and basketball. For example, Rooney's work shows that areas of the Northeast such as Ohio and Pennsylvania are known to produce great football talent, while in the Midwest, Illinois and Indiana have long been known for their production of basketball talent.

In Sports Geography (1988), Bale describes his motivation for writing his book. He believes that the book seeks to fill a gap in sports studies literature and is an initial attempt to draw together the principal foci from the existing literature on the geography of sports. He notes that his work included over a decade of academic involvement in the geographical aspects of sport and a lifetime's activity as a sports enthusiast and participant.

Bale used to use sports examples in his geography lectures. He found that using sports examples grabbed the attention of his students and made them more interesting. It was then that he thought that sports was worth studying in its own right and that sports' geographical dimensions did provide special insights not included in any of the other disciplines.

Bale believes that there are five approaches to the study of sport geography. The first is to identify temporal and regional variations in different sports attributes. These variations include diffusion of sports, innovations in sports, and the variations in the production of players, as well variations in fan regions.

The second approach as defined by Bale is the concentration of the migration pattern of elite athletes. One of the topics that Bale focused on was the migration of elite student athletes form foreign countries to universities in the United States.

The third approach involves the locational dynamics to sport club relocation. Sports activities in the future and the locations in which they will thrive is discussed. Bale mentions the fact that non-geographers frequently apply statisitcs and mathematics in their work, enabling them to predict these future sports locations.

The fourth of Bale's approaches is the external and multiplier effects of sports. Bale mentions that this area is worthy of further research and includes that studies that conceptualize the areas over which sports-induced studies are felt as externality fields should be included as well.

The fifth and final approach that Bale mentions is to recognize a more humanistic and cultural-geographical perspective focusing on sport and the cultural landscape. This highlights the effect of sport on the cultural environment and the experiences that sports create.

The approach of Bale's that would probably be the closest in theory to the work in this study is Bale's first approach. The different regions and the vast differences between these regions are what make golf unique. All of the characteristics mentioned by Bale in his first approach fit into the make up of golf.

In 1992 Rooney and Pillsbury's work Atlas of American Sport furthered the literature on sports and its relationship to geography. This work documents the history and progress on 74 sports and activities that are in America today. It includes everything from the major widespread sports of basketball, football, and baseball to the lesser known sports and activities like curling and handball. Over two hundred maps illustrate the areas that each sport calls home. Numerous charts and graphs have participation numbers and the progress that each sport has experienced. Rooney and Pillsbury analyze how sports has affected our society in America. The history of American sports as well as topics including sports and the media and sports in the community are included.

The second major section to the Atlas of American Sport breaks the U.S. into

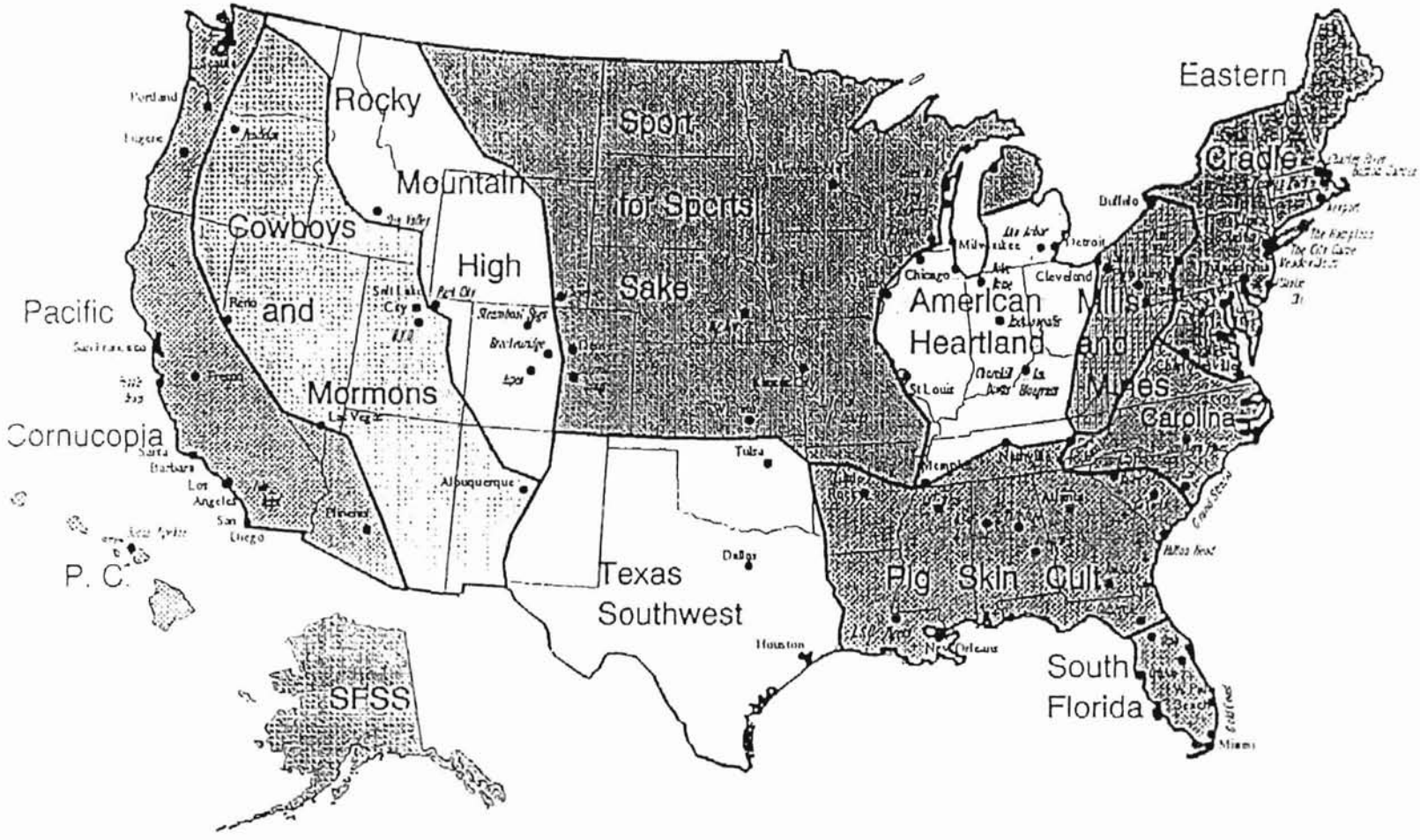

Figure 1. American Sports Regions

Source: Rooney and Pillsbury, 1992

eleven different sports regions. Each region has a title that gives it a sporting identity relative to the area. The different regions listed are: Sport for Sport's Sake, American Heartland, Rocky Mountain High, Pacific Cornucopia, Cowboys and Mormons, Eastern Cradle, Mills and Mines, Pigskin Cult, Carolina, Texas Southwest, and South Florida. The atlas reveals the different sports and activities that are indigenous to each respective region which are illustrated in Figure 1. (Rooney and Pillsbury, 1992)

The final major section to the atlas outlines each sport in the U.S. A brief history along with current data and maps for each sport are provided.

Golf Regions in America

Regions specific to golf have also been developed. Rooney and Adams (1989) developed these golf regions based on several factors. Examining the national distribution of golf holes, per capita accessibility, and the ratio of public versus private courses creates seven different golf regions in the United States. The seven regions as defined by Rooney and Adams are the Northern Heartland, Megalopolis, the South Atlantic, the Plains, the West, Pacific +, and the Southern Void (Figure 2).

The Northern Heartland region is the area of the U.S. where the game of American golf originated. Nearly forty percent of the nation's golf holes are located within this region. Public golf is abundant nearly everywhere allowing anyone to play. The cities in this region are also known as being the best served cities in terms of golf of any metropolitan areas in the country. (Adams and Rooney, 1989)

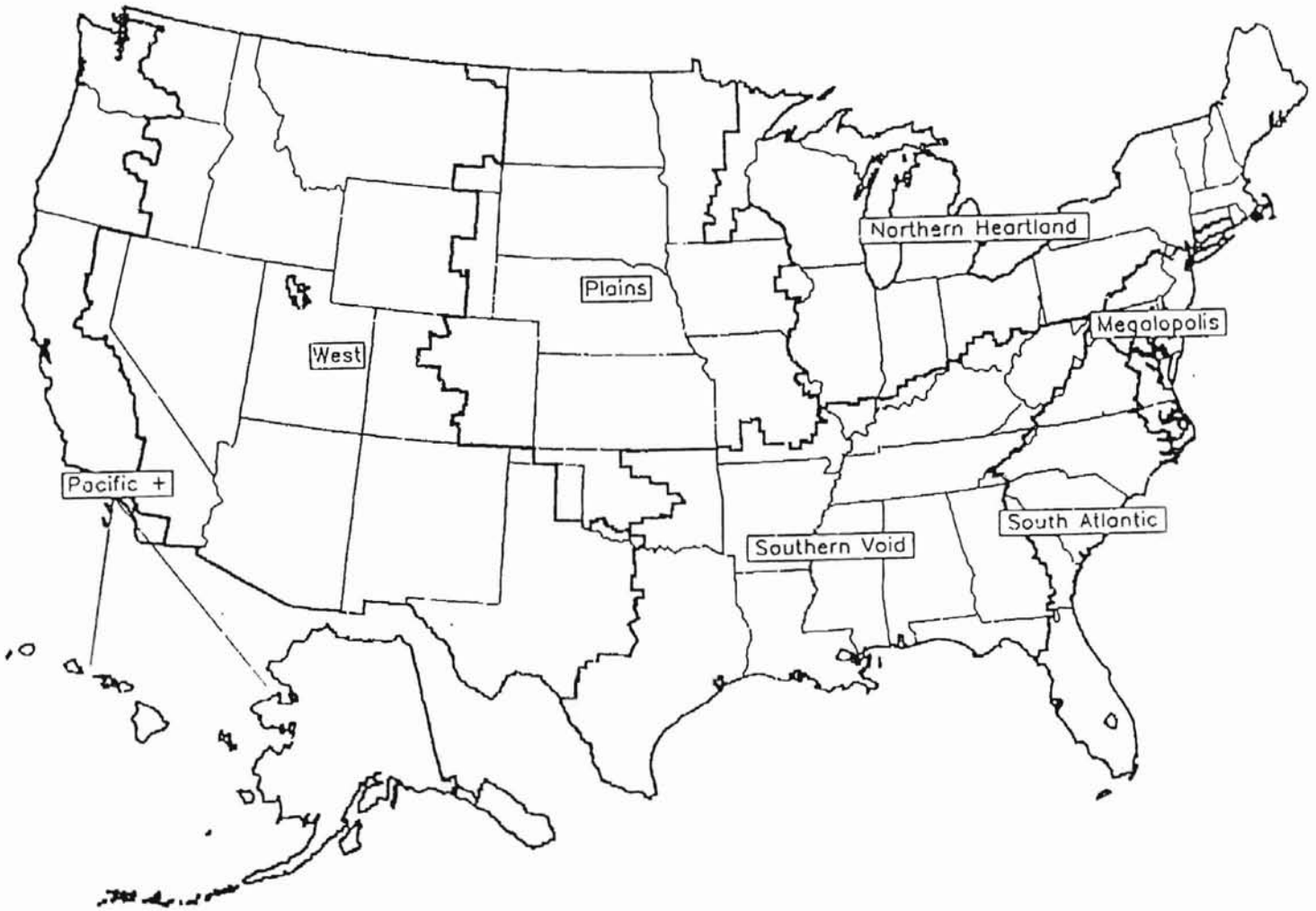

Figure 2. United States Golf Regions

Source: Adams and Rooney, 1989

Megalopolis is the most densely populated region in the country. A great deal of the Megalopolis region has a strong association with the early stages of golf in this country. Cities in New Jersey, along with New York City and Philadelphia were early golf centers. But the vast population growth and urbanization of these areas has hindered golfers.

Despite its early roots in the realm of American golf, the Megalopolis region is the worst served region in the country today. Availability of golf holes per 100,000 population is only 45 holes, and that number drops even more in metropolitan areas. Golf has simply not been able to compete with other land uses because of high population numbers and the high price of land. (Adams and Rooney, 1989)

The South Atlantic region has experienced rapid growth in population and tourism. It has been aided by the leisure revolution, younger and wealthier retirees, abundant and cheap air travel, and second home development (Rooney and Adams, 1989). The South Atlantic region became the premier golfing region in the U.S. when its rapid growth took place during the golf participation and facility boom in the 1950's.

The South Atlantic boasts some of the finest resorts in the country. Hot Springs, VA, Pinehurst, N.C., Myrtle Beach and Hilton Head, S.C. are golf-oriented resorts and retirement communities found outside of metropolitan areas. Access to golf is the highest in the South Atlantic of any region in the country.

The Plains region also has a very high participation rate. This occurs particularly in the region's nonmetropolitan areas, where half the region's population resides. But unlike the South Atlantic region where a great deal of the golfing population consists of

tourists vacationing at resorts, the Plains region's players are mostly local. The high participation rates are followed by an equally large number of holes per 100,000 persons. But this high number of holes per 100,000 does not adequately reflect the large degree of accessibility. Because small nine hole courses dot the landscape in the Plains region, courses are readily accessible to most people. In fact, over three quarters of golfing facilities in this area are of this variety and generally serve small to medium sized population clusters. (Adams and Rooney, 1989)

The West region is characterized by low population densities with large urban centers scattered about. The southern half of the West region has become known as popular resort area for vacationers and tourists. The Phoenix, Scottsdale, Tucson, and Palm Springs area are the major destinations for these types of golfers. The transient golfer has even made such places like Vail and Sun Valley resort islands of golf availability (Rooney and Adams, 1989).

The Pacific region is very similar to Megalopolis because of the low availability of golf facilities. California alone has ten of the worst served metropolitan areas in the country. Metropolitan areas in the West contain an abundance of wealthy private clubs that have long waiting lists and public courses that are severely overcrowded. (Adams and Rooney, 1989)

The Southern Void region is widely known for its lack of availability to golf. This region has over one third of the nation's worst served metropolitan areas. There are very few public golf courses available to the public. Less than forty percent of the region's counties contain a public course and several counties have no courses at all.

The facilities that do exist in the Southern Void are predominately private clubs.

Golf has never been high on the sports menu in this region. This area is best known for its football. It must compete with hunting, fishing, and auto racing at the individual level in this male oriented sports society. Also, golf has long been thought of as elitist, which include economic, social and racial discrimination. This connotation, along with high rates of poverty, has slowed the growth of golf in this region. (Adams and Rooney, 1989)

CHAPTER III

DATA SOURCES

The main objective of this thesis is to examine the impacts that changes in population have had on golf course facility growth in the United States for the period beginning in 1989 and ending in 1995. The new construction activity in this time frame will be compared to the number of existing facilities prior to 1989. Data will be organized primarily by state and MSA, but by non-MSA and resort as well.

Data for this project came from several different places. I began with the 1995 NGF course list used in the OSU office of the Database of Golf in America. 1989 population figures were obtained from the U.S. Census, and the 1995 figures were projections that were developed by Claritas, Inc.

There are more than 14,000 facilities contained on the current 1995 NGF list. But even with an extensive list such as that, it is impossible to include every course with the ongoing changes that are rapidly occurring in the golf world. So, in an effort to compile the most comprehensive list possible, I looked to other sources for possible courses that may not have been included in the '95 NGF list. These sources include Golf Market Today, The Golf Course Register, and Golf Course Development and Operations.

Golf Market Today is a bi-monthly publication of the the National Golf Foundation (NGF). It includes articles on developments in the golf community, profiles of prominent golf people, and sites and information on golf outings and conventions. But perhaps the most valuable information provided by the Golf Market Today is the regular

monitoring of the growth of golf facilities in the U.S. Golf course openings are covered by state, and city. Data is provided on number of holes at the facility, and course type (public, private, and resort). Information on courses that are under construction and are in planning is also provided.

Golf Course Development and Operations is also a publication published by the National Golf Foundation. This publication is the predecessor to the Golf Market Today reports and is basically identical. It has similar articles on golf's big names and events. It also features courses that are under construction and courses that have been opened along with their statistics. Golf Course Development and Operations was published on a bi-monthly basis and ceased publication after the Fall 1991 issue.

Golf Course Register is a product of Golf Industry Research Associates, Inc. based in Silver Spring, Maryland. This company is different from the National Golf Foundation in that their major business is keeping up with new course development and openings. They feature much the same information as Golf Market Today and Golf Course Development and Operations, but in much greater detail. It is published monthly.

Methodology

With the data provided by Dr. Rooney, the New York Times, and the National Golf Foundation, I was able to compile the most complete course list possible. The 1995 NGF list was compared with data from Golf Market Today, Golf Course Development and Operations, and Golf Course Register. Using the NGF list as a guide, I noted the courses that appeared on the other sources of data and not on the NGF list. The analysis

focused only on courses opened between 1989 to 1995.

The next step in building the course list was to take the courses that were found in Golf Market Today, Golf Course Development, and Golf Course Register and did not appear on the NGF list and add them to the 1995 NGF list. This was done by year and state.

This new and more comprehensive course list is separated into two segments; courses built before 1989 and those opened between 1989 and 1995. State data was calculated and ranked. The new facility database included number of holes, percentage hole change, number of courses, percentage hole growth, and breakdowns on public and private holes.

Location Quotients (LQ's) were calculated for states and MSA's. The equation for calculating an LQ is:

$$LQ = (Local_1 \backslash Local_2 / National_1 \backslash National_2) \quad (1)$$

This formula simply takes the two national variables and divides them into the two local variables to produce the LQ. The LQ is a figure which illustrates local figures against national figures.

The new course data will be analyzed by state, MSA (Metropolitan Statistical Area), and on the county level. There are 322 MSA's in the United States. The same kinds of data (ex. number of holes, percentage hole change, etc.) were generated for the MSA's. This data will then be compared to data from before 1989 to determine growth in population, overall number of courses, overall number of holes, private course, private holes, public courses, and public holes.

Resort areas were also examined, specifically, courses that were built in "resort counties" and may not necessarily be classified as resort. These were identified and noted.

A Spearman's rank correlation coefficient is used to measure the possible relationship between population and course construction. The formula used for this will be:

$$r_s = 1 - 6(\sum d^2)/N^3 - N \qquad (2)$$

where: d is the difference in ranks of variables X and Y for each paired data value.

$\sum d^2$ is the sum of the squared differences in ranks.

N is the number of paired data values.

This test will give us a number between -1 and 1. A number from 0 to 1 indicates a positive correlation while and number from 0 to -1 indicates a negative correlation. Zero indicates no correlation.

Eighteen hole equivalents were used to analyze pressure on facilities by population. This is done by dividing the total number of people in an area by the total number of 18 hole equivalents. This gives the number of people per 18 hole equivalent. The availability of golf in a certain area can be seen and therefore the need of further golf holes can be determined.

CHAPTER IV

IMPACTS OF POPULATION ON COURSE CONSTRUCTION

The purpose of this chapter is to examine the relationship between population growth and golf course construction. The effects of population change on course construction will be analyzed at both the state level and by MSA. The use of location quotients (LQ's) will be used to determine each state's status in relation to the rest of the nation. Also, a Spearman's rank correlation coefficient will be used to test the relationship between percent population growth and the percentage growth of golf facilities.

State and MSA Growth

When analyzing each state and MSA, the purpose is to measure the role of population increase on course construction. All 50 states showed an increase in number of holes, while Rhode Island, North Dakota, and Connecticut each decreased in population. Table 1 shows the percent hole growth and percent population growth, ranked by state. Also refer to Figures 3 and 4 for maps of how many courses were built in each state from 1989 to 1995 and also where they are located.

Of the 322 MSA's in the U.S., thirty MSA's had a decrease in population from 1989 to 1995. Sixty-four MSA's experienced minimal growth between 1989 and 1995. No MSA's had a decrease in the number of holes.

A location quotient (LQ) was calculated for each state and MSA to examine the

Table 1

Percent Increase in Holes and Population, by State

State	% Increase Holes	% Increase in Population
ALASKA	46.7	12.5
ALABAMA	25.1	5.5
ARKANSAS	15.5	5.4
ARIZONA	20.6	14.7
CALIFORNIA	18.5	8.4
COLORADO	16.9	13.7
CONNECTICUT	1.5	-0.3
DELAWARE	25.0	8.3
FLORIDA	20.6	11.7
GEORGIA	32.9	11.7
HAWAII	30.9	8.7
IOWA	7.7	2.4
IDAHO	9.1	16.3
ILLINOIS	16.5	3.5
INDIANA	17.8	4.8
KANSAS	11.2	3.8
KENTUCKY	27.9	4.7
LOUISIANA	4.9	1.8
MASSACHUSETTS	8.3	0.6
MARYLAND	24.4	6.6
MAINE	9.9	1.9
MICHIGAN	19.6	2.9
MINNESOTA	18.3	6.0
MISSOURI	23.6	4.1
MISSISSIPPI	17.1	4.4
MONTANA	18.9	8.4
N. CAROLINA	16.0	8.9
N. DAKOTA	7.7	-1.1
NEBRASKA	25.6	3.5
NEW HAMPSHIRE	19.2	3.5
NEW JERSEY	9.0	2.7
NEW MEXICO	11.9	11.7
NEVADA	59.2	32.1
NEW YORK	8.9	1.2
OHIO	10.9	2.9
OKLAHOMA	13.8	4.0
OREGON	21.4	12.0
PENNSYLVANIA	10.0	1.8
RHODE ISLAND	5.3	-0.6
S. CAROLINA	28.1	6.8
S. DAKOTA	14.0	4.1
TENNESSEE	19.7	7.7
TEXAS	11.3	10.8
UTAH	19.4	13.8
VIRGINIA	21.2	8.1
VERMONT	3.3	4.5
WASHINGTON	20.6	14.2
WISCONSIN	12.9	5.3
W. VIRGINIA	12.9	1.1
WYOMING	2.9	4.8

Figure 3. Number of Courses Built By State 1989 to 1995

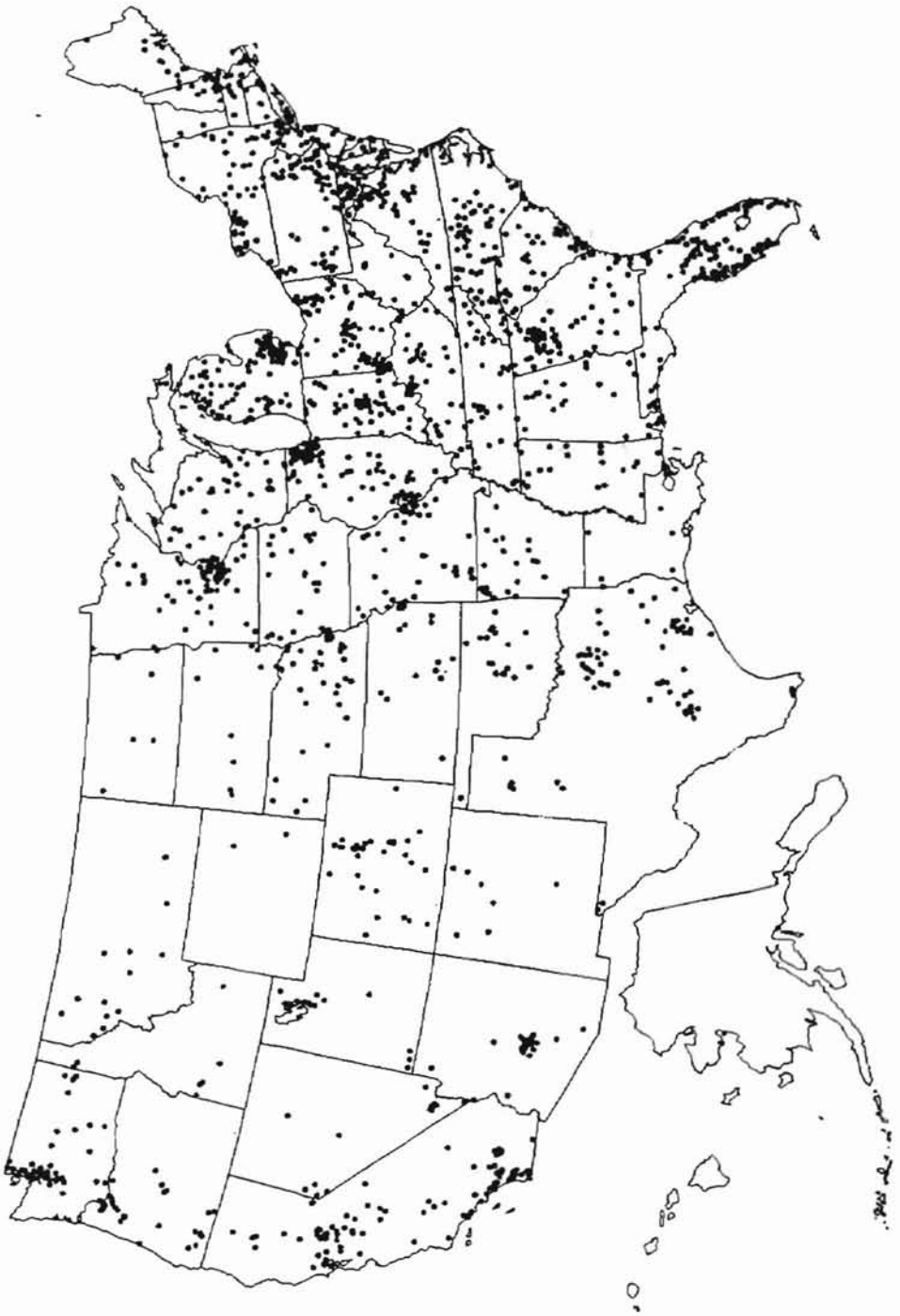

Figure 4. Courses Built 1989 to 1995

growth of population and total holes. A LQ simply compares each individual state or MSA against the national average for a respective category. The national average is always 1. Any LQ greater than 1 indicates an area where concentration exceeds the national average, while an LQ less than 1 indicates less than average concentration.

In this study a LQ was formulated to compare the categories of percent growth in population and percent growth in overall number of holes for each state. The formula for the LQ is as follows:

$$LQ = (Local_h \backslash Local_p \,/\, National_h \backslash National_p) \quad (3)$$

First, the national percentage growth in holes was divided by national percentage growth in population ($National_h \backslash National_p$). This calculation illustrated that golf hole construction (18 hole equivalents) exceeded percentage population growth by 2.57 times. Then each state's, percent hole growth was divided by that state's percent population growth ($Local_h \backslash Local_p$). To produce the LQ, that state ratio was divided by 2.57, the national ratio, to obtain each state's LQ. Massachusetts topped the list, with an LQ of 5.77. This LQ signifies that Massachusetts hole growth rate per population growth rate is 5.77 times the national average hole to population growth rate. Many of the states near the top of the list were not states that recorded meager population increases. Most of these states were located in the Upper Midwest and Northeast regions of the U.S., regions that are traditionally significant to U.S. golf (Table 2). The states found at the bottom of the LQ list with "N/A" in the last two columns each had a negative LQ number, which is not possible. So the "N/A" figure was inserted.

The hypothesis that population growth produced golf course construction can be

Table 2

State Hole/Population LQ's

State	Growth in Holes (%)	Growth in Population (%)	HI/Pop	LQ
MASSACHUSETTS	8.3	0.6	13.833333	5.38262
W. VIRGINIA	12.9	1.1	11.727273	4.5631411
NEW YORK	8.9	1.2	7.4166667	2.8858625
NEBRASKA	25.6	3.5	7.3142857	2.8460256
MICHIGAN	19.6	2.9	6.7586207	2.6298135
KENTUCKY	27.9	4.7	5.9361702	2.3097939
MISSOURI	23.6	4.1	5.7560976	2.2397267
PENNSYLVANIA	10.0	1.8	5.5555556	2.1616948
NEW HAMPSHIRE	19.2	3.5	5.4857143	2.1345192
MAINE	9.9	1.9	5.2105263	2.0274421
ILLINOIS	16.5	3.5	4.7142857	1.8343524
ALABAMA	25.1	5.5	4.5636364	1.775734
S. CAROLINA	28.1	6.8	4.1323529	1.6079194
MISSISSIPPI	17.1	4.4	3.8863636	1.5122037
OHIO	10.9	2.9	3.7586207	1.4624983
ALASKA	46.7	12.5	3.736	1.4536965
INDIANA	17.8	4.8	3.7083333	1.4429313
MARYLAND	24.4	6.6	3.6969697	1.4385096
HAWAII	30.9	8.7	3.5517241	1.3819938
OKLAHOMA	13.8	4.0	3.45	1.3424125
S. DAKOTA	14.0	4.1	3.4146341	1.3286514
NEW JERSEY	9.0	2.7	3.3333333	1.2970169
IOWA	7.7	2.4	3.2083333	1.2483787
MINNESOTA	18.3	6.0	3.05	1.1867704
DELAWARE	25.0	8.3	3.0120482	1.1720032
KANSAS	11.2	3.8	2.9473684	1.146836
ARKANSAS	15.5	5.4	2.8703704	1.1168756
GEORGIA	32.9	11.7	2.8119658	1.0941501
LOUISIANA	4.9	1.8	2.7222222	1.0592304
VIRGINIA	21.2	8.1	2.617284	1.0183984
TENNESSEE	19.7	7.7	2.5584416	0.9955026
WISCONSIN	12.9	5.3	2.4339623	0.947067
MONTANA	18.9	8.4	2.25	0.8754864
CALIFORNIA	18.5	8.4	2.202381	0.8569576
NEVADA	59.2	32.1	1.8442368	0.7176019
N. CAROLINA	16.0	8.9	1.7977528	0.6995147
OREGON	21.4	12.0	1.7833333	0.693904
FLORIDA	20.6	11.7	1.7606838	0.685091
WASHINGTON	20.6	14.2	1.4507042	0.5644764
UTAH	19.4	13.8	1.4057971	0.5470028
ARIZONA	20.6	14.7	1.4013605	0.5452765
COLORADO	16.9	13.7	1.2335766	0.4799909
TEXAS	11.3	10.8	1.0462963	0.4071192
NEW MEXICO	11.9	11.7	1.017094	0.3957564
VERMONT	3.3	4.5	0.7333333	0.2853437
WYOMING	2.9	4.8	0.6041667	0.2350843
IDAHO	9.1	16.3	0.5582822	0.2172304
CONNECTICUT	1.5	-0.3	N/A	N/A
N. DAKOTA	7.7	-1.1	N/A	N/A
RHODE ISLAND	5.3	-0.6	N/A	N/A

statistically tested by using Spearman's rank correlation coefficient. It is the most widely used test of the strength of relationship between two variables. In the equation, r_s is the correlation of the two variables. After applying the formula to the two variables, percent growth in population and percent growth in overall holes built between 1989 and 1995, the correlation was calculated to be .617190876, meaning that there is a strong relationship between the construction of holes and population. The R^2 value is then .380924578. This means that population growth accounts for approximately 38% of overall course construction in the U.S. The remaining 62% percent of course construction is being driven by other factors. The level of significance for R^2 is 0.00, indicating extremely strong confidence in this result.

MSA's were divided into different population groups in order to more effectively analyze each city. This was done in order to group MSA's of similar size and characteristics. It wouldn't be a fair representation to compare LQ's for Chicago and Tulsa, because Tulsa is so much smaller than the Chicago metropolitan area. So four different LQ population categories were created for MSA's. These included MSA's greater than two million, MSA's one to two million, MSA's five hundred thousand to one million, and MSA's less than five hundred thousand.

The MSA group of two million and greater included 24 of the 322 total MSA's. The leading MSA in this category was Pittsburgh, PA with an LQ of 10.77. Detroit, Boston, St. Louis, and Philadelphia all experienced high hole to population growth each with LQ's over five. Each of the leading ten MSA's in this category are located in the northern Midwest and northeast U.S. The MSA's located in the bottom half of the table

Table 3

MSA LQ's, Pop. 2 Million and Greater

MSA Name	% Chng in Holes	1995 pop	% Chng in Pop.	HI/Pop	LQ
Pittsburgh, PA	9.5	2,401,683	0.3	31.666667	10.770975
Detroit, MI	23.3	4,309,716	1.0	23.3	7.9251701
Boston, MA-NH	11.0	3,241,647	0.5	22	7.4829932
St. Louis, MO-IL	41.1	2,580,450	2.0	20.55	6.9897959
Philadelphia, PA-NJ	9.9	4,951,892	0.6	16.5	5.6122449
New York, NY	3.9	8,590,080	0.5	7.8	2.6530612
Baltimore, MD	28.7	2,469,249	3.7	7.7567568	2.6383526
Cleveland-Lorain-Elyria, OH	5.7	2,223,702	1.0	5.7	1.9387755
Nassau-Suffolk, NY	10.0	2,658,878	1.9	5.2631579	1.7901898
Chicago, IL	18.7	7,710,948	4.0	4.675	1.5901361
Miami, FL	15.7	2,002,978	3.4	4.6176471	1.5706283
San Luis Obispo-Atascadero-Paso Robles, CA	12.5	2,654,908	3.4	3.6764706	1.2505002
Orange County, CA	22.0	2,564,345	6.4	3.4375	1.1692177
Washington, DC-MD-VA-WV	22.7	4,516,067	6.9	3.2898551	1.1189983
Tampa-St. Petersburg-Clearwater, FL	15.8	2,176,253	5.2	3.0384615	1.0334903
Minneapolis-St. Paul, MN-WI	20.6	2,714,299	6.9	2.9855072	1.0154787
Atlanta, GA	39.5	3,399,341	14.8	2.6689189	0.9077956
Phoenix-Mesa, AZ	27.0	2,519,510	12.6	2.1428571	0.728863
Houston, TX	17.0	3,708,479	11.6	1.4655172	0.4984753
Salt Lake City-Ogden, UT	15.9	2,542,755	11.7	1.3589744	0.4622362
Dallas, TX	10.4	2,937,452	9.8	1.0612245	0.3609607
Riverside-San Bernardino, CA	12.0	2,951,152	14.0	0.8571429	0.2915452
Oakland, CA	3.7	2,197,219	5.5	0.6727273	-0.2288188
Los Angeles-Long Beach, CA	1.5	9,190,493	3.7	0.4054054	0.137893

are mostly located in California, Texas, and Florida. The lack of growth in most of these MSA's can be explained by lack of land which increase land costs. (Table 3)

The second MSA group consisted of areas with one to two million people. This included 31 MSA's. The LQ's in this list were lower at the top of the list. Cincinnati had the highest LQ with 2.146. Cincinnati and the next six MSA's were the only MSA's with LQ's over 1. This MSA population group did not experience as much hole growth as the first category did. This is probably due to the locations of most of the MSA's. Many of these MSA's are located in areas that have not been experiencing significant growth (Table 4).

The third area has MSA's with 500,000 to one million people. Forty MSA's fell within this category of population. Dayton-Springfield, OH topped the list of LQ's with 9.047. This was by far the highest scoring MSA with the second MSA, Louisville, KY, having an LQ of 3.366. Twenty-five of the forty MSA's in this category had LQ's less than 1 (Table 5).

The last category shows MSA's with less than 500,000 people. 227 MSA's fall within this population category. Jamestown, NY had an LQ of 24.149. This LQ is especially high because Jamestown experienced hole growth of 7.1%, while only experiencing .1% growth in population (Table 6).

It is important to look at which MSA's are experiencing large golf facility growth and where these MSA's are located. For instance, compare Chicago and Los Angeles. Chicago and Los Angeles are two of the largest MSA's in the U.S. with populations of approximately 7.7 million and 9.1 million, respectively. Both MSA's experienced

Table 4

MSA LQ's, Pop. 1 Million to 2 Million

MSA Name	% Chng in Holes	1995 Pop.	% Chng in Pop.	HI/Pop.	LQ
Cincinnati, OH-KY-IN	26.5	1,589,745	4.2	6.3095238	2.1460965
Rochester, NY	15.6	1,094,234	3.0	5.2	1.7687075
Indianapolis, IN	30.6	1,475,465	6.9	4.4347826	1.5084295
Norfolk-Virginia Beach-Newport News, VA	30.8	1,546,195	7.1	4.3380282	1.4755198
Kansas City, MO-KS	20.7	1,658,117	4.8	4.3125	1.4668367
Columbus, OH	22.6	1,435,579	6.7	3.3731343	1.1473246
Greensboro--Winston-Salem--High Point, NC	20.8	1,116,891	6.3	3.3015873	1.1229889
Sacramento, CA	24.6	1,452,611	8.4	2.9285714	0.9961127
Nashville, TN	29.2	1,086,107	10.3	2.8349515	0.9642692
Oklahoma City, OK	16.7	1,015,549	5.9	2.8305085	0.962758
Memphis, TN-AR-MS	16.1	1,064,759	5.7	2.8245614	0.9607352
Las Vegas, NV-AZ	85.7	1,115,421	30.8	2.7824675	0.9464175
Monmouth-Ocean, NJ	15.3	1,043,972	5.8	2.637931	0.8972555
San Diego, CA	15.1	1,197,270	6.3	2.3968254	0.8152467
Bergen-Passaic, NJ	5.6	1,309,100	2.4	2.3333333	0.7936508
New Orleans, LA	4.8	1,312,487	2.1	2.2857143	0.7774538
Santa Barbara-Santa Maria-Lompoc, CA	7.1	1,652,183	3.3	2.1515152	0.7318079
Portland-Vancouver, OR-WA	22.2	1,703,106	12.4	1.7903226	0.6089533
Milwaukee-Waukesha, WI	3.2	1,458,110	1.8	1.7777778	0.6046863
Fort Worth-Arlington, TX	14.5	1,481,551	8.9	1.6292135	0.5541542
Charlotte-Gastonia-Rock Hill, NC-SC	15.5	1,277,305	9.9	1.5656566	0.5325362
Newark, NJ	1.6	1,937,173	1.1	1.4545455	0.4947434
Orlando, FL	18.0	1,388,153	13.3	1.3533835	0.4603345
Middlesex-Somerset-Hunterdon, NJ	7.5	1,077,560	5.7	1.3157895	0.4475474
San Jose, CA	4.3	1,458,522	4.6	0.9347826	0.3179533
Denver, CO	7.9	1,827,888	12.6	0.6269841	0.2132599
Hartford, CT	1.9	1,150,435	0.1	19	0.154736
Providence-Fall River-Warwick, RI-MA	2.3	1,126,591	0.1	23	0.127826
Fort Lauderdale, FL	3.8	1,409,104	12.2	0.3114754	0.105944
Buffalo-Niagara Falls, NY	11.5	1,187,975	0.1	115	0.025561
Santa Cruz-Watsonville, CA	0.0	1,566,786	2.8	0	0

Table 5

MSA LQ's, Pop. 500,000 to 1 Million

MSA Name	% Chng in Holes	1995 Pop.	% Chng in Pop.	HI/Pop.	LQ
Dayton-Springfield, OH	13.3	956,091	0.5	26.6	9.047619
Louisville, KY-IN	38.6	985,834	3.9	9.8974359	3.3664748
Omaha, NE-IA	38.6	666,250	4.2	9.1904762	3.1260123
Ann Arbor, MI	47.9	519,563	6.0	7.9833333	2.7154195
Allentown-Bethlehem-Easton, PA	23.5	614,395	3.2	7.34375	2.4978741
Mobile, AL	50.0	518,359	8.7	5.7471264	1.9548049
Birmingham, AL	25.4	877,539	4.5	5.6444444	1.9198791
Tulsa, OK	24.5	748,634	5.6	4.375	1.4880952
Stockton-Lodi, CA	31.8	524,115	9.0	3.5333333	1.2018141
Little Rock-North Little Rock, AR	19.4	542,122	5.7	3.4035088	1.157656
Seattle-Bellevue-Everett, WA	27.2	523,859	8.3	3.2771084	1.1146627
Richmond-Petersburg, VA	22.6	925,412	6.9	3.2753623	1.1140688
Jacksonville, FL	27.3	984,759	8.6	3.1744186	1.0797342
Akron, OH	10.4	679,959	3.4	3.0588235	1.0404162
Charleston, WV	5.6	524,357	1.9	2.9473684	1.0025063
Greenville-Spartanburg-Anderson, SC	17.1	880,286	6.0	2.85	0.9693878
Syracuse, NY	5.1	755,226	1.8	2.8333333	0.9637188
Knoxville, TN	25.0	639,158	9.1	2.7472527	0.9344397
Harrisburg-Lebanon-Carlisle, PA	11.3	613,062	4.3	2.627907	0.8938459
Wilmington, NC	37.0	542,968	15.3	2.4183007	0.8225512
El Paso, TX	33.3	677,261	14.5	2.2965517	0.78114
Ventura, CA	13.2	708,091	5.8	2.2758621	0.7741027
Grand Rapids-Muskegon-Holland, MI	13.0	992,697	5.8	2.2413793	0.7623739
Bakersfield, CA	27.6	618,724	13.8	2	0.6802721
Fresno, CA	23.3	847,090	12.1	1.9256198	0.6549727
Albany-Schenectady-Troy, NY	3.3	876,783	1.8	1.8333333	0.6235828
Tacoma, WA	18.4	646,928	10.4	1.7692308	0.6017792
Sheboygan, WI	6.3	635,993	3.6	1.75	0.5952381
Raleigh-Durham-Chapel Hill, NC	16.2	984,170	15.0	1.08	0.3673469
Baton Rouge, LA	6.7	563,472	6.7	1	0.3401361
Austin-San Marcos, TX	15.2	985,963	16.5	0.9212121	0.3133375
Albuquerque, NM	9.7	655,913	11.3	0.8584071	0.2919752
West Palm Beach-Boca Raton, FL	10.3	972,486	12.6	0.8174603	0.2780477
Gary, IN	1.7	622,261	2.9	0.5862069	0.1993901
Tucson, AZ	4.8	745,053	11.7	0.4102564	0.139543
Youngstown-Warren, OH	0.0	604,177	0.5	0	0
Jersey City, NJ	0.0	552,025	-0.2	0	0
New Haven-Meriden, CT	0.0	521,297	-1.7	0	0
Wichita Falls, TX	0.0	510,189	1.8	0	0
Toledo, OH	0.0	613,687	-0.1	0	0

Table 6

MSA LQ's Pop. Less Than 500,000

MSA Name	% Chng in Holes	1995 Pop.	% Chng in Pop	Hl/Pop.	LQ
Jamestown, NY	7.1	142,064	0.1	71.0000	24.14965986
Gadsden, AL	44.4	100,519	0.7	63.4286	21.57434402
Duluth-Superior, MN-WI	15.2	240,809	0.3	50.6667	17.23356009
Benton Harbor, MI	7.4	161,725	0.2	37.0000	12.58503401
Flint, MI	15.6	433,547	0.7	22.2857	7.580174927
Huntington-Ashland, WV-KY-OH	27.3	316,879	1.4	19.5000	6.632653061
Lawrence, MA-NH	66.7	365,712	3.5	19.0571	6.48202138
Sumter, SC	83.3	107,627	4.9	17.0000	5.782312925
Parkersburg-Marietta, WV-OH	30.8	152,002	1.9	16.2105	5.513784461
Nashua, NH	90.0	180,552	5.6	16.0714	5.466472303
Dutchess County, NY	12.5	261,587	0.8	15.6250	5.31462585
Portsmouth-Rochester, NH-ME	9.1	225,366	0.6	15.1667	5.158730159
Grand Forks, ND-MN	7.1	103,697	0.5	14.2000	4.829931973
Dothan, AL	42.9	135,167	3.2	13.4063	4.55994898
Saginaw-Bay City-Midland, MI	9.8	402,435	0.8	12.2500	4.166666667
Charleston-North Charleston, SC	40.0	255,307	3.4	11.7647	4.00160064
Stamford-Norwalk, CT	4.7	331,323	0.4	11.7500	3.996598639
Terre Haute, IN	18.8	149,994	1.6	11.7500	3.996598639
Worcester, MA-CT	12.5	481,308	1.1	11.3636	3.865182437
La Crosse, WI-MN	41.7	120,745	3.7	11.2703	3.833425262
Topeka, KS	33.3	165,727	3.0	11.1000	3.775510204
Shreveport-Bossier City, LA	7.7	122,229	0.8	9.6250	3.273809524
Bloomington, IN	50.0	114,821	5.4	9.2593	3.149407911
Altoona, PA	10.0	131,983	1.1	9.0909	3.092145949
Wausau, WI	41.7	120,880	4.7	8.8723	3.017802866
Albany, GA	40.0	117,792	4.6	8.6957	2.957704821
Lima, OH	9.5	155,971	1.1	8.6364	2.937538652
Manchester, NH	20.0	177,822	2.4	8.3333	2.83446712
Portland, ME	18.5	226,322	2.4	7.7083	2.621882086
Florence, AL	28.6	136,378	3.8	7.5263	2.559971357
Amarillo, TX	45.5	198,917	6.1	7.4590	2.537080406
Chattanooga, TN-GA	30.0	441,902	4.1	7.3171	2.488800398
Trenton, NJ	9.5	330,030	1.3	7.3077	2.485609628
Atlantic-Cape May, NJ	27.6	331,789	3.9	7.0769	2.407116693
Lake Charles, LA	25.0	174,185	3.6	6.9444	2.362055933
Springfield, IL	26.7	153,352	3.9	6.8462	2.328623757
Glens Falls, NY	23.8	122,722	3.5	6.8000	2.31292517
Pueblo, CO	30.0	128,688	4.6	6.5217	2.218278616
Yolo, CA	28.6	147,338	4.4	6.5000	2.210884354
Lynchburg, VA	33.3	204,522	5.5	6.0545	2.059369202
Owensboro, KY	22.2	90,585	3.9	5.6923	1.936159079
Canton-Massillon, OH	13.5	403,728	2.4	5.6250	1.913265306
Lancaster, PA	30.8	445,987	5.5	5.6000	1.904761905
Lincoln, NE	36.8	227,800	6.6	5.5758	1.896516182
Hattiesburg, MS	33.3	104,613	6.0	5.5500	1.887755102
Lexington, KY	39.0	435,037	7.2	5.4167	1.842403628
Great Falls, MT	28.6	81,781	5.3	5.3962	1.835451162
Myrtle Beach, SC	38.5	154,364	7.2	5.3472	1.818783069
South Bend, IN	21.1	379,294	4.0	5.2750	1.794217687
Hagerstown, MD	25.0	127,213	4.8	5.2083	1.77154195
Fayetteville, NC	28.6	289,728	5.5	5.2000	1.768707483
Johnson City-Kingsport-Bristol, TN-VA	20.0	453,155	3.9	5.1282	1.744287459
Roanoke, VA	10.5	229,092	2.1	5.0000	1.700680272
Lakeland-Winter Haven, FL	35.9	434,498	7.2	4.9861	1.69595616
Charlottesville, VA	40.0	142,148	8.4	4.7619	1.619695497
Punta Gorda, FL	76.5	129,454	16.7	4.5808	1.558108273

MSA Name	% Holes	1995 Pop.	% Chng Pop.	HI/Pop.	LQ
Lansing-East Lansing, MI	4.1	436,481	0.9	4.5556	1.549508692
Rockford, IL	27.6	349,640	6.1	4.5246	1.538976246
Vallejo-Fairfield-Napa, CA	36.0	487,935	8.1	4.4444	1.511715797
Erie, PA	8.8	281,018	2.0	4.4000	1.496598639
Fort Wayne, IN	14.0	471,049	3.2	4.3750	1.488095238
Merced, CA	50.0	199,967	12.1	4.1322	1.405520886
Bloomington-Normal, IL	30.8	139,031	7.6	4.0526	1.378446115
Bismarck, ND	25.0	89,040	6.2	4.0323	1.371516348
Columbus, GA-AL	24.0	276,622	6.0	4.0000	1.360544218
Redding, CA	40.0	161,701	10.0	4.0000	1.360544218
Goldsboro, NC	20.0	109,948	5.0	4.0000	1.360544218
Savannah, GA	32.0	133,407	8.1	3.9506	1.343747375
Bryan-College Station, TX	33.3	132,165	8.5	3.9176	1.332533013
Lubbock, TX	16.7	232,151	4.3	3.8837	1.320993514
Athens, GA	25.0	134,627	6.6	3.7879	1.288394146
Dover, DE	33.3	120,823	8.9	3.7416	1.272643889
Green Bay, WI	27.8	209,397	7.6	3.6579	1.244181883
Longview-Marshall, TX	16.7	202,666	4.6	3.6304	1.234841763
Florence, SC	25.0	122,244	6.9	3.6232	1.232377009
Sarasota-Bradenton, FL	25.2	236,102	7.0	3.6000	1.224489796
Pensacola, FL	33.3	376,670	9.4	3.5426	1.204950065
Medford-Ashland, OR	44.4	165,130	12.8	3.4688	1.179846939
Huntsville, AL	31.6	320,111	9.2	3.4348	1.168293404
Peoria-Pekin, IL	4.8	343,911	1.4	3.4286	1.166180758
Madison, WI	24.3	394,145	7.4	3.2838	1.11693326
Asheville, NC	23.5	205,499	7.2	3.2639	1.110166289
Columbia, SC	27.0	491,158	8.3	3.2530	1.106466683
San Antonio, TX	32.7	350,655	10.1	3.2376	1.101232572
Modesto, CA	36.4	412,712	11.4	3.1930	1.086048454
Springfield, MO	35.0	401,575	11.0	3.1818	1.082251082
Chico-Paradise, CA	20.0	193,848	6.4	3.1250	1.06292517
Fargo-Moorhead, ND-MN	19.0	163,180	6.4	2.9688	1.009778912
Lafayette, IN	11.1	364,311	3.8	2.9211	0.993555317
Appleton-Oshkosh-Neenah, WI	18.6	335,192	6.4	2.9063	0.988520408
Eugene-Springfield, OR	19.0	301,546	6.6	2.8788	0.979179551
Daytona Beach, FL	35.4	448,514	12.3	2.8780	0.978928157
Santa Fe, NM	40.0	224,614	14.0	2.8571	0.971817298
St. Cloud, MN	17.6	196,892	6.2	2.8387	0.965547509
Rapid City, SD	20.0	87,155	7.1	2.8169	0.958129731
Yuba City, CA	33.3	137,247	11.9	2.7983	0.951809295
Panama City, FL	33.3	142,647	12.3	2.7073	0.920856147
Naples, FL	50.7	181,007	19.0	2.6684	0.907626208
Kokomo, IN	7.7	99,722	2.9	2.6552	0.903119869
Reading, PA	10.0	349,393	3.8	2.6316	0.89509488
Salem, OR	30.0	158,251	11.7	2.5641	0.872143729
Rochester, MN	18.2	113,981	7.1	2.5634	0.871898055
Elkhart-Goshen, IN	15.0	165,518	6.0	2.5000	0.850340136
Clarksville-Hopkinsville, TN-KY	28.6	189,129	11.6	2.4655	0.838611307
Tyler, TX	14.3	160,319	6.0	2.3833	0.810657596
Santa Rosa, CA	15.4	381,866	6.5	2.3692	0.805860806
Burlington, VT	11.8	162,121	5.2	2.2692	0.7718472
Iowa City, IA	11.1	100,806	4.9	2.2653	0.770512287
Hickory-Morganton, NC	12.1	308,177	5.4	2.2407	0.762156715
Gainesville, FL	16.7	195,415	7.6	2.1974	0.747404225
Davenport-Moline-Rock Island, IA-IL	4.8	358,566	2.2	2.1818	0.742115028
Jackson, MS	10.8	415,004	5.0	2.1600	0.734693878
Fort Smith, AR-OK	13.3	186,759	6.2	2.1452	0.729646697
Macon, GA	14.3	310,445	6.7	2.1343	0.725962027
Cedar Rapids, IA	11.8	178,187	5.6	2.1071	0.716715258
Des Moines, IA	14.6	420,532	7.0	2.0857	0.709426628
Fort Pierce-Port St. Lucie, FL	26.3	283,576	12.9	2.0388	0.693455677

MSA Name	% Holes	1995 Pop.	% Chng Pop	HI/Pop.	LQ
Wichita, KS	10.3	132,699	5.1	2.0196	0.686941443
Newburgh, NY-PA	14.3	359,564	7.1	2.0141	0.685062757
Fort Walton Beach, FL	28.6	164,429	14.4	1.9861	0.675547997
Greeley, CO	22.2	146,643	11.2	1.9821	0.674198251
Boulder-Longmont, CO	25.0	253,917	12.7	1.9685	0.669559162
Fayetteville-Springdale-Rogers, AR	34.8	248,492	17.8	1.9551	0.664985095
Bellingham, WA	30.0	148,336	16.1	1.8634	0.63379389
Melbourne-Titusville-Palm Bay, FL	23.5	452,157	13.3	1.7669	0.600992277
Eau Claire, WI	5.9	142,650	3.7	1.5946	0.542379114
Ocala, FL	26.3	227,004	16.5	1.5939	0.542156256
Kalamazoo-Battle Creek, MI	5.5	444,887	3.6	1.5278	0.519652305
Spokane, WA	16.7	119,713	11.1	1.5045	0.511736226
Sioux Falls, SD	15.0	97,614	10.1	1.4851	0.505152556
Fort Myers-Cape Coral, FL	17.0	373,570	11.5	1.4783	0.50280982
Billings, MT	14.3	124,440	9.7	1.4742	0.501437688
Sioux City, IA-NE	5.9	107,613	4.1	1.4390	0.489464078
Wilmington-Newark, DE-MD	8.3	197,398	5.8	1.4310	0.486746423
Yakima, WA	16.7	210,941	11.7	1.4274	0.485493343
Olympia, WA	25.0	191,601	18.8	1.3298	0.452308583
Biloxi-Gulfport-Pascagoula, MS	13.3	344,579	10.3	1.2913	0.439204808
Fort Collins-Loveland, CO	21.1	217,277	16.7	1.2635	0.429752739
Augusta-Aiken, GA-SC	10.9	453,526	9.2	1.1848	0.402987282
Barnstable-Yarmouth, MA	8.0	144,335	7.0	1.1429	0.388726919
Evansville-Henderson, IN-KY	3.6	287,875	3.2	1.1250	0.382653061
Beaumont-Port Arthur, TX	4.0	374,293	3.6	1.1111	0.377928949
Tallahassee, FL	11.1	257,298	10.1	1.0990	0.373812891
Provo-Orem, UT	12.5	296,321	12.4	1.0081	0.342879087
Lafayette, LA	5.3	167,749	5.6	0.9464	0.32191448
York, PA	5.9	360,853	6.3	0.9365	0.318540114
Montgomery, AL	6.9	315,327	7.8	0.8846	0.300889587
Boise City, ID	17.4	357,113	20.7	0.8406	0.285911466
Bremerton, WA	15.4	225,363	18.8	0.8191	0.278622087
Richland-Kennewick-Pasco, WA	13.3	175,964	17.3	0.7688	0.26149188
Reno, NV	10.0	287,957	13.1	0.7634	0.259645843
Brownsville-Harlingen-San Benito, TX	13.0	306,757	17.9	0.7263	0.247026185
Colorado Springs, CO	12.1	464,228	16.9	0.7160	0.243529364
San Francisco, CA	1.9	102,016	3.0	0.6333	0.215419501
McAllen-Edinburg-Mission, TX	4.3	475,471	24.0	0.1792	0.060941043
Bridgeport, CT	0.0	441,812	-0.4	0.0000	0
Corpus Christi, TX	0.0	380,058	8.6	0.0000	0
Visalia-Tulare-Porterville, CA	0.0	348,486	11.7	0.0000	0
Hamilton-Middletown, OH	15.4	316,450	0.0	0.0000	0
San Angelo, TX	0.0	310,509	3.6	0.0000	0
Killeen-Temple, TX	0.0	295,496	15.7	0.0000	0
St. Joseph, MO	0.0	293,538	0.3	0.0000	0
Lowell, MA-NH	0.0	289,073	3.0	0.0000	0
Sharon, PA	0.0	278,968	1.0	0.0000	0
Springfield, MA	0.0	256,930	-1.6	0.0000	0
Johnstown, PA	0.0	239,328	-0.8	0.0000	0
Odessa-Midland, TX	0.0	239,202	6.1	0.0000	0
Brockton, MA	0.0	238,911	1.1	0.0000	0
Galveston-Texas City, TX	0.0	237,575	9.3	0.0000	0
Brazoria, TX	0.0	214,876	12.1	0.0000	0
Danbury, CT	0.0	199,879	3.2	0.0000	0
Waco, TX	0.0	198,725	5.1	0.0000	0
Houma, LA	0.0	187,985	2.8	0.0000	0
Racine, WI	0.0	182,787	4.4	0.0000	0
Mansfield, OH	0.0	175,548	0.9	0.0000	0
New Bedford, MA	0.0	172,095	-2.0	0.0000	0
Laredo, TX	0.0	168,488	26.5	0.0000	0
Champaign-Urbana, IL	0.0	166,410	-3.8	0.0000	0

MSA Name	% Holes	1995 Pop.	% Chng Pop	HI/Pop.	LQ
Las Cruces, NM	0.0	159,217	17.5	0.0000	0
Tuscaloosa, AL	0.0	158,216	5.1	0.0000	0
Jackson, MI	0.0	153,773	2.7	0.0000	0
Monroe, LA	0.0	147,148	3.5	0.0000	0
Janesville-Beloit, WI	0.0	147,020	5.4	0.0000	0
Jacksonville, NC	0.0	145,863	-2.7	0.0000	0
Joplin, MO	0.0	143,111	6.1	0.0000	0
Rocky Mount, NC	0.0	140,680	5.6	0.0000	0
Decatur, AL	0.0	139,776	6.2	0.0000	0
Kenosha, WI	0.0	139,437	8.8	0.0000	0
Vineland-Millville-Bridgeton, NJ	0.0	138,687	0.5	0.0000	0
Fitchburg-Leominster, MA	0.0	138,262	0.1	0.0000	0
Yuma, AZ	0.0	131,629	23.1	0.0000	0
State College, PA	0.0	130,702	5.6	0.0000	0
Alexandria, LA	0.0	125,137	-4.9	0.0000	0
Columbia, MO	0.0	123,117	9.6	0.0000	0
Texarkana, TX-Texarkana, AR	0.0	123,115	2.5	0.0000	0
Abilene, TX	0.0	122,382	2.3	0.0000	0
Williamsport, PA	0.0	121,219	2.1	0.0000	0
Lawton, OK	0.0	118,428	6.2	0.0000	0
Greenville, NC	0.0	117,771	9.1	0.0000	0
Anniston, AL	0.0	117,222	1.0	0.0000	0
Danville, VA	0.0	110,131	1.3	0.0000	0
Kankakee, IL	0.0	102,178	6.2	0.0000	0
Salinas, CA	0.0	98,017	-1.4	0.0000	0
Elmira, NY	0.0	94,357	-0.9	0.0000	0
Bangor, ME	0.0	90,569	-3.2	0.0000	0
Lawrence, KS	0.0	89,245	9.1	0.0000	0
Dubuque, IA	0.0	88,435	2.4	0.0000	0
Pittsfield, MA	0.0	84,316	-3.7	0.0000	0
Pine Bluff, AR	0.0	83,761	-2.0	0.0000	0
Jackson, TN	0.0	83,388	6.9	0.0000	0
Victoria, TX	0.0	80,301	8.0	0.0000	0
Cheyenne, WY	0.0	78,950	7.9	0.0000	0
Casper, WY	0.0	64,361	5.1	0.0000	0
Enid, OK	0.0	57,030	0.5	0.0000	0
Sherman-Denison, TX	0.0	97,614	2.7	0.0000	0
Wheeling, WV-OH	5.0	157,533	0.0	0.0000	0
Lewiston-Auburn, ME	10.0	93,202	0.0	0.0000	0
Steubenville-Weirton, OH-WV	9.5	139,773	0.0	0.0000	0
Utica-Rome, NY	1.8	315,958	0.0	0.0000	0
New London-Norwich, CT-RI	20.0	284,574	0.0	0.0000	0
Binghamton, NY	13.5	261,009	0.0	0.0000	0
Decatur, IL	16.7	116,254	0.0	0.0000	0
Waterloo-Cedar Falls, IA	6.3	123,561	0.0	0.0000	0
Muncie, IN	14.3	119,227	0.0	0.0000	0
Scranton--Wilkes-Barre--Hazleton, PA	15.3	413,619	0.0	0.0000	0
Cumberland, MD-WV	33.3	100,885	0.0	0.0000	0
Waterbury, CT	5.6	221,478	0.0	0.0000	0

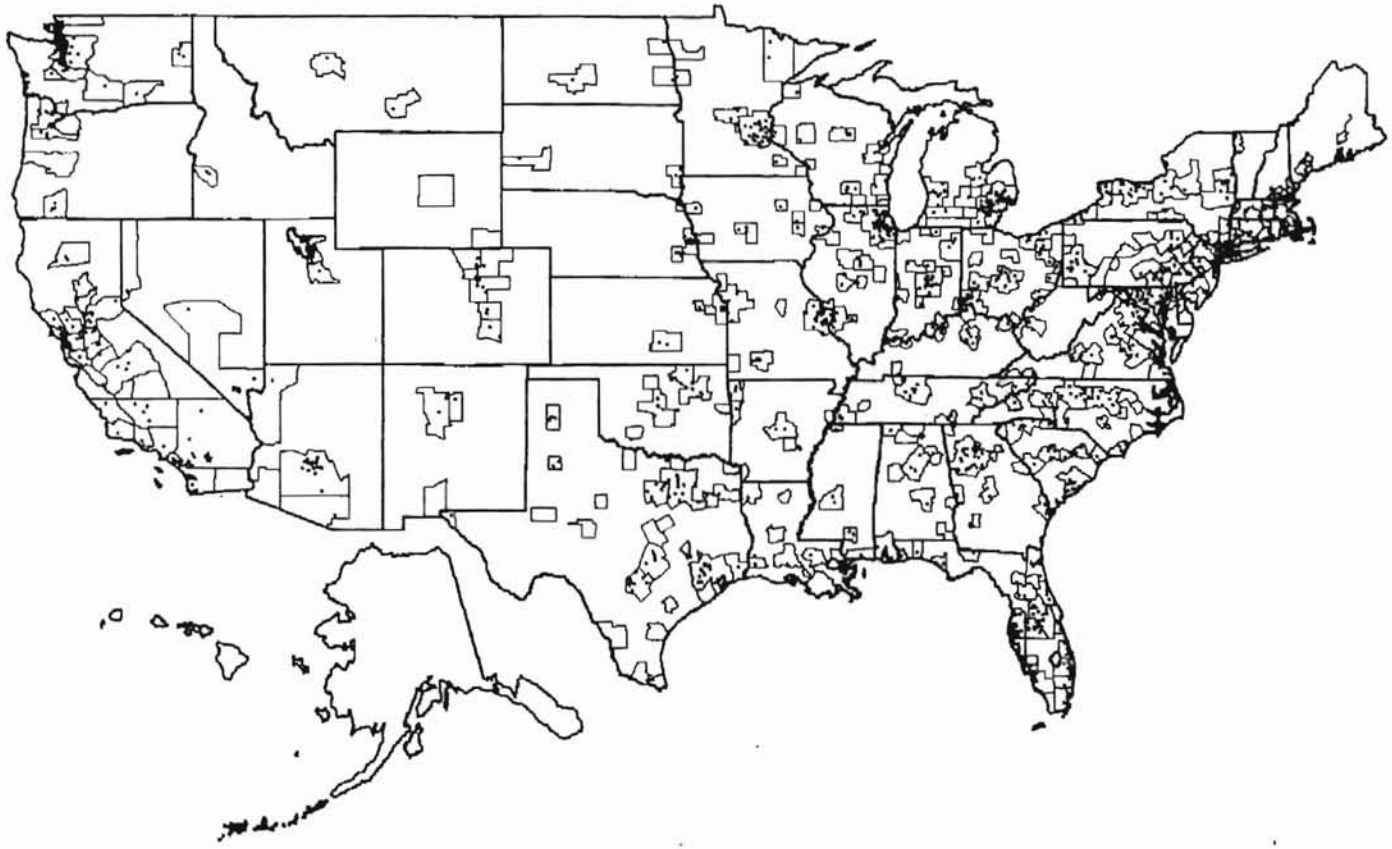

Figure 5. Courses Constructed In MSA's 1989 to 1995

similar growth from 1989 to 1995 (approximately 4% increase). But the differences in the number of golf holes constructed in each is striking. Chicago, with 4,293 total holes going into, added an additional 801 during construction from 1989 to 1995. Los Angeles, on the other hand, only added a mere 27 holes to its existing 1,746 from 1989 to 1995. The differences between Chicago and Los Angeles relative to golf course construction are enormous. Many would think that if either MSA were to experience significant growth it would be Los Angeles in its mild climate. Los Angeles has problems with new courses being built because of high land costs and environmental and water concerns. The population has grown so much in Southern California, and is confined to such a small area, that real estate is at a premium, and locations must be perfect in order to support a golf course. In addition to that, but to a lesser degree, is the environmental concerns of chemicals and fertilizers that are applied to courses. California has some of the strictest regulations in the country concerning the use of chemicals that may be harmful. And of course, the value of water in Southern California is high, so irrigating a golf course is an investment in itself.

Chicago boasts many of the same problems that Los Angeles endures. Land values are high here as well, but this obviously didn't stop courses from being built. Chicago is in a region that is crazy about golf and supports it highly. Despite the investment that is incurred when developing an area and building a course, it is almost always going to be successful because of the high participation of the people in this area.

Another phenomena that was recognized during the course of this study was the case of the Las Vegas MSA. Las Vegas was at the top, or near the top, of every category

tracking growth. Its population growth of over 30 percent and its hole growth of 85 percent was gigantic. It has always been a favorite tourists destination. Why did Las Vegas experience such course growth from 1989 to 1995?

One obvious answer is because of the enormous population explosion from 1989 to 1995. This kind of influx of people was probably projected. The kinds of people moving to the Las Vegas area are undoubtedly many retirees. So courses were soon being built to accommodate these people. But Las Vegas has done a magnificent job of marketing itself. People are moving here in record numbers and the tourism industry will always bring people in by the millions. Gambling will probably always be the biggest attraction in Las Vegas, but in the last decade, Las Vegas has tried to convey itself as a more family oriented atmosphere. Attractions other than flashy casinos are popping up all over Las Vegas. Golf has become one of those attractions. Nice golf courses in a comfortable climate with the other amenities that Las Vegas has to offer is the reason for the drastic construction in the Las Vegas MSA.

Another effective way to determine growing populations' impact on course growth is to examine the number of people per 18 hole equivalent. This indicates the number of people per 18 holes of golf. Obviously, states with higher populations per 18 hole equivalents will have less accessibility to golf than states with lower populations per 18 hole equivalents. This will be analyzed by examining the number of people per 18 hole equivalent for each state in 1989 and then comparing it to the number of people per 18 hole equivalent for 1995.

An LQ is applied to the 1989 and 1995 lists of people per 18 hole equivalents.

The formula for this LQ is as follows:

1989 LQ = 22,554/Local (state) 18 hole eq.

1995 LQ = 20,475/Local (state) 18 hole eq.

The national averages for people per 18 hole equivalent for both 1989 (22,554) and 1995 (20,475) are divided by the state numbers of people per 18 hole equivalent. The state with the greatest LQ is South Dakota (2.087). This indicates that South Dakota is 2.087 times above the national average in course accessibility. In 1995, South Dakota is again on top of this list with an LQ of 2.074 (Refer to tables 7 and 8). Figures 6 and 7 summarize the course accessability LQ's across the U.S.

The states and their Population/18 Hole equivalent LQ's are listed for 1989 and 1995 in tables 7 and 8. As is shown, the order of states did not vary much from 1989 to 1995. For the nation as a whole, the national average per 18 hole equivalent dropped from 22,554 in 1989, to 20,475 in 1995, showing a pattern of greater golf accessibility for the entire nation. Most of the states near the top of the list of LQ's for 18 hole equivalents in 1989 and 1995 are states located in the Upper Midwest and Northeast U.S. These areas are the tradition rich areas of golf in the U.S. and has always had high numbers of facilities available because of the popularity of the sport. States nearer the bottom of the list have a higher number of people per 18 hole equivalent. The lack of accessibility in 1989 meant that the demand for golf courses was present, and this triggered expansion in these states.

The first hypothesis in this study was to examine the impacts that population has on construction of golf courses in each state and MSA. It is obvious that population

Table 7

Population Per 18 Hole Equivalent, 1989

State	1989 Population	18 Hole Equivalent	People/18 Hole Eq.	People/18 Hole Eq. LQ
S. DAKOTA	697,000	64.5	10,806.2	2.087
N. DAKOTA	646,000	58.5	11,042.7	2.042
VERMONT	558,000	46	12,130.4	1.859
IOWA	2,771,000	221	12,538.5	1.799
WYOMING	458,000	35	13,085.7	1.724
S. CAROLINA	3,457,000	254	13,610.2	1.657
NEBRASKA	1,575,000	107.5	14,651.2	1.539
FLORIDA	12,638,000	850.5	14,859.5	1.518
WISCONSIN	4,857,000	325	14,944.6	1.509
MICHIGAN	9,253,000	618.5	14,960.4	1.508
MONTANA	800,000	53	15,094.3	1.494
MINNESOTA	4,338,000	281	15,437.7	1.461
N. CAROLINA	6,565,000	416	15,781.3	1.429
MAINE	1,220,000	76	16,052.6	1.405
KANSAS	2,473,000	151.5	16,323.4	1.382
IDAHO	994,000	60.5	16,429.8	1.373
NEW HAMPSHIRE	1,105,000	65	17,000.0	1.327
HAWAII	1,095,000	61.5	17,804.9	1.267
INDIANA	5,524,000	309.5	17,848.1	1.264
ARIZONA	3,622,000	197	18,385.8	1.227
OHIO	10,829,000	585.5	18,495.3	1.219
W. VIRGINIA	1,807,000	85.5	21,134.5	1.067
ARKANSAS	2,346,000	109.5	21,424.7	1.053
PENNSYLVANIA	11,866,000	542.5	21,872.8	1.031
COLORADO	3,276,000	147.5	22,210.2	1.015
KENTUCKY	3,677,000	161.5	22,767.8	0.991
CONNECTICUT	3,283,000	143	22,958.0	0.982
ALABAMA	4,030,000	175	23,028.6	0.979
MASSACHUSETTS	6,015,000	257.5	23,359.2	0.966
MISSISSIPPI	2,574,000	108	23,833.3	0.946
OREGON	2,791,000	117	23,854.7	0.945
ILLINOIS	11,410,000	472.5	24,148.1	0.934
OKLAHOMA	3,150,000	130	24,230.8	0.931
NEW MEXICO	1,504,000	59	25,491.5	0.885
MISSOURI	5,096,000	199.5	25,543.9	0.883
GEORGIA	6,411,000	248	25,850.8	0.872
TENNESSEE	4,854,000	185	26,237.8	0.860
RHODE ISLAND	1,001,000	38	26,342.1	0.856
UTAH	1,706,000	64.5	26,449.6	0.853
WASHINGTON	4,746,000	177	26,813.6	0.841
DELAWARE	658,000	24	27,416.7	0.823
VIRGINIA	6,120,000	216.5	28,267.9	0.798
TEXAS	16,807,000	582	28,878.0	0.781
NEW YORK	17,983,000	620.5	28,981.5	0.778
NEVADA	1,137,000	38	29,921.1	0.754
NEW JERSEY	7,726,000	222	34,801.8	0.648
LOUISIANA	4,253,000	113	37,637.2	0.599
MARYLAND	4,727,000	125	37,816.0	0.596
CALIFORNIA	29,218,000	682.5	42,810.3	0.527
ALASKA	547,000	7.5	72,933.3	0.309

Figure 6. 1989 Population/18 Hole Equivalent by State

Table 8

Population Per 18 Hole Equivalent, 1995

State	1995 Population	18 Hole Equivalent	People/18 Hole Eq.	People/18 Hole Eq. LQ
S. DAKOTA	725,397	73.5	9,869.3	2.075
N. DAKOTA	638,633	63.0	10,137.0	2.020
S. CAROLINA	3,691,462	325.5	11,340.9	1.805
IOWA	2,837,678	238.0	11,923.0	1.717
NEBRASKA	1,629,848	135.0	12,072.9	1.696
VERMONT	583,090	47.5	12,275.6	1.668
MICHIGAN	9,524,277	740.0	12,870.6	1.591
WYOMING	480,158	36.0	13,337.7	1.535
MONTANA	867,075	63.0	13,763.1	1.488
FLORIDA	14,118,076	1025.7	13,764.8	1.488
MINNESOTA	4,600,326	332.5	13,835.6	1.480
WISCONSIN	5,113,067	367.0	13,932.1	1.470
NEW HAMPSHIRE	1,143,963	77.5	14,760.8	1.387
HAWAII	1,190,170	80.5	14,784.7	1.385
N. CAROLINA	7,147,392	482.5	14,813.2	1.382
MAINE	1,242,600	83.5	14,881.4	1.376
KANSAS	2,567,031	168.5	15,234.6	1.344
INDIANA	5,787,633	364.5	15,878.3	1.290
OHIO	11,140,120	649.2	17,160.6	1.193
ARIZONA	4,155,806	237.5	17,498.1	1.170
IDAHO	1,156,283	66.0	17,519.4	1.169
KENTUCKY	3,850,163	206.5	18,644.9	1.098
W. VIRGINIA	1,826,929	96.5	18,931.9	1.082
ALABAMA	4,249,837	219.0	19,405.6	1.055
ARKANSAS	2,471,910	126.5	19,540.8	1.048
PENNSYLVANIA	12,074,991	596.5	20,243.1	1.011
MISSISSIPPI	2,687,798	126.5	21,247.4	0.964
ILLINOIS	11,805,251	550.5	21,444.6	0.955
MISSOURI	5,305,803	246.5	21,524.6	0.951
COLORADO	3,724,429	172.5	21,590.9	0.948
MASSACHUSETTS	6,048,812	279.0	21,680.3	0.944
GEORGIA	7,160,359	329.5	21,731.0	0.942
OREGON	3,126,934	142.0	22,020.7	0.930
OKLAHOMA	3,276,731	148.0	22,140.1	0.925
CONNECTICUT	3,272,168	147.0	22,259.6	0.920
TENNESSEE	5,229,824	221.5	23,610.9	0.867
DELAWARE	712,398	30.0	23,746.6	0.862
NEVADA	1,501,577	60.5	24,819.5	0.825
RHODE ISLAND	994,783	40.0	24,869.6	0.823
VIRGINIA	6,614,831	262.5	25,199.4	0.813
UTAH	1,942,224	77.0	25,223.7	0.812
WASHINGTON	5,421,995	213.5	25,395.8	0.806
NEW MEXICO	1,679,572	66.0	25,448.1	0.805
NEW YORK	18,193,530	675.5	26,933.4	0.760
TEXAS	18,629,572	647.5	28,771.5	0.712
MARYLAND	5,040,705	155.5	32,416.1	0.632
NEW JERSEY	7,935,029	242.0	32,789.4	0.624
LOUISIANA	4,330,077	118.5	36,540.7	0.560
CALIFORNIA	31,678,652	808.5	39,182.0	0.523
ALASKA	615,424	11.0	55,947.6	0.366

Figure 7. 1995 Population/18 Hole Equivalent by State

growth has an influence on course construction. The LQ's calculated for each State and MSA illustrated the growth of holes related to population. There are several states and MSA's that fit the appearance of being driven by population. But many of the states and MSA's that are found near the top in all of these tables are found in the northeast and north central U.S. where population growth is not as high. The Spearman's Rank Order Correlation Coefficient that was applied to percentage hole growth and percentage population growth. R was calculated to be .6171 and R^2 was .3809. The level of significance was 0.000.

The second hypothesis in this study was that course construction occurred in areas with high populations per 18 hole equivalent. The 18 hole equivalents for 1989 and 1995 illustrate the growth of golf courses nation wide. The states near the bottom of the list (high populations per 18 hole equivalent) undoubtedly experienced course construction due to high demand for more facilities. However, the states near the top of each list were not states that had high population growth and already had low population numbers per 18 hole equivalent (high accessibility to golf). This can be explained by examining the regions' golf characteristics. The Northern Heartland region is home to many of the states that are experiencing large growth in golf. Its characteristics are covered further in the next chapter.

CHAPTER V

OTHER IMPACTS ON COURSE CONSTRUCTION

The previous chapter concentrated on the role that population growth has had on golf course development. The Spearman's rank order coefficient test indicated that population growth accounted for approximately 38 percent of the new course construction from 1989 to 1995. This chapter will attempt to identify the remaining factors that influenced golf course construction during that period.

The Northern Heartland golf region, identified by Adams and Rooney, has been referred to earlier in this study. It is a region that includes all or portions of Maine, Vermont, New Hampshire, Massachusetts, New York, Connecticut, Rhode Island, New Jersey, Pennsylvania, Ohio, Indiana, Illinois, Missouri, Michigan, Wisconsin, and Minnesota. This region, especially the states in the Northeast, are the cultural hearth of American golf. Tradition is very high here and the game is immensely popular.

Course construction was active in this region, even though population numbers did not rise as fast as many other states. More facilities were built simply because the golfing population wants to play on new courses and participation rates are higher than any other region in the country. The term "inventory replacement" can be used to describe why so many new courses were built. Inventory replacement refers to the building of new courses despite there being an adequate number of courses to play . People play enough golf to support these new courses. They apparently like the variety and selection. Course accessibility has always been high in this region but does not seem

to affect the progress of new course construction.

As the figures and maps in the previous chapter indicated, the states located in the Northern Heartland are very strong in golf. Nearly all of the states within the Northern Heartland had LQ's greater than the national average. The only exception is Wisconsin, with an LQ of .947, slightly below the national figure.

Many of the MSA's located within the Northern Heartland are located near the top of each MSA LQ table. This is especially evident in Table 3, which shows MSA's with populations of 2 million and greater. Every MSA located within the Northern Heartland has an LQ greater than the national average.

Another indication of the status of golf in this region is the State Hole/Population LQ tables (Tables 7 and 8) shown in Chapter 4, for 1989 and 1995. Again, many of the states that are located within the Northern Heartland are very high on the list of LQ's for population per 18 hole equivalents, demonstrating that even though they have low numbers of people per golf course, they have been able to maintain high course construction rates.

The Northern Heartland is a unique area in relation to U.S. golf. This area is home to nearly forty percent of the nation's golf course holes. The ongoing construction of courses in this area is a direct reflection of the people of the area and their activities toward sports and the outdoors, and in this particular case, their attitude toward golf.

The Southern Void region, identified by Adams and Rooney, on the other hand, is notoriously known for its lack of support in the golfing world. In general, the states of this region have high population numbers per hole, particularly in metropolitan regions.

There are also very few public courses that were built to cater to local residents, again most notable in metropolitan areas. Less than forty percent of this region's counties contain a public golf course facility, and many rural counties have no golf facilities. The presence of private clubs raises the regional average, but this region is still far behind the other golf regions. The South Atlantic region, immediately east of the Southern Void region, has about twice as many holes per capita. The Southern Void region is a prime example of a golf region needing more than just a positive climate to generate significant golf course construction (Adams and Rooney, 1989).

Table 9 shows the comparison between the states in the Southern Void golf region and the Northern Heartland region in terms of holes constructed from 1989 to 1995. As can be seen in the table, there is a vast difference in the numbers between the Northern Heartland and the Southern Void region. Overall, the numbers are larger in the Northern Heartland. There are some large numbers as well in the Southern Void region, but keep in mind the differences in population and golf participation figures. This will undoubtedly weaken the appearance of many Southern Void states.

The table shows that many states appear in both regions. These states include Missouri, Ohio, Indiana, and Illinois. Each of these states are very strong overall in course construction and golf participation. However, the areas shown on the golf regions map (Figure 2) indicate the weaker areas of each of these states.

The difference in participation rates between the Northern Heartland and the Southern Void is dramatic. Minnesota and Wisconsin lead the nation in overall participation with rates of 20.2% and 18.2%, respectively. Michigan, Ohio, Indiana, and

Illinois all have high participation rates as well (Table 9). Conversely, the states in the Southern Void region are among the lowest in participation percentage. Louisiana, Mississippi, Arkansas, and Alabama are annually among the lowest in participation in the U.S. Figure 8 illustrates the percent participation in each state. The patterns of participation are quite visible, with southern states notably lower than northern states.

Percentage participation by state and percentage growth in holes were also tested with another Spearman's rank order correlation coefficient. Using the same formula mentioned earlier, the R_s value was calculated to be .316597915, with the R^2 being .100234239. This means that participation rates can account for approximately ten percent of the growth in holes from 1989 to 1995. The level of significance is .0136, meaning that there is a confidence level of over 99 percent.

Another significant factor in the pattern of course construction between 1989 and 1995 were the resort courses. The popularity of resort courses is growing along with the popularity of golf. The combination of lush resort hotels and majestic golf courses as their backdrop has gathered the attention of business travelers and vacationers alike. Many resort locations are influenced by golf sensitive winter and summer climates. So, we would expect higher than average course construction in the Sun Belt and selected northern locations.

But the limits on where these types of resort facilities can be placed may have a resounding effect on the overall outlook of course construction. One obvious limit is the location of the resort. Typically, resorts are found in areas that are popular vacation destinations. Certainly the climate of Arizona, California, and Florida enhance the

Table 9

1994 Participation Rates, By State

State	Participation Rate By State (%)
NORTH DAKOTA	22.1
MINNESOTA	20.2
SOUTH DAKOTA	18.5
UTAH	18.3
WISCONSIN	18.2
NEBRASKA	17.2
MICHIGAN	17.0
IOWA	16.7
IDAHO	15.9
ILLINOIS	15.5
OHIO	14.6
WYOMING	13.9
KANSAS	13.9
CONNECTICUT	13.8
ARIZONA	13.5
NEVADA	13.4
MONTANA	13.0
MISSOURI	12.9
INDIANA	12.8
WASHINGTON	12.8
RHODE ISLAND	12.8
COLORADO	12.6
NEW MEXICO	12.2
MASSACHUSETTS	11.6
NEW YORK	11.3
OREGON	11.2
OKLAHOMA	10.9
CALIFORNIA	10.9
PENNSYLVANIA	10.8
KENTUCKY	10.7
SOUTH CAROLINA	10.6
NEW HAMPSHIRE	10.2
NEW JERSEY	10.2
FLORIDA	10.0
NORTH CAROLINA	9.9
MAINE	9.6
VIRGINIA	9.4
TEXAS	9.1
VERMONT	9.0
DELAWARE	8.6
MARYLAND	8.4
GEORGIA	8.1
TENNESSEE	7.5
ALABAMA	7.1
WEST VIRGINIA	6.7
ARKANSAS	6.1
LOUISIANA	5.3
MISSISSIPPI	5.1

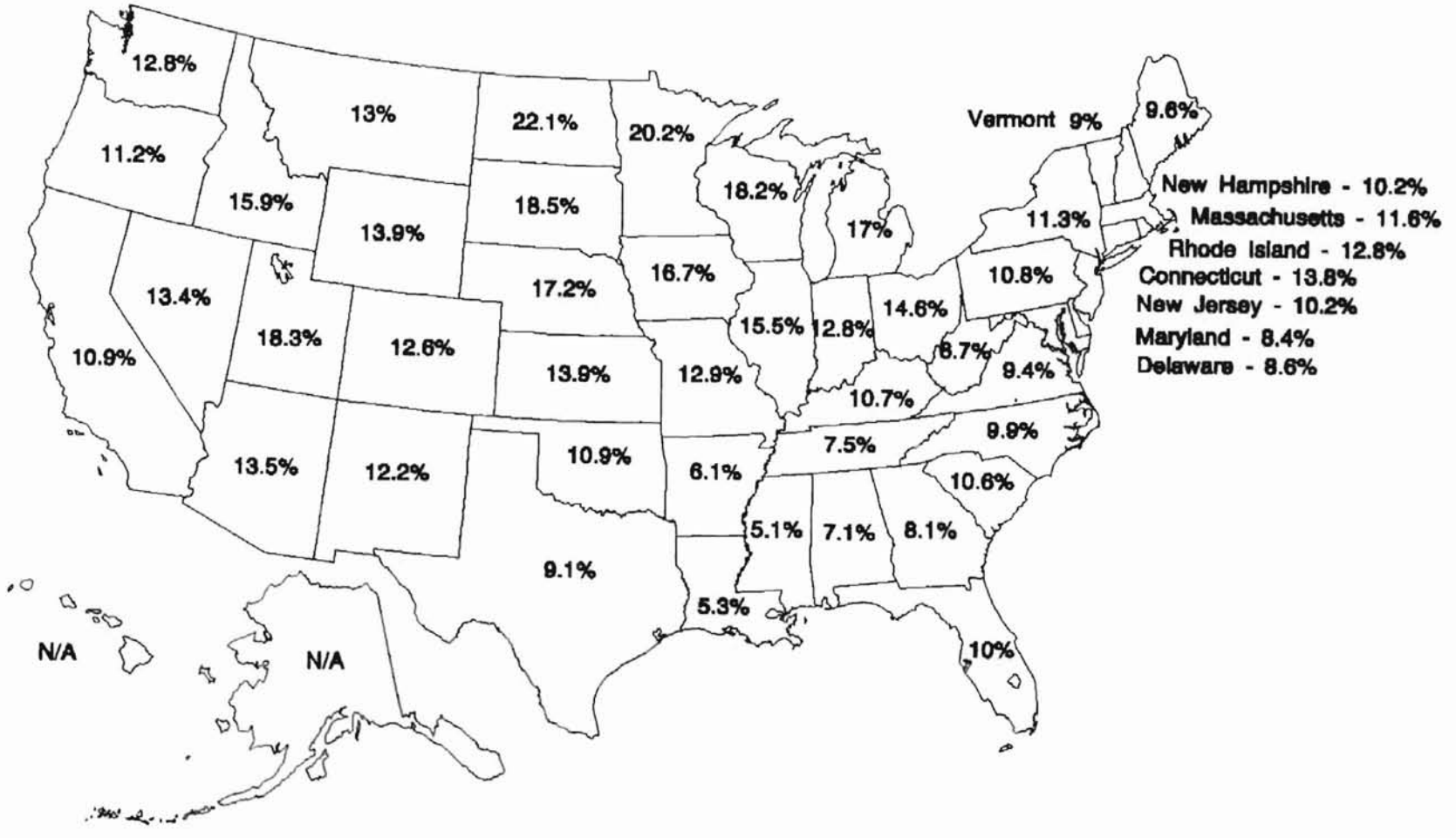

Figure 8. Percent Participation By State, 1994

appeal of resort courses in those areas, particularly in the winter months. Resort locations are generally located within the vicinity of a sizable city. For instance, there are many resorts close to the areas in Miami, Tampa, Phoenix, and Palm Springs, just to name a few. But this is not always the case. Hilton Head, SC, Pinehurst, NC, and Northern Michigan are examples of resort areas with great reputations but not located near a large city. These resort courses can survive in remote areas because their customers are generally not from the immediate area. Many people who play resort courses are on vacation or happen to be in the area on business and choose these place because of their fabulous facilities dedicated to both golf and business. Table 10 breaks down major resort construction. The resorts are sorted by county. Each resort area is shown in the table along with the total number of courses constructed within theses counties.

There are many different possibilities that explain why golf is not growing in certain areas of the country where it theoretically should be growing. MSA's like Los Angeles and New York are experiencing land shortages and high land costs. The demand for golf is present, but the cost of land in these areas is too high for the development of golf courses.

Environmental concerns also can affect the construction of golf courses in areas. The fact that golf courses require many different kinds of pesticides and fertilizers make them unpopular in certain areas. California, for one, is a state with very strict laws governing the application of chemicals and fertilizers. Without the use of chemicals, many can not construct the kind of course that they want to build.

Table 10

Courses Constructed Inside Resort Counties. 1989 to 1995

State	County	Resort Area	Total Courses
ARKANSAS			
	Benton	Ozarks	3
ARIZONA			
	Maricopa	Phoenix	28
	Pima	Tuscon	3
CALIFORNIA			
	Riverside	Palm Springs	15
COLORADO			
	Eagle	Rocky Mtns.	1
	Pitkin	"	2
	San Juan	"	1
	Summit	"	2
FLORIDA			
	Volusia	Daytona	7
	Charlotte	Fort Myers	4
	Lee	"	9
	St. Johns	Jacksonville	2
	Collier	Naples	16
	Hernando	Orlando	5
	Lake	"	9
	Orange	"	4
	Polk	"	10
	Bay	Panama City	2
	Santa Rosa	Pensacola	4
	Walton	"	1
	St. Lucie	Port St. Lucie	3
	Manatee	Sarasota	3
	Sarasota	"	9
	Brevard	South Florida	4
	Dade	"	4
	Hillsborough	Tampa	6
	Pasco	"	2
	Pinellas	"	4
	Indian River	Vero Beach	3
	Martin	W. Palm Beach	7
	Palm Beach	"	11
GEORGIA			
	Glynn	Atlantic Coast	4
HAWAII			
	Maui	Honolulu	4
MASSACHUSETTS			
	Barnstable	Cape Cod	4
MARYLAND			
	Worcester	Worcester	3
MICHIGAN			
	Antrim	Upper Michigan	1
	Benzie	"	2

Table 10

Courses Constructed Inside Resort Counties, 1989 to 1995

State	County	Resort Area	Total Courses
MICHIGAN			
	Charlevoix	Upper Michigan	2
	Emmet	"	2
	Leelanau	"	2
	Oscoda	"	2
	Otsego	"	3
MISSOURI			
	Camden	Ozarks	2
	Taney	"	1
MONTANA			
	Flathead	Flathead Lake	2
	Gallatin	Bozeman	1
N. CAROLINA			
	Avery	NW Carolina	1
	Brunswick	Coastal Carolina	5
	Macon	Western Carolina	1
	Moore	Pinehurst	4
N. HAMPSHIRE			
	Carroll	NH Mountains	1
NEW JERSEY			
	Cape May	Cape May	2
NEVADA			
	Clark	Las Vegas	13
OREGON			
	Deschutes	Mt. Bachelor	5
PENNSYLVANIA			
	Monroe	Poconos	2
S. CAROLINA			
	Beaufort	Myrtle Beach	10
	Horry	Hilton Head	13
WISCONSIN			
	Vilas	Upper Wisconsin	1

Water concerns are also a problem in areas. A golf course requires a great deal of irrigation and in some areas, primarily in the southwestern U.S., restrictions on water use is a major concern. Water may not be available or may be too expensive to irrigate a golf course. And in areas such as this, irrigation is vital to the survival of the golf course.

Chapter 4 addressed the hypotheses in relation to population impacting course construction and the construction of courses in areas with high numbers of people per 18 hole equivalents to eliminate shortage of holes. But this did not account for all course construction.

This chapter explored other reasons for courses being built. Specifically, it addressed the Northern Heartland region and the impacts it has had on course construction. Participation is the highest in this area and the popularity of golf here is unmatched anywhere else. This tradition and popularity has done a great deal in supporting the game of golf in this region, even when it appeared that the growth of population couldn't.

Other possible factors influencing the expansion of golf are mentioned. Resort construction, water concerns, and environmental regulations all have impacts on the building of courses in this country as well.

CHAPTER VI

CONCLUSIONS

The purpose of this study was to examine the impacts that population growth has had on construction of golf courses in each state and MSA. It has always been thought that population is the biggest factor in the need for new facilities, but other factors influencing course construction were analyzed as well and shown to be important.

The first hypothesis was that population growth influences course construction. This should always be true, because if there is sizable population growth, then there will be a demand for new golf facilities. But what needed to be determined is exactly how much of an impact population has had on the construction of new courses.

Location quotients (LQ's) were calculated and applied to states and MSA's to demonstrate how their numbers stood in relation to national averages. The state/hole population LQ's revealed that many of the states in the northeast and upper Midwest experienced greater growth in golf facilities than in population. The LQ's for MSA's revealed much of the same information. MSA's in the northern half of the U.S., particularly in the northeast had greater golf facility growth than population growth.

A Spearman's Rank Order Correlation Coefficient was applied to the categories of percentage hole growth and percentage population growth. In this case, r_s was calculated to be .6171, and r^2 was determined to be .3809. This indicated that population growth explained approximately 38% of overall course construction in the U.S.

The second hypothesis was that course construction occurred in areas with high

populations per 18 hole equivalent. The number of people per 18 hole equivalent was calculated for each state in both 1989 and 1995. An LQ was also calculated to reveal how each state compared to the national average. In comparing the figures from 1989 to 1995, it was discovered that there was not much change in the order of the states from 1989 to 1995. But the nation as a whole dropped the national average by approximately 2,000 people per 18 hole equivalent.

Another phenomena that was discovered during this study was that course growth occurred in the "Northern Heartland" golf region despite low increases in population growth. This was referred to several times as the "heart" of golf in the U.S. Throughout the study, the states in the Northern Heartland region were consistently found to have tremendous facility construction. Even though the rise in population numbers were not as high in the Northern Heartland states than in other states, course construction remained strong.

Extremely high participation percentages among the population is the single most important factor in the ongoing construction in this region. High quality public courses are the norm in this region, and the public golfers are the main golf group that needs to be satisfied. The popularity of golf in this area will always draw large numbers of people, and new facilities will always be in demand. This area has always been home to golf in the U.S. and harbors a tradition that is unmatched by the rest of the country.

Despite the accommodating climate that the South enjoys, golf remains a secondary sport in this region. As illustrated earlier, participation rates are low and courses are not as accessible in the South. Golf does not have a strong tradition and

following here, unlike other sports such as football and outdoor activities like hunting and fishing. This is the perfect example of the power that tradition and popularity have in the influence of course construction in a certain area.

The Northern Heartland region of the U.S. is a prime example of how other influences have come into play with relation to golf course construction in the U.S. Population was believed to have been the single greatest factor in the rise in number of courses in the U.S. But the Northern Heartland region demonstrated that the tradition and popularity of the game can be a big influence on the expansion of golf. The participation figures showed the success that golf is experiencing here and that is the single greatest factor in the continuing construction of courses in the region. Other regions across the U.S. are improving in terms of courses being built. The South Atlantic region is growing, mainly due to the rise in resort construction in Florida and the Carolinas. The West is experiencing good growth with the boom of golf in cities like Las Vegas and the Phoenix areas. But all other regions pale in comparison to the status of golf in the Northern Heartland.

This information provided by this study can be usefully applied in different areas. First, the analysis of the construction dynamics of each state and MSA would be very helpful to anyone wanting to develop a new golf course. This study pinpoints the regions across the country where new course construction can be successful. The breakdown of MSA's would be particularly useful when looking at which cities might be the best for new course construction.

The resort data provided in this study also has applied value. The popularity of

resort courses that mix business and golf make this information valuable. The identification of resort counties across the U.S. illustrates where resort courses are being located and are successful.

Further research could focus on the construction dynamics in particular MSA's. The in depth analysis of such cities like Las Vegas, Dallas, Atlanta, and Chicago would provide for an interesting study, specifically case studies that compare cities of similar size but different golf characteristics. Good examples of this kind of study would be the current situation with Dallas and Atlanta. These are two cities similar in size, but worlds apart in golf. Both are growing, Dallas at 9% from 1989 to 1995, and Atlanta at 14%, but Atlanta experienced hole growth of nearly 40%, while Dallas had hole growth of only 10%. A case study examining the reasons for these differences would be a suitable project in the future.

Another project would be the follow up of many of these new golf courses. Surveys could be sent to individual courses tracking how these courses have done since their inception. This data would be valuable to track and analyze individual regions across the U.S. and show the strengths and weaknesses of each region's golf community.

Also several possible impacts on construction that were mentioned in this study could be explored further. Such subjects as environmental regulations that may help/hinder course development, tourism areas, retirement migration patterns, analysis of resort and retirement community golf, and the geographic differences in the role of women in golf are all issues that may be having influences on the expansion of golf today.

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Appendixes

Appendix A

State Data

State	Holes Before 1989	Holes 1989 and After	% Increase Holes	1989 Population	1995 Population	% Increase in Population	Course Before 1989	Courses 1989 and After	% Increase in Courses	Private Holes Before 1989	Private Holes 1989 and After
ALASKA	135	63	0.467	547000	615424	0.125	12	5	0.417	9	0
ALABAMA	3150	792	0.251	4030000	4249837	0.055	193	36	0.187	1548	90
ARKANSAS	1971	306	0.155	2346000	2471910	0.054	130	25	0.192	1197	90
ARIZONA	3546	729	0.206	3622000	4155806	0.147	200	40	0.200	1071	135
CALIFORNIA	12285	2268	0.185	29218000	31678652	0.084	717	96	0.134	4716	369
COLORADO	2655	450	0.169	3276000	3724429	0.137	159	31	0.195	855	27
CONNECTICUT	5238	81	0.015	3283000	3272168	-0.003	158	7	0.044	1224	27
DELAWARE	432	108	0.250	658000	712398	0.083	21	7	0.333	306	27
FLORIDA	15309	3153	0.206	12638000	14118076	0.117	748	176	0.235	6786	1044
GEORGIA	4464	1467	0.329	6411000	7160359	0.117	265	84	0.317	2205	279
HAWAII	1107	342	0.309	1095000	1190170	0.087	52	19	0.365	243	72
IOWA	3978	306	0.077	2771000	2837678	0.024	370	25	0.068	972	27
IDAHO	1089	99	0.091	994000	1156283	0.163	81	7	0.086	207	0
ILLINOIS	8505	1404	0.165	11410000	11805251	0.035	538	93	0.173	2799	234
INDIANA	5571	990	0.178	5524000	5787633	0.048	348	67	0.193	1458	72
KANSAS	2727	306	0.112	2473000	2567031	0.038	222	21	0.095	1278	36
KENTUCKY	2907	810	0.279	3677000	3850163	0.047	198	55	0.278	1269	198
LOUISIANA	2034	99	0.049	4253000	4330077	0.018	141	8	0.057	1098	0
MASSACHUSETTS	4635	387	0.083	6015000	6048812	0.006	311	27	0.087	1665	45
MARYLAND	2250	549	0.244	4727000	5040705	0.066	124	31	0.250	1314	72
MAINE	1368	135	0.099	1220000	1242600	0.019	110	12	0.109	216	27
MICHIGAN	11133	2187	0.196	9253000	9524277	0.029	643	126	0.196	2250	207
MINNESOTA	5058	927	0.183	4338000	4600326	0.060	354	61	0.172	891	45
MISSOURI	3591	846	0.236	5096000	5305803	0.041	256	55	0.215	1404	171
MISSISSIPPI	1944	333	0.171	2574000	2687798	0.044	140	24	0.171	1152	45
MONTANA	954	180	0.189	800000	867075	0.084	72	14	0.194	252	0
N. CAROLINA	7488	1197	0.160	6565000	7147392	0.089	414	72	0.174	2718	270
N. DAKOTA	1053	81	0.077	646000	638633	-0.011	102	6	0.059	198	0
NEBRASKA	1935	495	0.256	1575000	1629848	0.035	159	38	0.239	603	54
NEW HAMPSHIRE	1170	225	0.192	1105000	1143963	0.035	82	17	0.207	180	0
NEW JERSEY	3996	360	0.090	7726000	7935029	0.027	226	23	0.102	2007	180

State	% Increase in Private Holes	Private Courses Before 1989	Private Courses 1989 and After	% Increase in Private Courses	Public Holes Before 1989	Public Holes 1989 and After	% Increase in Public Holes	Public Courses Before 1989	Public Courses 1989 and After
ALASKA	0.000	1	0	0.000	126	63	0.500	11	5
ALABAMA	0.058	98	6	0.061	1467	702	0.479	95	30
ARKANSAS	0.075	75	5	0.067	774	216	0.279	55	20
ARIZONA	0.126	54	7	0.130	2475	594	0.240	146	33
CALIFORNIA	0.078	253	22	0.087	7569	1170	0.155	464	74
COLORADO	0.032	44	2	0.045	1800	423	0.235	115	29
CONNECTICUT	0.022	73	2	0.027	1359	54	0.040	85	5
DELAWARE	0.088	14	4	0.286	126	36	0.286	7	3
FLORIDA	0.154	308	53	0.172	8523	2109	0.247	440	123
GEORGIA	0.127	125	14	0.112	2259	1188	0.526	140	70
HAWAII	0.296	14	4	0.286	864	270	0.313	38	15
IOWA	0.028	80	2	0.025	3006	279	0.093	290	23
IDAHO	0.000	13	0	0.000	882	99	0.112	68	7
ILLINOIS	0.084	174	13	0.075	5706	1170	0.205	364	80
INDIANA	0.049	89	4	0.045	4113	918	0.223	259	63
KANSAS	0.028	100	2	0.020	1449	270	0.186	122	19
KENTUCKY	0.156	82	12	0.146	1638	612	0.374	116	43
LOUISIANA	0.000	76	0	0.000	936	99	0.106	65	8
MASSACHUSETTS	0.027	104	3	0.029	2970	342	0.115	207	24
MARYLAND	0.055	68	4	0.059	936	477	0.510	56	27
MAINE	0.125	15	2	0.133	1152	108	0.094	95	10
MICHIGAN	0.092	127	12	0.094	8883	1980	0.223	516	114
MINNESOTA	0.051	55	3	0.055	4167	882	0.212	299	58
MISSOURI	0.122	100	10	0.100	2187	675	0.309	156	45
MISSISSIPPI	0.039	90	4	0.044	792	288	0.364	50	19
MONTANA	0.000	17	0	0.000	702	180	0.256	55	14
N. CAROLINA	0.099	142	15	0.106	4770	927	0.194	272	57
N. DAKOTA	0.000	16	0	0.000	855	81	0.095	86	6
NEBRASKA	0.090	44	3	0.068	1332	441	0.331	115	35
NEW HAMPSHIRE	0.000	13	0	0.000	990	225	0.227	69	17
NEW JERSEY	0.090	112	12	0.107	1989	180	0.090	114	11

State	Holes Before 1989	Holes 1989 and After	'ercent Increas Holes	1989 Population	1995 Population	Percent Increase in Population	Course Before 1989	Courses 1989 and After	'ercent Increas in Courses	Private Holes Before 1989	Private Holes 1989 and After
NEW MEXICO	1062	126	0.119	1504000	1679572	0.117	68	7	0.103	306	18
NEVADA	684	405	0.592	1137000	1501577	0.321	39	22	0.564	81	153
NEW YORK	11169	990	0.089	17983000	18193530	0.012	694	76	0.110	3870	144
OHIO	10539	1146	0.109	10829000	11140120	0.029	631	74	0.117	2862	306
OKLAHOMA	2340	324	0.138	3150000	3276731	0.040	158	21	0.133	720	0
OREGON	2106	450	0.214	2791000	3126934	0.120	142	32	0.225	522	99
PENNSYLVANIA	9765	972	0.100	11866000	12074991	0.018	594	63	0.106	3456	252
RHODE ISLAND	684	36	0.053	1001000	994783	-0.006	46	2	0.043	324	0
S. CAROLINA	4572	1287	0.281	3457000	3691462	0.068	242	69	0.285	1566	297
S. DAKOTA	1161	162	0.140	697000	725397	0.041	104	14	0.135	333	45
TENNESSEE	3330	657	0.197	4854000	5229824	0.077	213	38	0.178	1422	99
TEXAS	10476	1179	0.113	16807000	18629572	0.108	647	77	0.119	4608	189
UTAH	1161	225	0.194	1706000	1942224	0.138	75	14	0.187	216	0
VIRGINIA	3897	828	0.212	6120000	6614831	0.081	228	50	0.219	1980	189
VERMONT	828	27	0.033	558000	583090	0.045	55	2	0.036	135	0
WASHINGTON	3186	657	0.206	4746000	5421995	0.142	217	40	0.184	882	36
WISCONSIN	5850	756	0.129	4857000	5113067	0.053	384	56	0.146	990	63
W. VIRGINIA	1539	198	0.129	1807000	1826929	0.011	105	14	0.133	414	27
WYOMING	630	18	0.029	458000	480158	0.048	46	2	0.043	81	0

State	Percent Increae in Private Holes	Private Courses Before 1989	Private Courses 1989 and After	_Percent Increase in Private Courses	Public Holes Before 1989	Public Holes 1989 and After	Percent Increase in Public Holes	Public Courses Before 1989	Public Courses 1989 and After
NEW MEXICO	0.059	19	0	0.000	756	108	0.143	49	6
NEVADA	1.889	4	8	2.000	603	252	0.418	35	14
NEW YORK	0.037	229	9	0.039	7299	846	0.116	465	67
OHIO	0.107	165	15	0.091	7677	840	0.109	466	59
OKLAHOMA	0.000	46	0	0.000	1620	324	0.200	112	21
OREGON	0.190	33	6	0.182	1584	351	0.222	109	26
PENNSYLVANIA	0.073	203	15	0.074	6309	720	0.114	391	48
RHODE ISLAND	0.000	20	0	0.000	360	36	0.100	26	2
S. CAROLINA	0.190	84	17	0.202	3006	990	0.329	158	52
S. DAKOTA	0.135	27	3	0.111	828	117	0.141	77	11
TENNESSEE	0.070	86	5	0.058	1908	558	0.292	127	33
TEXAS	0.041	264	10	0.038	5868	990	0.169	383	67
UTAH	0.000	12	0	0.000	945	225	0.238	63	14
VIRGINIA	0.095	116	11	0.095	1917	639	0.333	112	39
VERMONT	0.000	7	0	0.000	693	27	0.039	48	2
WASHINGTON	0.041	54	2	0.037	2304	621	0.270	163	38
WISCONSIN	0.064	60	4	0.067	4860	693	0.143	324	52
W. VIRGINIA	0.065	29	2	0.069	1125	171	0.152	76	12
WYOMING	0.000	6	0	0.000	549	18	0.033	40	2

Appendix B

MSA Data

MSA	1989 Population	1995 Population	% Increase in Population	Courses Before 1989	Courses 1989 and After	% Increase in Courses	Holes Before 1989	Holes 1989 to 1995	% Increase in Holes	Private Holes Before 1989
Abilene, TX	119655	122382	0.023	6	0	0.000	90	0	0.000	54
Akron, OH	657575	679959	0.034	41	6	0.146	810	84	0.104	243
Albany, GA	112561	117792	0.046	3	1	0.333	45	18	0.400	18
Albany-Schenectady-Troy, NY	861424	876783	0.018	47	3	0.064	810	27	0.033	252
Albuquerque, NM	589131	655913	0.113	13	1	0.077	279	27	0.097	117
Alexandria, LA	131556	125137	-0.049	5	0	0.000	63	0	0.000	36
Allentown-Bethlehem-Easton, PA	595081	614395	0.032	15	5	0.333	306	72	0.235	171
Altoona, PA	130542	131983	0.011	6	1	0.167	90	9	0.100	36
Amarillo, TX	187547	198917	0.061	5	3	0.600	99	45	0.455	36
Ann Arbor, MI	490058	519563	0.060	40	16	0.400	657	315	0.479	207
Anniston, AL	116034	117222	0.010	7	0	0.000	108	0	0.000	36
Appleton-Oshkosh-Neenah, WI	315121	335192	0.064	24	5	0.208	387	72	0.186	99
Asheville, NC	191774	205499	0.072	9	2	0.222	153	36	0.235	72
Athens, GA	126262	134627	0.066	4	1	0.250	72	18	0.250	18
Atlanta, GA	2959950	3399341	0.148	84	33	0.393	1548	612	0.395	873
Atlantic-Cape May, NJ	319416	331789	0.039	16	5	0.313	261	72	0.276	108
Augusta-Aiken, GA-SC	415184	453526	0.092	22	2	0.091	414	45	0.109	243
Austin-San Marcos, TX	846227	985963	0.165	32	5	0.156	594	90	0.152	234
Bakersfield, CA	543477	618724	0.138	17	4	0.235	261	72	0.276	108
Baltimore, MD	2382172	2469249	0.037	47	13	0.277	846	243	0.287	576
Bangor, ME	93544	90569	-0.032	6	0	0.000	90	0	0.000	18
Barnstable-Yarmouth, MA	134932	144335	0.070	25	2	0.080	450	36	0.080	153
Baton Rouge, LA	528264	563472	0.067	18	1	0.056	270	18	0.067	126
Beaumont-Port Arthur, TX	361226	374293	0.036	13	1	0.077	225	9	0.040	117
Bellingham, WA	127780	148336	0.161	14	3	0.214	180	54	0.300	36
Benton Harbor, MI	161378	161725	0.002	13	1	0.077	243	18	0.074	72
Bergen-Passaic, NJ	1278440	1309100	0.024	27	1	0.037	486	27	0.056	261
Billings, MT	113419	124440	0.097	7	1	0.143	126	18	0.143	90
Biloxi-Gulfport-Pascagoula, MS	312368	344579	0.103	15	2	0.133	270	36	0.133	63
Binghamton, NY	264497	261009	-0.013	18	3	0.167	333	45	0.135	81
Birmingham, AL	840140	877539	0.045	32	6	0.188	567	144	0.254	369
Bismarck, ND	83831	89040	0.062	5	1	0.200	72	18	0.250	18
Bloomington, IN	108978	114821	0.054	5	2	0.400	90	45	0.500	18
Bloomington-Normal, IL	129180	139031	0.076	9	2	0.222	117	36	0.308	45
Boise City, ID	295851	357113	0.207	14	3	0.214	207	36	0.174	63
Boston, MA-NH	3226935	3241647	0.005	113	12	0.106	1719	189	0.110	774
Boulder-Longmont, CO	225339	253917	0.127	9	2	0.222	144	36	0.250	45
Brazoria, TX	191707	214876	0.121	10	0	0.000	144	0	0.000	54
Bremerton, WA	189731	225363	0.188	7	1	0.143	117	18	0.154	36
Bridgeport, CT	443729	441812	-0.004	16	0	0.000	261	0	0.000	135
Brockton, MA	236409	238911	0.011	14	0	0.000	207	0	0.000	45
Brownsville-Harlingen-San Benito, TX	260120	306757	0.179	11	2	0.182	207	27	0.130	63
Bryan-College Station, TX	121862	132165	0.085	3	1	0.333	54	18	0.333	18
Buffalo-Niagara Falls, NY	1189288	1187975	-0.001	46	8	0.174	783	90	0.115	288
Burlington, VT	154058	162121	0.052	10	1	0.100	153	18	0.118	18
Canton-Massillon, OH	394106	403728	0.024	24	4	0.167	468	63	0.135	99
Casper, WY	61226	64361	0.051	3	0	0.000	45	0	0.000	18

MSA	Private Holes 1989 and After	% Increase in Private Holes	Private Courses Before 1989	Private Courses 1989 and After	% Increase in Private Courses	Public Holes Before 1989	Public Holes 1989 and After	% Increase in Public Holes	Public Courses Before 1989	Public Courses 1989 and After	% Increase in Public Courses
Abilene, TX	0	0.000	3	0	0.000	36	0	0.000	3	0	0.000
Akron, OH	18	0.074	12	1	0.083	567	66	0.116	29	5	0.172
Albany, GA	0	0.000	1	0	0.000	27	18	0.667	2	1	0.500
Albany-Schenectady-Troy, NY	0	0.000	14	0	0.000	558	27	0.048	33	3	0.091
Albuquerque, NM	0	0.000	6	0	0.000	162	27	0.167	7	1	0.143
Alexandria, LA	0	0.000	2	0	0.000	27	0	0.000	3	0	0.000
Allentown-Bethlehem-Easton, PA	0	0.000	7	0	0.000	135	72	0.533	8	5	0.625
Altoona, PA	0	0.000	2	0	0.000	54	9	0.167	4	1	0.250
Amarillo, TX	0	0.000	2	0	0.000	63	45	0.714	3	3	1.000
Ann Arbor, MI	18	0.087	13	1	0.077	450	297	0.660	27	15	0.556
Anniston, AL	0	0.000	2	0	0.000	72	0	0.000	5	0	0.000
Appleton-Oshkosh-Neenah, WI	0	0.000	6	0	0.000	288	72	0.250	18	5	0.278
Asheville, NC	0	0.000	4	0	0.000	81	36	0.444	5	2	0.400
Athens, GA	0	0.000	1	0	0.000	54	18	0.333	3	1	0.333
Atlanta, GA	153	0.175	44	8	0.182	675	459	0.680	40	25	0.625
Atlantic-Cape May, NJ	18	0.167	5	2	0.400	153	54	0.353	11	3	0.273
Augusta-Aiken, GA-SC	27	0.111	11	1	0.091	171	18	0.105	11	1	0.091
Austin-San Marcos, TX	0	0.000	10	0	0.000	360	90	0.250	22	5	0.227
Bakersfield, CA	18	0.167	7	1	0.143	153	54	0.353	10	3	0.300
Baltimore, MD	72	0.125	29	4	0.138	270	171	0.633	18	9	0.500
Bangor, ME	0	0.000	1	0	0.000	72	0	0.000	5	0	0.000
Barnstable-Yarmouth, MA	18	0.118	8	1	0.125	297	18	0.061	17	1	0.059
Baton Rouge, LA	0	0.000	9	0	0.000	144	18	0.125	9	1	0.111
Beaumont-Port Arthur, TX	0	0.000	7	0	0.000	108	9	0.083	6	1	0.167
Bellingham, WA	0	0.000	3	0	0.000	144	54	0.375	11	3	0.273
Benton Harbor, MI	0	0.000	4	0	0.000	171	18	0.105	9	1	0.111
Bergen-Passaic, NJ	27	0.103	15	1	0.067	225	0	0.000	12	0	0.000
Billings, MT	0	0.000	5	0	0.000	36	18	0.500	2	1	0.500
Biloxi-Gulfport-Pascagoula, MS	0	0.000	4	0	0.000	207	36	0.174	11	2	0.182
Binghamton, NY	0	0.000	4	0	0.000	252	45	0.179	14	3	0.214
Birmingham, AL	36	0.098	20	2	0.100	198	108	0.545	12	4	0.333
Bismarck, ND	0	0.000	1	0	0.000	54	18	0.333	4	1	0.250
Bloomington, IN	0	0.000	1	0	0.000	72	45	0.625	4	2	0.500
Bloomington-Normal, IL	0	0.000	3	0	0.000	72	36	0.500	6	2	0.333
Boise City, ID	0	0.000	4	0	0.000	144	36	0.250	10	3	0.300
Boston, MA-NH	18	0.023	47	1	0.021	945	171	0.181	66	11	0.167
Boulder-Longmont, CO	0	0.000	2	0	0.000	99	36	0.364	7	2	0.286
Brazoria, TX	0	0.000	3	0	0.000	90	0	0.000	7	0	0.000
Bremerton, WA	0	0.000	2	0	0.000	81	18	0.222	5	1	0.200
Bridgeport, CT	0	0.000	8	0	0.000	126	0	0.000	8	0	0.000
Brockton, MA	0	0.000	3	0	0.000	162	0	0.000	11	0	0.000
Brownsville-Harlingen-San Benito, TX	18	0.286	3	1	0.333	144	9	0.063	8	1	0.125
Bryan-College Station, TX	18	1.000	1	1	1.000	36	0	0.000	2	0	0.000
Buffalo-Niagara Falls, NY	18	0.063	16	1	0.063	495	72	0.145	30	7	0.233
Burlington, VT	0	0.000	1	0	0.000	135	18	0.133	9	1	0.111
Canton-Massillon, OH	18	0.182	6	1	0.167	369	45	0.122	18	3	0.167
Casper, WY	0	0.000	1	0	0.000	27	0	0.000	2	0	0.000

MSA	1989 Population	1995 Population	% Increase in Population	Courses Before 1989	Courses 1989 and After	% Increase in Courses	Holes Before 1989	Holes 1989 to 1995	% Increase in Holes	Private Holes Before 1989
Cedar Rapids, IA	168767	178187	0.056	11	1	0.091	153	18	0.118	45
Champaign-Urbana, IL	173025	166410	-0.038	8	0	0.000	171	0	0.000	63
Charleston-North Charleston, SC	506875	524357	0.034	22	10	0.455	450	180	0.400	135
Charleston, WV	250454	255307	0.019	10	1	0.100	162	9	0.056	72
Charlotte-Gastonia-Rock Hill, NC-SC	1162093	1277305	0.099	49	8	0.163	873	135	0.155	387
Charlottesville, VA	131107	142148	0.084	5	2	0.400	90	36	0.400	90
Chattanooga, TN-GA	424347	441902	0.041	17	5	0.294	270	81	0.300	153
Cheyenne, WY	73142	78950	0.079	5	0	0.000	72	0	0.000	0
Chicago, IL	7410858	7710948	0.040	242	51	0.211	4293	801	0.187	1485
Chico-Paradise, CA	182120	193848	0.064	7	1	0.143	90	18	0.200	18
Cincinnati, OH-KY-IN	1526092	1589745	0.042	70	20	0.286	1224	324	0.265	450
Clarksville-Hopkinsville, TN-KY	169439	189129	0.116	7	2	0.286	126	36	0.286	63
Cleveland-Lorain-Elyria, OH	2202069	2223702	0.010	115	7	0.061	2052	117	0.057	504
Colorado Springs, CO	397014	464228	0.169	14	3	0.214	297	36	0.121	198
Columbia, MO	112379	123117	0.096	7	0	0.000	108	0	0.000	54
Columbia, SC	453331	491158	0.083	17	6	0.353	333	90	0.270	171
Columbus, GA-AL	260860	276622	0.060	10	3	0.300	225	54	0.240	81
Columbus, OH	1345450	1435579	0.067	68	15	0.221	1116	252	0.226	396
Corpus Christi, TX	349894	380058	0.086	11	0	0.000	198	0	0.000	99
Cumberland, MD-WV	101643	100885	-0.007	4	1	0.250	54	18	0.333	36
Dallas, TX	2676248	2937452	0.098	75	12	0.160	1467	153	0.104	738
Danbury, CT	193597	199879	0.032	11	0	0.000	153	0	0.000	90
Danville, VA	108711	110131	0.013	6	0	0.000	108	0	0.000	72
Davenport-Moline-Rock Island, IA-IL	350861	358566	0.022	26	1	0.038	378	18	0.048	108
Dayton-Springfield, OH	951270	956091	0.005	33	6	0.182	675	90	0.133	270
Daytona Beach, FL	399413	448514	0.123	24	9	0.375	432	153	0.354	90
Decatur, AL	131556	139776	0.062	7	0	0.000	108	0	0.000	36
Decatur, IL	117206	116254	-0.008	7	1	0.143	108	18	0.167	45
Denver, CO	1622980	1827888	0.126	54	5	0.093	1026	81	0.079	432
Des Moines, IA	392928	420532	0.070	22	3	0.136	369	54	0.146	135
Detroit, MI	4266654	4309716	0.010	168	42	0.250	3123	729	0.233	792
Dothan, AL	130964	135167	0.032	7	2	0.286	126	54	0.429	72
Dover, DE	110993	120823	0.089	3	1	0.333	54	18	0.333	36
Dubuque, IA	86403	88435	0.024	6	0	0.000	90	0	0.000	36
Duluth-Superior, MN-WI	239971	240809	0.003	22	3	0.136	297	45	0.152	45
Dutchess County, NY	259462	261587	0.008	17	2	0.118	216	27	0.125	90
Eau Claire, WI	137543	142650	0.037	11	1	0.091	153	9	0.059	36
El Paso, TX	591610	677261	0.145	8	3	0.375	162	54	0.333	99
Elkhart-Goshen, IN	156198	165518	0.060	10	2	0.200	180	27	0.150	72
Elmira, NY	95195	94357	-0.009	4	0	0.000	81	0	0.000	18
Enid, OK	56735	57030	0.005	3	0	0.000	45	0	0.000	18
Erie, PA	275572	281018	0.020	20	3	0.150	306	27	0.088	90
Eugene-Springfield, OR	282912	301546	0.066	13	2	0.154	189	36	0.190	63
Evansville-Henderson, IN-KY	278990	287875	0.032	16	1	0.063	252	9	0.036	108
Fargo-Moorhead, ND-MN	153296	163180	0.064	14	2	0.143	189	36	0.190	63
Fayetteville, NC	274566	289728	0.055	7	2	0.286	126	36	0.286	72
Fayetteville-Springdale-Rogers, AR	210908	248492	0.178	7	6	0.857	207	72	0.348	162
Fitchburg-Leominster, MA	138165	138262	0.001	7	0	0.000	108	0	0.000	18

MSA	Private Holes 1989 and After	% Increase in Private Holes	Private Courses Before 1989	Private Courses 1989 and After	% Increase in Private Courses	Public Holes Before 1989	Public Holes 1989 and After	% Increase in Public Holes	Public Courses Before 1989	Public Courses 1989 and After	% Increase in Public Courses
Cedar Rapids, IA	0	0.000	3	0	0.000	108	18	0.167	8	1	0.125
Champaign-Urbana, IL	0	0.000	4	0	0.000	108	0	0.000	4	0	0.000
Charleston-North Charleston, SC	36	0.267	7	2	0.286	315	144	0.457	15	8	0.533
Charleston, WV	0	0.000	4	0	0.000	90	9	0.100	6	1	0.167
Charlotte-Gastonia-Rock Hill, NC-SC	54	0.140	20	3	0.150	486	81	0.167	29	5	0.172
Charlottesville, VA	36	0.400	5	2	0.400	0	0		0	0	#DIV/0!
Chattanooga, TN-GA	18	0.118	9	1	0.111	117	63	0.538	8	4	0.500
Cheyenne, WY	0		0	0		72	0	0.000	5	0	0.000
Chicago, IL	216	0.145	81	12	0.148	2808	585	0.208	161	39	0.242
Chico-Paradise, CA	18	1.000	1	1	1.000	72	0	0.000	6	0	0.000
Cincinnati, OH-KY-IN	99	0.220	26	6	0.231	774	207	0.267	44	13	0.295
Clarksville-Hopkinsville, TN-KY	0	0.000	3	0	0.000	63	36	0.571	4	2	0.500
Cleveland-Lorain-Elyria, OH	18	0.036	28	1	0.036	1548	99	0.064	87	6	0.069
Colorado Springs, CO	0	0.000	8	0	0.000	99	36	0.364	6	3	0.500
Columbia, MO	0	0.000	4	0	0.000	54	0	0.000	3	0	0.000
Columbia, SC	45	0.263	8	3	0.375	162	45	0.278	9	3	0.333
Columbus, GA-AL	0	0.000	4	0	0.000	144	54	0.375	6	3	0.500
Columbus, OH	117	0.295	23	6	0.261	720	135	0.188	45	9	0.200
Corpus Christi, TX	0	0.000	6	0	0.000	99	0	0.000	5	0	0.000
Cumberland, MD-WV	0	0.000	2	0	0.000	18	18	1.000	2	1	0.500
Dallas, TX	0	0.000	38	0	0.000	729	153	0.210	37	12	0.324
Danbury, CT	0	0.000	7	0	0.000	63	0	0.000	4	0	0.000
Danville, VA	0	0.000	4	0	0.000	36	0	0.000	2	0	0.000
Davenport-Moline-Rock Island, IA-IL	0	0.000	7	0	0.000	270	18	0.067	19	1	0.053
Dayton-Springfield, OH	18	0.067	14	1	0.071	405	72	0.178	19	5	0.263
Daytona Beach, FL	18	0.200	5	1	0.200	342	135	0.395	19	8	0.421
Decatur, AL	0	0.000	2	0	0.000	72	0	0.000	5	0	0.000
Decatur, IL	0	0.000	3	0	0.000	63	18	0.286	4	1	0.250
Denver, CO	0	0.000	23	0	0.000	594	81	0.136	31	5	0.161
Des Moines, IA	18	0.133	9	1	0.111	234	36	0.154	13	2	0.154
Detroit, MI	90	0.114	42	6	0.143	2331	639	0.274	126	36	0.286
Dothan, AL	0	0.000	3	0	0.000	54	54	1.000	4	2	0.500
Dover, DE	18	0.500	2	1	0.500	18	0	0.000	1	0	0.000
Dubuque, IA	0	0.000	2	0	0.000	54	0	0.000	4	0	0.000
Duluth-Superior, MN-WI	0	0.000	3	0	0.000	252	45	0.179	19	3	0.158
Dutchess County, NY	0	0.000	8	0	0.000	126	27	0.214	9	2	0.222
Eau Claire, WI	0	0.000	2	0	0.000	117	9	0.077	9	1	0.111
El Paso, TX	36	0.364	5	2	0.400	63	18	0.286	3	1	0.333
Elkhart-Goshen, IN	0	0.000	4	0	0.000	108	27	0.250	6	2	0.333
Elmira, NY	0	0.000	1	0	0.000	63	0	0.000	3	0	0.000
Enid, OK	0	0.000	1	0	0.000	27	0	0.000	2	0	0.000
Erie, PA	0	0.000	5	0	0.000	216	27	0.125	15	3	0.200
Eugene-Springfield, OR	0	0.000	4	0	0.000	126	36	0.286	9	2	0.222
Evansville-Henderson, IN-KY	0	0.000	7	0	0.000	144	9	0.063	9	1	0.111
Fargo-Moorhead, ND-MN	0	0.000	3	0	0.000	126	36	0.286	11	2	0.182
Fayetteville, NC	18	0.250	4	1	0.250	54	18	0.333	3	1	0.333
Fayetteville-Springdale-Rogers, AR	18	0.111	4	1	0.250	45	54	1.200	3	5	1.667
Fitchburg-Leominster, MA	0	0.000	1	0	0.000	90	0	0.000	6	0	0.000

MSA	1989 Population	1995 Population	% Increase in Population	Courses Before 1989	Courses 1989 and After	% Increase in Courses	Holes Before 1989	Holes 1989 to 1995	% Increase in Holes	Private Holes Before 1989
Flint, MI	430459	433547	0.007	24	4	0.167	405	63	0.156	162
Florence, AL	131327	136378	0.038	9	2	0.222	126	36	0.286	54
Florence, SC	114344	122244	0.069	4	1	0.250	72	18	0.250	36
Fort Collins-Loveland, CO	186136	217277	0.167	11	3	0.273	171	36	0.211	36
Fort Lauderdale, FL	1255488	1409104	0.122	54	2	0.037	1188	45	0.038	414
Fort Myers-Cape Coral, FL	335113	373570	0.115	43	9	0.209	846	144	0.170	387
Fort Pierce-Port St. Lucie, FL	251071	283576	0.129	38	12	0.316	729	192	0.263	495
Fort Smith, AR-OK	175911	186759	0.062	9	2	0.222	135	18	0.133	36
Fort Walton Beach, FL	143776	164429	0.144	10	5	0.500	252	72	0.286	63
Fort Wayne, IN	456281	471049	0.032	31	4	0.129	513	72	0.140	72
Fort Worth-Arlington, TX	1361034	1481551	0.089	38	7	0.184	684	99	0.145	315
Fresno, CA	755580	847090	0.121	17	4	0.235	270	63	0.233	99
Gadsden, AL	99840	100519	0.007	5	1	0.200	81	36	0.444	63
Gainesville, FL	181596	195415	0.076	6	1	0.167	108	18	0.167	36
Galveston-Texas City, TX	217399	237575	0.093	8	0	0.000	153	0	0.000	81
Gary, IN	604526	622261	0.029	28	1	0.036	522	9	0.017	144
Glens Falls, NY	118539	122722	0.035	14	3	0.214	189	45	0.238	36
Goldsboro, NC	104666	109948	0.050	5	1	0.200	90	18	0.200	54
Grand Forks, ND-MN	103181	103697	0.005	11	1	0.091	126	9	0.071	36
Grand Rapids-Muskegon-Holland, MI	937891	992697	0.058	69	9	0.130	1314	171	0.130	234
Great Falls, MT	77691	81781	0.053	4	1	0.250	63	18	0.286	18
Greeley, CO	131821	146643	0.112	5	1	0.200	81	18	0.222	45
Green Bay, WI	194594	209397	0.076	10	3	0.300	162	45	0.278	18
Greensboro–Winston-Salem–High Point, NC	1050304	1116891	0.063	61	14	0.230	1125	234	0.208	288
Greenville, NC	107924	117771	0.091	6	0	0.000	108	0	0.000	72
Greenville-Spartanburg-Anderson, SC	830563	880286	0.060	37	7	0.189	684	117	0.171	351
Hagerstown, MD	121393	127213	0.048	5	1	0.200	72	18	0.250	27
Hamilton-Middletown, OH	316450	316450	0.000	14	3	0.214	234	36	0.154	90
Harrisburg-Lebanon-Carlisle, PA	587986	613062	0.043	29	3	0.103	477	54	0.113	198
Hartford, CT	1157618	1150435	-0.006	53	2	0.038	954	18	0.019	315
Hattiesburg, MS	98738	104613	0.060	5	2	0.400	81	27	0.333	18
Hickory-Morganton, NC	292409	308177	0.054	15	3	0.200	297	36	0.121	81
Houma, LA	182842	187985	0.028	6	0	0.000	72	0	0.000	45
Houston, TX	3322025	3708479	0.116	76	14	0.184	1539	261	0.170	927
Huntington-Ashland, WV-KY-OH	312529	316879	0.014	15	3	0.200	198	54	0.273	63
Huntsville, AL	293047	320111	0.092	10	1	0.100	171	54	0.316	72
Indianapolis, IN	1380491	1475465	0.069	70	20	0.286	1089	333	0.306	396
Iowa City, IA	96119	100806	0.049	7	1	0.143	81	9	0.111	9
Jackson, MI	149756	153773	0.027	20	0	0.000	351	0	0.000	45
Jackson, MS	395396	415004	0.050	16	3	0.188	333	36	0.108	207
Jackson, TN	77982	83388	0.069	5	0	0.000	72	0	0.000	36
Jacksonville, FL	906727	984759	0.086	35	11	0.314	693	189	0.273	369
Jacksonville, NC	149838	145863	-0.027	6	0	0.000	135	0	0.000	54
Jamestown, NY	141895	142064	0.001	16	2	0.125	252	18	0.071	36
Janesville-Beloit, WI	139510	147020	0.054	10	0	0.000	171	0	0.000	36
Jersey City, NJ	553099	552025	-0.002	0	0		0	0		0
Johnson City-Kingsport-Bristol, TN-VA	436047	453155	0.039	17	4	0.235	270	54	0.200	63
Johnstown, PA	241247	239328	-0.008	23	0	0.000	297	0	0.000	36

MSA	Private Holes 1989 and After	% Increase in Private Holes	Private Courses Before 1989	Private Courses 1989 and After	% Increase in Private Courses	Public Holes Before 1989	Public Holes 1989 and After	% Increase in Public Holes	Public Courses Before 1989	Public Courses 1989 and After	% Increase in Public Courses
Flint, MI	0	0.000	9	0	0.000	243	63	0.259	15	4	0.267
Florence, AL	0	0.000	4	0	0.000	72	36	0.500	5	2	0.400
Florence, SC	0	0.000	2	0	0.000	36	18	0.500	2	1	0.500
Fort Collins-Loveland, CO	0	0.000	2	0	0.000	135	36	0.267	9	3	0.333
Fort Lauderdale, FL	27	0.065	18	1	0.056	774	18	0.023	36	1	0.028
Fort Myers-Cape Coral, FL	54	0.140	18	3	0.167	459	90	0.196	25	6	0.240
Fort Pierce-Port St. Lucie, FL	90	0.182	27	5	0.185	234	102	0.436	11	7	0.636
Fort Smith, AR-OK	0	0.000	2	0	0.000	99	18	0.182	7	2	0.286
Fort Walton Beach, FL	0	0.000	3	0	0.000	189	72	0.381	7	5	0.714
Fort Wayne, IN	18	0.250	4	1	0.250	441	54	0.122	27	3	0.111
Fort Worth-Arlington, TX	9	0.029	16	1	0.063	369	90	0.244	22	6	0.273
Fresno, CA	18	0.182	6	1	0.167	171	45	0.263	11	3	0.273
Gadsden, AL	0	0.000	4	0	0.000	18	36	2.000	1	1	1.000
Gainesville, FL	0	0.000	2	0	0.000	72	18	0.250	4	1	0.250
Galveston-Texas City, TX	0	0.000	4	0	0.000	72	0	0.000	4	0	0.000
Gary, IN	0	0.000	7	0	0.000	378	9	0.024	21	1	0.048
Glens Falls, NY	0	0.000	2	0	0.000	153	45	0.294	12	3	0.250
Goldsboro, NC	0	0.000	3	0	0.000	36	18	0.500	2	1	0.500
Grand Forks, ND-MN	0	0.000	3	0	0.000	90	9	0.100	8	1	0.125
Grand Rapids-Muskegon-Holland, MI	72	0.308	13	3	0.231	1080	81	0.075	56	5	0.089
Great Falls, MT	0	0.000	1	0	0.000	45	18	0.400	3	1	0.333
Greeley, CO	0	0.000	3	0	0.000	36	18	0.500	2	1	0.500
Green Bay, WI	18	1.000	1	1	1.000	144	27	0.188	9	2	0.222
Greensboro--Winston-Salem--High Point, NC	0	0.000	14	0	0.000	837	234	0.280	47	14	0.298
Greenville, NC	0	0.000	4	0	0.000	36	0	0.000	2	0	0.000
Greenville-Spartanburg-Anderson, SC	36	0.103	19	2	0.105	333	81	0.243	18	5	0.278
Hagerstown, MD	0	0.000	2	0	0.000	45	18	0.400	3	1	0.333
Hamilton-Middletown, OH	18	0.200	6	1	0.167	144	9	0.063	8	1	0.125
Harrisburg-Lebanon-Carlisle, PA	0	0.000	12	0	0.000	279	54	0.194	17	3	0.176
Hartford, CT	0	0.000	17	0	0.000	639	18	0.028	36	2	0.056
Hattiesburg, MS	0	0.000	1	0	0.000	63	27	0.429	4	2	0.500
Hickory-Morganton, NC	9	0.111	4	1	0.250	216	27	0.125	11	2	0.182
Houma, LA	0	0.000	3	0	0.000	27	0	0.000	3	0	0.000
Houston, TX	108	0.117	41	5	0.122	612	153	0.250	35	9	0.257
Huntington-Ashland, WV-KY-OH	0	0.000	4	0	0.000	135	54	0.400	11	3	0.273
Huntsville, AL	0	0.000	4	0	0.000	99	54	0.545	6	1	0.167
Indianapolis, IN	54	0.136	24	3	0.125	693	279	0.403	46	17	0.370
Iowa City, IA	0	0.000	1	0	0.000	72	9	0.125	6	1	0.167
Jackson, MI	0	0.000	2	0	0.000	306	0	0.000	18	0	0.000
Jackson, MS	9	0.043	9	1	0.111	126	27	0.214	7	2	0.286
Jackson, TN	0	0.000	2	0	0.000	36	0	0.000	3	0	0.000
Jacksonville, FL	90	0.244	18	5	0.278	324	99	0.306	17	6	0.353
Jacksonville, NC	0	0.000	2	0	0.000	81	0	0.000	4	0	0.000
Jamestown, NY	0	0.000	2	0	0.000	216	18	0.083	14	2	0.143
Janesville-Beloit, WI	0	0.000	2	0	0.000	135	0	0.000	8	0	0.000
Jersey City, NJ	0		0	0		0	0		0	0	#DIV/0!
Johnson City-Kingsport-Bristol, TN-VA	36	0.571	4	2	0.500	207	18	0.087	13	2	0.154
Johnstown, PA	0	0.000	3	0	0.000	261	0	0.000	20	0	0.000

MSA	1989 Population	1995 Population	% Increase in Population	Courses Before 1989	Courses 1989 and After	% Increase in Courses	Holes Before 1989	Holes 1989 to 1995	% Increase in Holes	Private Holes Before 1989
Joplin, MO	134910	143111	0.061	8	0	0.000	135	0	0.000	54
Kalamazoo-Battle Creek, MI	429453	444887	0.036	36	2	0.056	657	36	0.055	162
Kankakee, IL PMSA	96255	102178	0.062	8	0	0.000	144	0	0.000	18
Kansas City, MO-KS	1582875	1658117	0.048	63	14	0.222	1089	225	0.207	414
Kenosha, WI	128181	139437	0.088	8	0	0.000	135	0	0.000	18
Killeen-Temple, TX	255301	295496	0.157	10	0	0.000	171	0	0.000	72
Knoxville, TN	585960	639158	0.091	20	5	0.250	360	90	0.250	144
Kokomo, IN	96946	99722	0.029	6	1	0.167	117	9	0.077	18
La Crosse, WI-MN	116401	120745	0.037	9	3	0.333	108	45	0.417	0
Lafayette, LA	344953	364311	0.056	11	1	0.091	171	9	0.053	81
Lafayette, IN	161572	167749	0.038	9	1	0.111	162	18	0.111	45
Lake Charles, LA	168134	174185	0.036	4	1	0.250	72	18	0.250	36
Lakeland-Winter Haven, FL	405382	434498	0.072	31	13	0.419	576	207	0.359	171
Lancaster, PA	422822	445987	0.055	13	4	0.308	234	72	0.308	72
Lansing-East Lansing, MI	432674	436481	0.009	31	1	0.032	441	18	0.041	45
Laredo, TX	133239	168488	0.265	2	0	0.000	36	0	0.000	18
Las Cruces, NM	135510	159217	0.175	7	0	0.000	126	0	0.000	63
Las Vegas, NV-AZ	852737	1115421	0.308	22	17	0.773	378	324	0.857	63
Lawrence, KS	81798	89245	0.091	5	0	0.000	72	0	0.000	36
Lawrence, MA-NH	353334	365712	0.035	11	8	0.727	162	108	0.667	63
Lawton, OK	111486	118428	0.062	4	0	0.000	72	0	0.000	54
Lewiston-Auburn, ME	95343	93202	-0.022	6	1	0.167	90	9	0.100	18
Lexington, KY	405936	435037	0.072	23	9	0.391	369	144	0.390	162
Lima, OH	154340	155971	0.011	10	1	0.100	189	18	0.095	45
Lincoln, NE	213641	227800	0.066	10	4	0.400	171	63	0.368	72
Little Rock-North Little Rock, AR	513117	542122	0.057	16	3	0.188	279	54	0.194	135
Longview-Marshall, TX	193801	202666	0.046	12	2	0.167	162	27	0.167	72
Los Angeles-Long Beach, CA	8863164	9190493	0.037	104	2	0.019	1746	27	0.015	630
Louisville, KY-IN	948829	985834	0.039	43	14	0.326	630	243	0.386	306
Lowell, MA-NH	280586	289073	0.030	10	0	0.000	117	0	0.000	36
Lubbock, TX	222636	232151	0.043	9	2	0.222	162	27	0.167	63
Lynchburg, VA	193928	204522	0.055	12	3	0.250	162	54	0.333	72
Macon, GA	290909	310445	0.067	11	2	0.182	189	27	0.143	81
Madison, WI	367085	394145	0.074	19	5	0.263	333	81	0.243	108
Manchester, NH	173705	177822	0.024	6	1	0.167	90	18	0.200	18
Mansfield, OH	174007	175548	0.009	15	0	0.000	234	0	0.000	54
McAllen-Edinburg-Mission, TX	383545	475471	0.240	13	1	0.077	207	9	0.043	36
Medford-Ashland, OR	146389	165130	0.128	6	3	0.500	81	36	0.444	36
Melbourne-Titusville-Palm Bay, FL	398978	452157	0.133	16	4	0.250	306	72	0.235	108
Memphis, TN-AR-MS	1007306	1064759	0.057	29	5	0.172	558	90	0.161	306
Merced, CA	178403	199967	0.121	3	1	0.333	36	18	0.500	0
Miami, FL	1937094	2002978	0.034	29	4	0.138	630	99	0.157	126
Middlesex-Somerset-Hunterdon, NJ	1019835	1077560	0.057	31	4	0.129	603	45	0.075	360
Milwaukee-Waukesha, WI	1432149	1458110	0.018	66	2	0.030	1116	36	0.032	288
Minneapolis-St. Paul, MN-WI	2538834	2714299	0.069	134	30	0.224	2232	459	0.206	558
Mobile, AL	476923	518359	0.087	16	8	0.500	324	162	0.500	81
Modesto, CA	370522	412712	0.114	6	3	0.500	99	36	0.364	54
Monmouth-Ocean, NJ	986327	1043972	0.058	38	6	0.158	648	99	0.153	342

MSA	Private Holes 1989 and After	% Increase in Private Holes	Private Courses Before 1989	Private Courses 1989 and After	% Increase in Private Courses	Public Holes Before 1989	Public Holes 1989 and After	% Increase in Public Holes	Public Courses Before 1989	Public Courses 1989 and After	% Increase in Public Courses
Joplin, MO	0	0.000	3	0	0.000	81	0	0.000	5	0	0.000
Kalamazoo-Battle Creek, MI	0	0.000	9	0	0.000	495	36	0.073	27	2	0.074
Kankakee, IL PMSA	0	0.000	1	0	0.000	126	0	0.000	7	0	0.000
Kansas City, MO-KS	36	0.087	26	2	0.077	675	189	0.280	37	12	0.324
Kenosha, WI	0	0.000	1	0	0.000	117	0	0.000	7	0	0.000
Killeen-Temple, TX	0	0.000	4	0	0.000	99	0	0.000	6	0	0.000
Knoxville, TN	0	0.000	8	0	0.000	216	90	0.417	12	5	0.417
Kokomo, IN	0	0.000	1	0	0.000	99	9	0.091	5	1	0.200
La Crosse, WI-MN	18		0	1		108	27	0.250	9	2	0.222
Lafayette, LA	0	0.000	5	0	0.000	90	9	0.100	6	1	0.167
Lafayette, IN	0	0.000	3	0	0.000	117	18	0.154	6	1	0.167
Lake Charles, LA	0	0.000	2	0	0.000	36	18	0.500	2	1	0.500
Lakeland-Winter Haven, FL	18	0.105	10	1	0.100	405	189	0.467	21	12	0.571
Lancaster, PA	18	0.250	4	1	0.250	162	54	0.333	9	3	0.333
Lansing-East Lansing, MI	0	0.000	3	0	0.000	396	18	0.045	28	1	0.036
Laredo, TX	0	0.000	1	0	0.000	18	0	0.000	1	0	0.000
Las Cruces, NM	0	0.000	3	0	0.000	63	0	0.000	4	0	0.000
Las Vegas, NV-AZ	108	1.714	3	5	1.667	315	216	0.686	19	12	0.632
Lawrence, KS	0	0.000	2	0	0.000	36	0	0.000	3	0	0.000
Lawrence, MA-NH	9	0.143	4	1	0.250	99	99	1.000	7	7	1.000
Lawton, OK	0	0.000	3	0	0.000	18	0	0.000	1	0	0.000
Lewiston-Auburn, ME	0	0.000	1	0	0.000	72	9	0.125	5	1	0.200
Lexington, KY	18	0.111	10	1	0.100	207	126	0.609	13	8	0.615
Lima, OH	0	0.000	3	0	0.000	144	18	0.125	7	1	0.143
Lincoln, NE	0	0.000	4	0	0.000	99	63	0.636	6	4	0.667
Little Rock-North Little Rock, AR	36	0.267	8	2	0.250	144	18	0.125	8	1	0.125
Longview-Marshall, TX	0	0.000	6	0	0.000	90	27	0.300	6	2	0.333
Los Angeles-Long Beach, CA	0	0.000	35	0	0.000	1116	27	0.024	69	2	0.029
Louisville, KY-IN	90	0.294	18	5	0.278	324	153	0.472	25	9	0.360
Lowell, MA-NH	0	0.000	3	0	0.000	81	0	0.000	7	0	0.000
Lubbock, TX	0	0.000	4	0	0.000	99	27	0.273	5	2	0.400
Lynchburg, VA	0	0.000	5	0	0.000	90	54	0.600	7	3	0.429
Macon, GA	0	0.000	5	0	0.000	108	27	0.250	6	2	0.333
Madison, WI	18	0.167	6	1	0.167	225	63	0.280	13	4	0.308
Manchester, NH	0	0.000	1	0	0.000	72	18	0.250	5	1	0.200
Mansfield, OH	0	0.000	3	0	0.000	180	0	0.000	12	0	0.000
McAllen-Edinburg-Mission, TX	0	0.000	3	0	0.000	171	9	0.053	10	1	0.100
Medford-Ashland, OR	0	0.000	2	0	0.000	45	36	0.800	4	3	0.750
Melbourne-Titusville-Palm Bay, FL	18	0.167	5	1	0.200	198	54	0.273	11	3	0.273
Memphis, TN-AR-MS	36	0.118	14	2	0.143	252	54	0.214	15	3	0.200
Merced, CA	0		0	0		36	18	0.500	3	1	0.333
Miami, FL	27	0.214	6	2	0.333	504	72	0.143	23	2	0.087
Middlesex-Somerset-Hunterdon, NJ	36	0.100	18	3	0.167	243	9	0.037	13	1	0.077
Milwaukee-Waukesha, WI	0	0.000	15	0	0.000	828	36	0.043	51	2	0.039
Minneapolis-St. Paul, MN-WI	18	0.032	32	1	0.031	1674	441	0.263	102	29	0.284
Mobile, AL	0	0.000	4	0	0.000	243	162	0.667	12	8	0.667
Modesto, CA	0	0.000	3	0	0.000	45	36	0.800	3	3	1.000
Monmouth-Ocean, NJ	36	0.105	21	2	0.095	306	63	0.206	17	4	0.235

MSA	1989 Population	1995 Population	% Increase in Population	Courses Before 1989	Courses 1989 and After	% Increase in Courses	Holes Before 1989	Holes 1989 to 1995	% Increase in Holes	Private Holes Before 1989
Monroe, LA	142191	147148	0.035	6	0	0.000	81	0	0.000	36
Montgomery, AL	292517	315327	0.078	14	1	0.071	261	18	0.069	171
Muncie, IN	119659	119227	-0.004	7	1	0.143	126	18	0.143	36
Myrtle Beach, SC	144053	154364	0.072	37	12	0.324	819	315	0.385	18
Naples, FL	152099	181007	0.190	31	16	0.516	621	315	0.507	468
Nashua, NH	171005	180552	0.056	5	5	1.000	90	81	0.900	18
Nashville, TN	985026	1086107	0.103	36	10	0.278	585	171	0.292	270
Nassau-Suffolk, NY	2609212	2658878	0.019	106	11	0.104	1881	189	0.100	1008
New Bedford, MA	175641	172095	-0.020	11	0	0.000	153	0	0.000	90
New Haven-Meriden, CT	530188	521297	-0.017	21	0	0.000	333	0	0.000	180
New London-Norwich, CT-RI	290734	284574	-0.021	14	3	0.214	225	45	0.200	63
New Orleans, LA	1285270	1312487	0.021	31	2	0.065	567	27	0.048	261
New York, NY	8546846	8590080	0.005	77	4	0.052	1386	54	0.039	810
Newark, NJ	1915928	1937173	0.011	65	1	0.015	1134	18	0.016	603
Newburgh, NY-PA	335613	359564	0.071	21	3	0.143	315	45	0.143	162
Norfolk-Virginia Beach-Newport News, VA	1443244	1546195	0.071	35	13	0.371	702	216	0.308	279
Oakland, CA	2082914	2197219	0.055	37	2	0.054	729	27	0.037	297
Ocala, FL	194833	227004	0.165	8	3	0.375	171	45	0.263	45
Odessa-Midland, TX	225545	239202	0.061	8	0	0.000	171	0	0.000	99
Oklahoma City, OK	958839	1015549	0.059	28	5	0.179	540	90	0.167	216
Olympia, WA	161238	191601	0.188	4	1	0.250	72	18	0.250	18
Omaha, NE-IA	639580	666250	0.042	36	11	0.306	513	198	0.386	171
Orange County, CA	2410556	2564345	0.064	40	9	0.225	738	162	0.220	378
Orlando, FL	1224852	1388153	0.133	63	13	0.206	1251	225	0.180	468
Owensboro, KY	87189	90585	0.039	5	1	0.200	81	18	0.222	36
Panama City, FL	126994	142647	0.123	6	2	0.333	108	36	0.333	45
Parkersburg-Marietta, WV-OH	149169	152002	0.019	7	3	0.429	117	36	0.308	36
Pensacola, FL	344406	376670	0.094	14	5	0.357	270	90	0.333	108
Peoria-Pekin, IL	339172	343911	0.014	22	1	0.045	378	18	0.048	117
Philadelphia, PA-NJ	4922175	4951892	0.006	141	14	0.099	2457	243	0.099	1197
Phoenix-Mesa, AZ	2238480	2519510	0.126	115	28	0.243	2070	558	0.270	729
Pine Bluff, AR	85487	83761	-0.020	3	0	0.000	45	0	0.000	36
Pittsburgh, PA	2394811	2401683	0.003	130	12	0.092	2187	207	0.095	819
Pittsfield, MA	87556	84316	-0.037	9	0	0.000	144	0	0.000	54
Portland, ME	221095	226322	0.024	18	3	0.167	243	45	0.185	81
Portland-Vancouver, OR-WA	1515452	1703106	0.124	49	12	0.245	810	180	0.222	234
Portsmouth-Rochester, NH-ME	223993	225366	0.006	14	2	0.143	198	18	0.091	45
Providence-Fall River-Warwick, RI-MA	1134350	1126591	-0.007	55	1	0.018	774	18	0.023	342
Provo-Orem, UT	263590	296321	0.124	8	1	0.125	144	18	0.125	36
Pueblo, CO	123051	128688	0.046	4	2	0.500	90	27	0.300	18
Punta Gorda, FL	110975	129454	0.167	8	5	0.625	153	117	0.765	36
Racine, WI	175034	182787	0.044	11	0	0.000	198	0	0.000	36
Raleigh-Durham-Chapel Hill, NC	855545	984170	0.150	38	6	0.158	666	108	0.162	261
Rapid City, SD	81343	87155	0.071	6	2	0.333	90	18	0.200	36
Reading, PA	336523	349393	0.038	20	2	0.100	360	36	0.100	90
Redding, CA	147036	161701	0.100	7	3	0.429	90	36	0.400	36
Reno, NV	254667	287957	0.131	9	1	0.111	180	18	0.100	18
Richland-Kennewick-Pasco, WA	150033	175964	0.173	7	1	0.143	135	18	0.133	18

MSA	Private Holes 1989 and After	% Increase in Private Holes	Private Courses Before 1989	Private Courses 1989 and After	% Increase in Private Courses	Public Holes Before 1989	Public Holes 1989 and After	% Increase in Public Holes	Public Courses Before 1989	Public Courses 1989 and After	% Increase in Public Courses
Monroe, LA	0	0.000	2	0	0.000	45	0	0.000	4	0	0.000
Montgomery, AL	0	0.000	9	0	0.000	90	18	0.200	5	1	0.200
Muncie, IN	0	0.000	2	0	0.000	90	18	0.200	5	1	0.200
Myrtle Beach, SC	18	1.000	1	1	1.000	801	297	0.371	36	11	0.306
Naples, FL	225	0.481	22	11	0.500	153	90	0.588	9	5	0.556
Nashua, NH	0	0.000	1	0	0.000	72	81	1.125	4	5	1.250
Nashville, TN	18	0.067	17	1	0.059	315	153	0.486	19	9	0.474
Nassau-Suffolk, NY	54	0.054	58	3	0.052	873	135	0.155	48	8	0.167
New Bedford, MA	0	0.000	7	0	0.000	63	0	0.000	4	0	0.000
New Haven-Meriden, CT	0	0.000	10	0	0.000	153	0	0.000	11	0	0.000
New London-Norwich, CT-RI	9	0.143	4	1	0.250	162	36	0.222	10	2	0.200
New Orleans, LA	0	0.000	13	0	0.000	306	27	0.088	18	2	0.111
New York, NY	54	0.067	43	4	0.093	576	0	0.000	34	0	0.000
Newark, NJ	0	0.000	33	0	0.000	531	18	0.034	32	1	0.031
Newburgh, NY-PA	0	0.000	10	0	0.000	153	45	0.294	11	3	0.273
Norfolk-Virginia Beach-Newport News, VA	27	0.097	16	2	0.125	423	189	0.447	19	11	0.579
Oakland, CA	0	0.000	14	0	0.000	432	27	0.063	23	2	0.087
Ocala, FL	36	0.800	2	2	1.000	126	9	0.071	6	1	0.167
Odessa-Midland, TX	0	0.000	5	0	0.000	72	0	0.000	3	0	0.000
Oklahoma City, OK	0	0.000	12	0	0.000	324	90	0.278	16	5	0.313
Olympia, WA	18	1.000	1	1	1.000	54	0	0.000	3	0	0.000
Omaha, NE-IA	36	0.211	10	2	0.200	342	162	0.474	26	9	0.346
Orange County, CA	54	0.143	18	3	0.167	360	108	0.300	22	6	0.273
Orlando, FL	36	0.077	23	2	0.087	783	189	0.241	40	11	0.275
Owensboro, KY	0	0.000	2	0	0.000	45	18	0.400	3	1	0.333
Panama City, FL	0	0.000	3	0	0.000	63	36	0.571	3	2	0.667
Parkersburg-Marietta, WV-OH	0	0.000	2	0	0.000	81	36	0.444	5	3	0.600
Pensacola, FL	36	0.333	5	2	0.400	162	54	0.333	9	3	0.333
Peoria-Pekin, IL	0	0.000	7	0	0.000	261	18	0.069	15	1	0.067
Philadelphia, PA-NJ	135	0.113	69	8	0.116	1260	108	0.086	72	6	0.083
Phoenix-Mesa, AZ	126	0.173	36	6	0.167	1341	432	0.322	79	22	0.278
Pine Bluff, AR	0	0.000	2	0	0.000	9	0	0.000	1	0	0.000
Pittsburgh, PA	90	0.110	48	5	0.104	1368	117	0.086	82	7	0.085
Pittsfield, MA	0	0.000	3	0	0.000	90	0	0.000	6	0	0.000
Portland, ME	18	0.222	5	1	0.200	162	27	0.167	13	2	0.154
Portland-Vancouver, OR-WA	36	0.154	13	2	0.154	576	144	0.250	36	10	0.278
Portsmouth-Rochester, NH-ME	0	0.000	3	0	0.000	153	18	0.118	11	2	0.182
Providence-Fall River-Warwick, RI-MA	0	0.000	22	0	0.000	432	18	0.042	33	1	0.030
Provo-Orem, UT	0	0.000	2	0	0.000	108	18	0.167	6	1	0.167
Pueblo, CO	0	0.000	1	0	0.000	72	27	0.375	3	2	0.667
Punta Gorda, FL	18	0.500	2	1	0.500	117	99	0.846	6	4	0.667
Racine, WI	0	0.000	2	0	0.000	162	0	0.000	9	0	0.000
Raleigh-Durham-Chapel Hill, NC	45	0.172	14	2	0.143	405	63	0.156	24	4	0.167
Rapid City, SD	0	0.000	2	0	0.000	54	18	0.333	4	2	0.500
Reading, PA	0	0.000	5	0	0.000	270	36	0.133	15	2	0.133
Redding, CA	27	0.750	2	2	1.000	54	9	0.167	5	1	0.200
Reno, NV	0	0.000	1	0	0.000	162	18	0.111	8	1	0.125
Richland-Kennewick-Pasco, WA	0	0.000	1	0	0.000	117	18	0.154	6	1	0.167

MSA	1989 Population	1995 Population	% Increase in Population	Courses Before 1989	Courses 1989 and After	% Increase in Courses	Holes Before 1989	Holes 1989 to 1995	% Increase in Holes	Private Holes Before 1989
Richmond-Petersburg, VA	865640	925412	0.069	25	6	0.240	477	108	0.226	270
Riverside-San Bernardino, CA	2588793	2951152	0.140	114	16	0.140	2178	261	0.120	990
Roanoke, VA	224477	229092	0.021	10	1	0.100	171	18	0.105	99
Rochester, MN	106470	113981	0.071	6	1	0.167	99	18	0.182	18
Rochester, NY	1062470	1094234	0.030	68	13	0.191	1215	189	0.156	342
Rockford, IL	329676	349640	0.061	17	4	0.235	261	72	0.276	99
Rocky Mount, NC	133235	140680	0.056	8	0	0.000	117	0	0.000	63
Sacramento, CA	1340010	1452611	0.084	35	9	0.257	549	135	0.246	189
Saginaw-Bay City-Midland, MI	399320	402435	0.008	26	3	0.115	459	45	0.098	99
St. Cloud, MN	148976	158251	0.062	11	3	0.273	153	27	0.176	27
St. Joseph, MO	97715	98017	0.003	5	0	0.000	81	0	0.000	36
St. Louis, MO-IL	2492525	2542755	0.020	86	35	0.407	1359	558	0.411	522
Salem, OR	278024	310509	0.117	13	5	0.385	180	54	0.300	45
Salinas, CA	355660	350655	-0.014	19	0	0.000	387	0	0.000	144
Salt Lake City-Ogden, UT	1072227	1197270	0.117	35	6	0.171	567	90	0.159	126
San Angelo, TX	98458	102016	0.036	5	0	0.000	72	0	0.000	36
San Antonio, TX	1324749	1458522	0.101	26	10	0.385	468	153	0.327	234
San Diego, CA	2498016	2654908	0.063	68	11	0.162	1314	198	0.151	477
San Francisco, CA	1603678	1652183	0.030	28	1	0.036	486	9	0.019	225
San Jose, CA	1497577	1566786	0.046	25	1	0.040	423	18	0.043	162
San Luis Obispo-Atascadero-Paso Robles,CA	217162	224614	0.034	10	1	0.100	144	18	0.125	45
Santa Barbara-Santa Maria-Lompoc, CA	369608	381866	0.033	16	1	0.063	252	18	0.071	144
Santa Cruz-Watsonville, CA	229734	236102	0.028	10	0	0.000	153	0	0.000	18
Santa Fe, NM	117043	133407	0.140	3	1	0.333	45	18	0.400	9
Santa Rosa, CA	388222	413619	0.065	15	2	0.133	234	36	0.154	27
Sarasota-Bradenton, FL	489483	523859	0.070	48	13	0.271	1035	261	0.252	360
Savannah, GA	258060	278968	0.081	8	4	0.500	225	72	0.320	171
Scranton--Wilkes-Barre--Hazleton, PA	638466	635993	-0.004	36	6	0.167	531	81	0.153	180
Seattle-Bellevue-Everett, WA	2033156	2202843	0.083	51	14	0.275	828	225	0.272	351
Sharon, PA	121003	122229	0.010	13	0	0.000	198	0	0.000	63
Sheboygan, WI	103877	107613	0.036	7	1	0.143	144	9	0.063	18
Sherman-Denison, TX	95021	97614	0.027	4	0	0.000	72	0	0.000	18
Shreveport-Bossier City, LA	376330	379294	0.008	16	2	0.125	234	18	0.077	126
Sioux City, IA-NE	115018	119713	0.041	12	1	0.083	153	9	0.059	27
Sioux Falls, SD	139236	153352	0.101	12	2	0.167	180	27	0.150	54
South Bend, IN	247052	256930	0.040	11	2	0.182	171	36	0.211	81
Spokane, WA	361364	401575	0.111	13	3	0.231	216	36	0.167	36
Springfield, IL	189550	196892	0.039	9	3	0.333	135	36	0.267	18
Springfield, MO	264346	293538	0.110	11	4	0.364	180	63	0.350	54
Springfield, MA	590111	580450	-0.016	32	0	0.000	513	0	0.000	144
Stamford-Norwalk, CT	329935	331323	0.004	22	1	0.045	387	18	0.047	297
State College, PA	123786	130702	0.056	6	0	0.000	117	0	0.000	36
Steubenville-Weirton, OH-WV	142523	139773	-0.019	14	1	0.071	189	18	0.095	63
Stockton-Lodi, CA	480628	524115	0.090	12	4	0.333	198	63	0.318	126
Sumter, SC	102637	107627	0.049	3	3	1.000	54	45	0.833	36
Syracuse, NY	742177	755226	0.018	68	6	0.088	1053	54	0.051	279
Tacoma, WA	586203	646928	0.104	22	3	0.136	342	63	0.184	135
Tallahassee, FL	233598	257298	0.101	10	1	0.100	162	18	0.111	72

MSA	Private Holes 1989 and After	% Increase in Private Holes	Private Courses Before 1989	Private Courses 1989 and After	% Increase in Private Courses	Public Holes Before 1989	Public Holes 1989 and After	% Increase in Public Holes	Public Courses Before 1989	Public Courses 1989 and After	% Increase in Public Courses
Richmond-Petersburg, VA	54	0.200	13	3	0.231	207	54	0.261	12	3	0.250
Riverside-San Bernardino, CA	63	0.064	51	4	0.078	1188	198	0.167	63	12	0.190
Roanoke, VA	0	0.000	5	0	0.000	72	18	0.250	5	1	0.200
Rochester, MN	0	0.000	1	0	0.000	81	18	0.222	5	1	0.200
Rochester, NY	18	0.053	20	1	0.050	873	171	0.196	48	12	0.250
Rockford, IL	0	0.000	6	0	0.000	162	72	0.444	11	4	0.364
Rocky Mount, NC	0	0.000	4	0	0.000	54	0	0.000	4	0	0.000
Sacramento, CA	27	0.143	12	2	0.167	360	108	0.300	23	7	0.304
Saginaw-Bay City-Midland, MI	0	0.000	6	0	0.000	360	45	0.125	20	3	0.150
St. Cloud, MN	0	0.000	2	0	0.000	126	27	0.214	9	3	0.333
St. Joseph, MO	0	0.000	2	0	0.000	45	0	0.000	3	0	0.000
St. Louis, MO-IL	90	0.172	31	5	0.161	837	468	0.559	55	30	0.545
Salem, OR	0	0.000	3	0	0.000	135	54	0.400	10	5	0.500
Salinas, CA	0	0.000	7	0	0.000	243	0	0.000	12	0	0.000
Salt Lake City-Ogden, UT	0	0.000	7	0	0.000	441	90	0.204	28	6	0.214
San Angelo, TX	0	0.000	2	0	0.000	36	0	0.000	3	0	0.000
San Antonio, TX	0	0.000	12	0	0.000	234	153	0.654	14	10	0.714
San Diego, CA	18	0.038	26	1	0.038	837	180	0.215	42	10	0.238
San Francisco, CA	0	0.000	11	0	0.000	261	9	0.034	17	1	0.059
San Jose, CA	18	0.111	9	1	0.111	261	0	0.000	16	0	0.000
San Luis Obispo-Atascadero-Paso Robles,CA	0	0.000	3	0	0.000	99	18	0.182	7	1	0.143
Santa Barbara-Santa Maria-Lompoc, CA M	0	0.000	8	0	0.000	108	18	0.167	8	1	0.125
Santa Cruz-Watsonville, CA	0	0.000	1	0	0.000	135	0	0.000	9	0	0.000
Santa Fe, NM	18	2.000	1	1	1.000	36	0	0.000	2	0	0.000
Santa Rosa, CA	0	0.000	2	0	0.000	207	36	0.174	13	2	0.154
Sarasota-Bradenton, FL	72	0.200	15	3	0.200	675	189	0.280	33	10	0.303
Savannah, GA	18	0.105	5	1	0.200	54	54	1.000	3	3	1.000
Scranton--Wilkes-Barre--Hazleton, PA	36	0.200	10	2	0.200	351	45	0.128	26	4	0.154
Seattle-Bellevue-Everett, WA	18	0.051	22	1	0.045	477	207	0.434	29	13	0.448
Sharon, PA	0	0.000	4	0	0.000	135	0	0.000	9	0	0.000
Sheboygan, WI	0	0.000	1	0	0.000	126	9	0.071	6	1	0.167
Sherman-Denison, TX	0	0.000	1	0	0.000	54	0	0.000	3	0	0.000
Shreveport-Bossier City, LA	0	0.000	9	0	0.000	108	18	0.167	7	2	0.286
Sioux City, IA-NE	0	0.000	2	0	0.000	126	9	0.071	10	1	0.100
Sioux Falls, SD	0	0.000	3	0	0.000	126	27	0.214	9	2	0.222
South Bend, IN	0	0.000	4	0	0.000	90	36	0.400	7	2	0.286
Spokane, WA	0	0.000	2	0	0.000	180	36	0.200	11	3	0.273
Springfield, IL	18	1.000	1	1	1.000	117	18	0.154	8	2	0.250
Springfield, MO	27	0.500	3	2	0.667	126	36	0.286	8	2	0.250
Springfield, MA	0	0.000	8	0	0.000	369	0	0.000	24	0	0.000
Stamford-Norwalk, CT	18	0.061	17	1	0.059	90	0	0.000	5	0	0.000
State College, PA	0	0.000	2	0	0.000	81	0	0.000	4	0	0.000
Steubenville-Weirton, OH-WV	0	0.000	4	0	0.000	126	18	0.143	10	1	0.100
Stockton-Lodi, CA	18	0.143	8	1	0.125	72	45	0.625	4	3	0.750
Sumter, SC	0	0.000	2	0	0.000	18	45	2.500	1	3	3.000
Syracuse, NY	0	0.000	17	0	0.000	774	54	0.070	51	6	0.118
Tacoma, WA	0	0.000	8	0	0.000	207	63	0.304	14	3	0.214
Tallahassee, FL	0	0.000	4	0	0.000	90	18	0.200	6	1	0.167

MSA	1989 Population	1995 Population	% Increase in Population	Courses Before 1989	Courses 1989 and After	% Increase in Courses	Holes Before 1989	Holes 1989 to 1995	% Increase in Holes	Private Holes Before 1989
Tampa-St. Petersburg-Clearwater, FL	2067959	2176253	0.052	96	18	0.188	1998	315	0.158	765
Terre Haute, IN	147585	149994	0.016	10	2	0.200	144	27	0.188	27
Texarkana, TX-Texarkana, AR	120132	123115	0.025	4	0	0.000	63	0	0.000	45
Toledo, OH	614128	613687	-0.001	24	2	0.083	414	36	0.087	153
Topeka, KS	160976	165727	0.030	7	2	0.286	108	36	0.333	36
Trenton, NJ	325824	330030	0.013	11	1	0.091	189	18	0.095	99
Tucson, AZ	666880	745053	0.117	28	2	0.071	567	27	0.048	216
Tulsa, OK	708954	748634	0.056	25	7	0.280	477	117	0.245	225
Tuscaloosa, AL	150522	158216	0.051	6	0	0.000	108	0	0.000	72
Tyler, TX	151309	160319	0.060	6	1	0.167	126	18	0.143	54
Utica-Rome, NY	316633	315958	-0.002	38	1	0.026	513	9	0.018	117
Vallejo-Fairfield-Napa, CA	451186	487935	0.081	13	5	0.385	225	81	0.360	99
Ventura, CA	669016	708091	0.058	20	3	0.150	342	45	0.132	126
Victoria, TX	74361	80301	0.080	3	0	0.000	63	0	0.000	36
Vineland-Millville-Bridgeton, NJ	138053	138687	0.005	4	0	0.000	63	0	0.000	0
Visalia-Tulare-Porterville, CA	311921	348486	0.117	10	0	0.000	144	0	0.000	54
Waco, TX	189123	198725	0.051	7	0	0.000	135	0	0.000	54
Washington, DC-MD-VA-WV	4223485	4516067	0.069	101	25	0.248	1827	414	0.227	999
Waterbury, CT	221614	221478	-0.001	10	1	0.100	162	9	0.056	72
Waterloo-Cedar Falls, IA	123798	123561	-0.002	9	1	0.111	144	9	0.063	36
Wausau, WI	115400	120880	0.047	7	4	0.571	108	45	0.417	18
West Palm Beach-Boca Raton, FL	863518	972486	0.126	98	13	0.133	2349	243	0.103	1701
Wheeling, WV-OH	159301	157533	-0.011	10	1	0.100	180	9	0.050	54
Wichita, KS	485270	510189	0.051	22	3	0.136	351	36	0.103	162
Wichita Falls, TX	130351	132699	0.018	7	0	0.000	108	0	0.000	18
Williamsport, PA	118710	121219	0.021	3	0	0.000	72	0	0.000	18
Wilmington-Newark, DE-MD	513293	542968	0.058	15	2	0.133	324	27	0.083	234
Wilmington, NC	171269	197398	0.153	19	8	0.421	414	153	0.370	72
Worcester, MA-CT	476199	481308	0.011	25	4	0.160	360	45	0.125	99
Yakima, WA	188823	210941	0.117	7	1	0.143	108	18	0.167	36
Yolo, CA	141092	147338	0.044	4	1	0.250	63	18	0.286	36
York, PA	339574	360853	0.063	17	1	0.059	306	18	0.059	72
Youngstown-Warren, OH	600895	604177	0.005	55	0	0.000	792	0	0.000	126
Yuba City, CA	122643	137247	0.119	4	1	0.250	54	18	0.333	18
Yuma, AZ	106895	131629	0.231	6	0	0.000	99	0	0.000	18

MSA	Private Holes 1989 and After	% Increase in Private Holes	Private Courses Before 1989	Private Courses 1989 and After	% Increase in Private Courses	Public Holes Before 1989	Public Holes 1989 and After	% Increase in Public Holes	Public Courses Before 1989	Public Courses 1989 and After	% Increase in Public Courses
Tampa-St. Petersburg-Clearwater, FL	99	0.129	31	6	0.194	1233	216	0.175	65	12	0.185
Terre Haute, IN	0	0.000	2	0	0.000	117	27	0.231	8	2	0.250
Texarkana, TX-Texarkana, AR	0	0.000	3	0	0.000	18	0	0.000	1	0	0.000
Toledo, OH	0	0.000	8	0	0.000	261	36	0.138	16	2	0.125
Topeka, KS	18	0.500	2	1	0.500	72	18	0.250	5	1	0.200
Trenton, NJ	0	0.000	6	0	0.000	90	18	0.200	5	1	0.200
Tucson, AZ	9	0.042	11	1	0.091	351	18	0.051	17	1	0.059
Tulsa, OK	0	0.000	12	0	0.000	252	117	0.464	13	7	0.538
Tuscaloosa, AL	0	0.000	4	0	0.000	36	0	0.000	2	0	0.000
Tyler, TX	0	0.000	3	0	0.000	72	18	0.250	3	1	0.333
Utica-Rome, NY	0	0.000	9	0	0.000	396	9	0.023	29	1	0.034
Vallejo-Fairfield-Napa, CA	18	0.182	5	1	0.200	126	63	0.500	8	4	0.500
Ventura, CA	36	0.286	7	2	0.286	216	9	0.042	13	1	0.077
Victoria, TX	0	0.000	2	0	0.000	27	0	0.000	1	0	0.000
Vineland-Millville-Bridgeton, NJ	0		0	0		63	0	0.000	4	0	0.000
Visalia-Tulare-Porterville, CA	0	0.000	3	0	0.000	90	0	0.000	7	0	0.000
Waco, TX	0	0.000	2	0	0.000	81	0	0.000	5	0	0.000
Washington, DC-MD-VA-WV	36	0.036	54	2	0.037	828	378	0.457	47	23	0.489
Waterbury, CT	0	0.000	4	0	0.000	90	9	0.100	6	1	0.167
Waterloo-Cedar Falls, IA	0	0.000	2	0	0.000	108	9	0.083	7	1	0.143
Wausau, WI	0	0.000	1	0	0.000	90	45	0.500	6	4	0.667
West Palm Beach-Boca Raton, FL	90	0.053	65	3	0.046	648	153	0.236	33	10	0.303
Wheeling, WV-OH	0	0.000	3	0	0.000	126	9	0.071	7	1	0.143
Wichita, KS	0	0.000	9	0	0.000	189	36	0.190	13	3	0.231
Wichita Falls, TX	0	0.000	1	0	0.000	90	0	0.000	6	0	0.000
Williamsport, PA	0	0.000	1	0	0.000	54	0	0.000	2	0	0.000
Wilmington-Newark, DE-MD	0	0.000	10	0	0.000	90	27	0.300	5	2	0.400
Wilmington, NC	0	0.000	3	0	0.000	342	153	0.447	16	8	0.500
Worcester, MA-CT	0	0.000	7	0	0.000	261	45	0.172	18	4	0.222
Yakima, WA	0	0.000	2	0	0.000	72	18	0.250	5	1	0.200
Yolo, CA	0	0.000	2	0	0.000	27	18	0.667	2	1	0.500
York, PA	0	0.000	5	0	0.000	234	18	0.077	12	1	0.083
Youngstown-Warren, OH	0	0.000	8	0	0.000	666	0	0.000	47	0	0.000
Yuba City, CA	0	0.000	1	0	0.000	36	18	0.500	3	1	0.333
Yuma, AZ	0	0.000	1	0	0.000	81	0	0.000	5	0	0.000

VITA

Tyler Joe Kisling

Candidate for the Degree of

Master of Science

Thesis: A GEOGRAPHICAL ANALYSIS OF THE IMPACTS OF POPULATION ON U.S. GOLF COURSE CONSTRUCTION, 1989-1995

Major Field: Geography

Biographical:

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