ACCOUNTING FOR THE SUPPLY AND DEMAND

OF GOLF IN KANSAS AND OKLAHOMA

By

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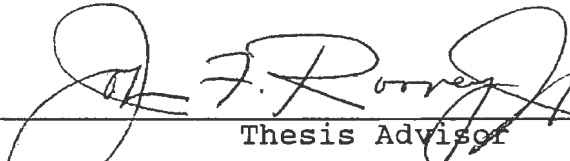Bachelor of Arts

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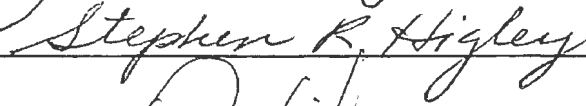
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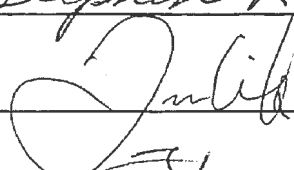
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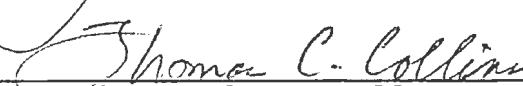
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CHAPTER I

INTRODUCTION

The geography of sport is concerned with the spatial variation of the games people play and with the participants and fans (Rooney, 1974). One game that can be evaluated geographically, or spatially, is the game of golf. To explain the geography of golf in the United States, it is important to understand how golf spread throughout the nation.

The popularity of the game grew rapidly following its first introduction in New York in 1888. Although every state had a golf course by 1900, they were still concentrated in the Northeast areas of New York and Boston, as well as in Chicago, Pittsburgh, and Philadelphia.

There was a steady increase in the number of courses constructed until World War I. By 1931, the focus of the game was shifting to the interior United States as construction of golf courses and participation increased, though golf was still considered a northern game. Interest in the game declined again during the great depression and World War II and did not surge again until the late 1950s. Television introduced the game to many more households and participation began to increase. This created a boom for

golf in the United States that continued through the mid-1970s. Rapid development took place in the Sunbelt, the North Central region, and the West Coast, though the Northeast and North Central regions still remain the dominant golf regions in the United States (Adams and Rooney, 1985).

Currently, there are more than 14,000 golf courses and nearly 25 million participants annually in the United States. American golfers play more than 505 million rounds annually. Golf is enjoyed by people of all ages and participation rates have steadily increased since the 1980s as the number of new golfers has increased. In 1992 alone, there were 2 million new golfers (National Golf Foundation, 1992).

In terms of regional variation in golf participation, the Midwestern states and North Central states have high rates as compared to the remainder of the United States. Participation is lowest in the South Central states such as Louisiana and Mississippi (National Golf Foundation, 1992).

Annual tracking of golf participation in the United States is important because it enables those in the golf industry to predict trends. Data on the number of golfers in the country, the number of new golfers and new golf courses, and the number of rounds played is used to determine the existing supply of golf holes as well as the current demand for golf, which is the desire to participate.

The ability to determine supply (the number of golf holes) and demand is important to the marketing of golf. To

be able to predict the need for additional golf holes is a valuable tool. The costly mistake of construction of golf courses where there is not enough demand for golf can be avoided through such forecasting.

In this study, Kansas and Oklahoma golf data will be compared. Each year, the National Golf Foundation (NGF) estimates what percentage of the population in each state plays golf based on data gathered from telephone surveys. Golf participation rates for Kansas and Oklahoma are significantly different. This may be a indication of overall golf interest in the two states. Kansas is more rural than Oklahoma, has a lower population, and is larger in land area, as well. There are also more golf holes in Kansas. It is the goal of this study to determine why golf interest and participation differs between Kansas and Oklahoma.

Problem Statement and Hypotheses

This study utilizes sport geography and marketing geography methodology for the purpose of determining what specific conditions explain or account for the supply and demand of golf in Kansas and Oklahoma. Specifically, this study has three primary objectives:

1) To determine that the supply and demand of golf are a function of Central Place Theory.
2) To determine that Kansas golfers have better accessibility to golf than Oklahoma golfers.

3) To determine whether or not rural golfers have better
    accessibility to golf than urban golfers in Kansas and
    Oklahoma.

Because golf is a good or service that can be sold, a
market for golf can be estimated for a defined area and the
supply and demand of golf can be determined. By relating
supply and demand to central place theory, it may be
possible to account for the two. Central place theory,
developed by the scholar, Walter Christaller, is a set of
assumptions and principles that can be used to determine the
size, number, and distribution of settlements.

Christaller stated that the chief function of a
settlement, or town, is to be the central place of a region.
Central places are those settlements which are regional
centers. Goods and services are bought and sold in these
central places and markets for such can be defined. In this
study, the central place is the golf course. The number of
golf holes will be used to measure the supply of golf. To
measure the demand for golf, data pertaining to the number
of rounds played, golf magazine subscriptions, and the
number of golfers have been collected to be used for the
analysis.

Justification of Research

Early work by Rooney (1974) demonstrated the
application of geographic principles to sports. Much of his

research has pertained to the game of golf and has resulted in a working relationship with The New York Times Company Magazine Group Sports and Leisure Division. Among the magazines published by The New York Times Company are Golf Digest, Golf World, and Women's Golf. The Sports and Leisure Division recognized the importance of the application of geographic principles to sports marketing analysis. The research partnership with the New York Times Magazine Group, in conjunction with Rooney, developed the Database of Golf in America. The Database is a unique inventory pertaining to the supply and demand of golf in the United States. Data for this study will come from the Database.

Research by Rooney and Adams (1989) focused on the development of golf supply regions in the United States (Figure 2) based on various aspects of the game such as distribution of golf holes, per capita access to golf, and the public to private ratio of golf courses. Also, recent research by Rooney and Pillsbury (1992) has focused on the development of sport regions in the United States (Figure 1). Seventy factors, such as high school sports participation, memberships in sports associations, and collegiate athlete per capita origins, were analyzed (Rooney, Pillsbury, 1992:30). Regions are based on overall participation in sports, the frequency of play, and the preferences of spectators.

The Rooney, Adams, and Pillsbury research suggest that Kansas and Oklahoma are two very different states when

compared based on golf supply and overall sports participation and interest. Kansas is in the "Plains" golf supply region, where access to golf is high. Oklahoma is in three golf supply regions, including the "Plains" region. Regarding the sports regions, Kansas is in the "Sports for Sport's Sake" region, where participation in sports is more important than spectating, while Oklahoma is in the "Texas Southwest" region, where football and baseball are most popular. Determining if Kansas golfers have better accessibility to golf than Oklahoma golfers may support the placement of Kansas and Oklahoma in separate sports regions.

CHAPTER II

LITERATURE REVIEW

Introduction

The literature review begins with a discussion of
central place theory, followed by a summary of material
pertaining to the subdiscipline of sport geography.   A
review of literature on the sport of golf, American sporting
regions, and American golf regions concludes this chapter.

Central Place Theory

There are a plethora of books and scientific
publications pertaining to central place theory. The
availability of the English translation of Walter
Christaller's, The Central Places of Southern Germany
(1966), permitted geographers, economists, and others with
an opportunity to review the concept of central place
theory, the field of settlement geography, and study the
spatial dispersion of economic and social activity. This
work was his contribution to the methodology for
investigating the organized relationships and functions of
an economic system from a spatial perspective. Christaller

sought to determine if there were laws which govern the number, size, and distribution of settlements.

In order to develop his system of central places, Christaller used a set of assumptions and conditions to define the landscape. The assumptions tell us about the landscape on which the system would be constructed, and include, (1) an unrestricted plain having fertile soil with resources distributed evenly; (2) purchasing power and population distributed evenly; (3) a transportation system uniform in every direction so that there is equal access to all central places of the same type; and (4) there should be as few central places as possible (Getis, 1966:222-223).

Because Christaller's central place theory has a very rigid model for the location of cities there are deficiencies in his system. However, his theory on the formulation of central places is most relevant for "understanding the geography of retail and service business" (Berry, 1967:73). Two common criticisms of Christaller's model are that central place theory is not a general location theory for all types of cities, and that the hexagonal trade area pattern in his ideal model cannot be found in reality. Consequently, central place theory is a theory of location of business activity rather than a general model on the location and development of cities (Berry, 1961:5).

In an attempt to fill a void in the literature on economic geography, Berry (1967) described the principles of spatial distribution and organization of marketing.

Marketing geography and the system of central places is
discussed, and central place theory is defined as the theory
of the location, nature, and spacing of clusters of retail
and service business activities. An area of the Mid-Western
and Upper Mid-Western United States was analyzed for the
purpose of evaluating the properties of central place
systems. The State of Iowa was analyzed in detail because,
according to Berry, it satisfied the assumptions of central
place theory more than any other region in the United
States.

To supplement and index the expanding amount of
literature relating to the size, spacing, and functions of
cities, and their subsequent trading and market areas and
consumer behavior, Berry (1961) provided a comprehensive
bibliography that compiled the research on central place
studies. Berry also included a review of Christaller's
central place theory, stating that in essence, the basic
function of a city is be a central place; that is, to
provide goods and services for a surrounding tributary area.

Recent work in the subdiscipline of the geography of
marketing and retail location highlights the emergence of
the applied field of marketing strategy (Berry and Parr,
1988). This revision of Berry's earlier work (1967) is a
comprehensive text on the theory of marketing systems and
central place theory. The authors provide an explanation of
the spatial structure of retail and service activity.

Sport Geography

Sport geography as an applied science has experienced steady growth since Burley's call for the subdiscipline (1962). Mitchell and Smith (1985) document the rising scholarly interest in the field and state that the number of texts and articles related to sport dramatically increased following the publication of Rooney's contributions (1969, 1974, 1975) which established sport geography as a respected research area. The Geography of American Sport (1974), was the first introduction of the major concepts of sport geography.

Rooney's approach to the study of the geography of sport takes two directions. The topical approach focuses on the origin and diffusion of specific sports, and the spatial organization and interaction of sports. The regional approach focuses on an inventory of sports with regional areas of interest, as well as the spatial organization and interaction of these sport regions.

According to Bale (1988), there are five approaches to sport geography studies. The first focuses on the identification of temporal and regional variations in different sports attributes, such as the diffusion of sports, innovations in sports, and the geographical variation in the 'production' of players or participants, as well as the 'fan' regions.

The second approach by Bale is of a regional nature and concentrates on the migration patterns of elite athletes.

Rooney received national attention for <u>The Recruiting Game</u> (1987), because of his recommendations for the reorganization of collegiate football recruiting practices. Bale's (1987) study on the patterns of migration of elite foreign student-athletes to American universities also follows this regional approach.

The locational dynamics of sports club relocation and movement is the third approach to the studies of the spatial dimension of sport. These are principally authored by economists and other non-geographers, and Bale points out that they frequently apply statistical and mathematical models to their work, which focuses on the prediction of optimal locations for future sports activity.

The fourth group of sports-geographic studies is concerned with the external and multiplier effects of sporting events. Bale has suggested that this area, including studies that conceptualize the areas over which sports-induced impacts are felt as externality fields, are worthy of further research.

The final group of studies, according to Bale, displays a more humanistic and cultural-geographic perspective focusing on sport and the cultural landscape. Raitz's (1987) study of the perception of sport landscapes points out the affect of sport on the cultural environment and experience and gratification associated with sports ensembles (Mitchell and Smith, 1989).

<u>Sports Geography</u> (Bale, 1988), an introductory text, is an addition to the general category of sport geography.

Through it, Bale seeks to fill a substantial void in the literature. He summarizes all previous existing literature on the geography of sport and elaborates on the importance of place and space to the study of sport geography.

A recent addition to the existing literature related to sport geography is the <u>Atlas of American Sport</u> (Rooney and Pillsbury, 1992). In this work, the country is divided into ten sporting regions so as to show the regionality of sport in the United States. Over 70 sports are documented, with their origins and geographic dispersion interpreted. The atlas attempts to demonstrate the application of geographical elements to sport by mapping facility, participant, and activity distribution (ibid., xiii).

Golf and Sport Regions

Literature on the supply and demand of golf is not abundant. Much of what exists pertains to regional patterns of interest in sports, including golf. Rooney and Adams (1985) trace the evolution of American golf by analyzing the development of golf facilities through space and time since the late nineteenth century. According to their research, golf in the United States has seen periods of change and tremendous growth in popularity since it was first introduced in Yonkers, New York in 1888. Enthusiasm for the game rose significantly between 1890 and 1931. In 1900, courses were concentrated in the northeastern metropolitan areas of Boston and New York, and also Chicago,

Philadelphia, and Pittsburgh areas. The fact that courses were concentrated in wealthy areas and on the grounds of major universities and military institutions contributed to its elite image. By 1931, more than 41 percent of the golf facilities in the United States were located in the North Central region, as popularity for the game had spread from the Northeast. The number of facilities at this time numbered over five thousand and the focus on the game was shifting to the interior United States as interest increased.

The construction of golf courses swelled in the late 1950s after slowing because of World War II, the depression, and the Korean conflict. Television helped to boost the popularity of the game, as did President Dwight D. Eisenhower's enthusiasm for the sport. Golf facility construction in the United States expanded rapidly during the 1960s, particularly in the North Central region. Facilities numbered six thousand in 1959 and grew to nearly ten thousand by 1969, with golf attracting a huge following among the masses, including blue-collar workers.

During the 1960s and 1970s, growth had continued in every region of the United States except the Northeast, where a dense, urban population and high land costs coupled to slow the development of new golf courses. States with large populations, such as Texas, Michigan, Ohio, California, and Florida had the greatest number of facilities, and course construction also increased rapidly in resort areas of the country. Rooney and Adams (1985)

found that the distribution of courses in the North-central region was similar to that in the Southern states. There were as many courses in relation to population in both regions, despite rapid course development in the Sunbelt and on the west coast.

Rooney and Adams (1985) also traced the diffusion of private and public courses in the United States. Golf was once a game found almost exclusively on private courses through 1930, when 78 percent of the facilities were private. The number of public facilities rose during the period following the depression and World War II. By the 1950s, there was a demand for public courses because of growing interest in the game by the lower and middle classes. Golf was beginning to be recognized as a business, stimulating the rapid construction of facilities in association with resort and residential communities in the South.

As of 1983, the North Central and Northeast regions had low proportions of private facilities, as did the Pacific and Mountain regions primarily because facility expansion took place during the public course boom of the 1950s. From Delaware to Texas, the percentage of private courses was above fifty because of a high number of residential and resort communities built around private courses and because of the economic strength of existing private courses. The exception within this region was Florida and North and South Carolina, where, because of a large tourist-oriented economy, public courses are required to accommodate the

visitors.

Regarding dispersion golf facilities across the United States based on per capita availability, Rooney and Adams (1985) found that there are distinct regional differences. Per capita availability in the South is lower than the North because of decreased demand as a result of lower incomes, a high minority population, a high number of private country clubs, and population growth that outpaced that in the North. In several southern states, course development did not keep up with this growth.

Among the reasons for a better supply of golf in the North are higher per capita incomes, a tradition of sports participation, and a lower percentage of poverty. In the Northern Plains region and in New England, per capita values are high. In the Northern Plains, the settlement pattern resembles that of the central-place type. Many small service centers evenly cover the landscape and many are large enough to support nine hole golf courses. In this region and in the Northern Plains region, earlier research by Rooney (1974) suggests that the high number of courses can be attributed to the increased interest in the game because of sports-oriented population. Participation rates by high schoolers and adults is high in many sports. While the population has continued to increase in New England, the number of holes per capita has stayed in relative balance primarily because this was a hearth for golf development in the late nineteenth and early twentieth century. The number of facilities constructed during that period provided a

substantial course base that still exists, and which as been supplemented with many nine hole courses in small and resort communities.

Recent research done by Rooney and Pillsbury (1992) has focused on the development of American sports regions (Figure 1). They have divided the United States into ten regions, based on the type of sports which are played, the quality and frequency of their play, preferences of spectators, and the role of sports in the community (Rooney and Pillsbury, 1992:30). Seventy factors were analyzed in order to map these regions; some of them are high school sports participation, membership in sports associations, and the origins of collegiate and professional athletes at the per capita level. They emphasized basketball, baseball, and football, but also examined the differences in regional participation in other activities such as golf, tennis, boxing, bowling, wrestling, and horse-shoe pitching. Eighty-five sports were investigated and resulted in ten sports regions, each with distinct traditions.

In the "Eastern Cradle" region, more American sports were introduced here and the number of sports played is still high, however, elite athlete production is lowest at this time. The "Mines and Mills" region has seen a decrease in the production of football players and the poor economic climate has caused a decline in interest in sports. However, this region has high per capita averages for numbers of football, baseball, hockey, and basketball spectators, while support for women's sports ranks low.
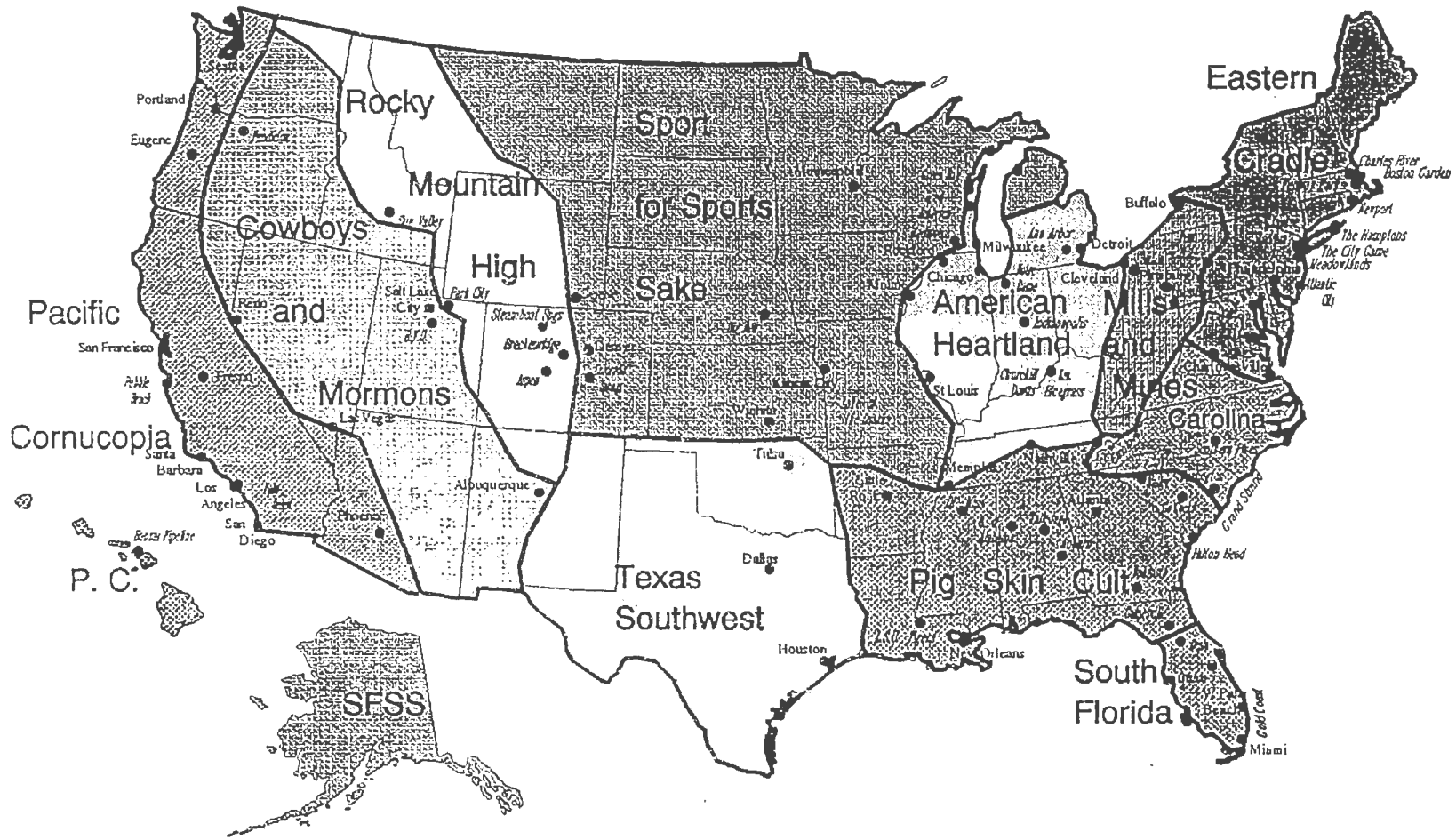
Figure 1. American Sports Regions

Basketball defines the "American Heartland," yet participation in baseball and football and many other sportsis high in this region. The South is home to football and the "Pigskin Cult" region. Interest is high in all levels of football, from high school to the professional level, and basketball is gaining in popularity, yet there lacks diverse opportunities in sports for youths. This is because the region's passion for football does not carry over to many other sports.

"South Florida" is set apart from other regions because no one sport defines this region. Golf, croquet, horseracing and basketball are all popular and people generally support professional teams from the North.

In the "Sports for Sports Sake" region, where population is sparse, participation is the defining factor. Sports participation is high, especially in small schools with low enrollments, allowing almost everyone the chance to play the sport of their choice. Girls' high school athletics has very strong support here and, because of an abundance of inexpensive golf courses, golf participation is strong, especially in high school. What sets this region apart is the fact that only three cities support professional teams. This indicates that the sports attitude here is very different from other regions-- participation, not spectating, is most important.

The "Texas Southwest" region has football-crazed Texas, and a tradition of baseball star production in Oklahoma. Women's golf and tennis are also very popular, as is rodeo.

Sports-oriented visitors give the "Rocky Mountain High" region a high individual sport participation rate. World-class skiing, golf, and tennis resorts support this tourist base and many summer sports are popular, such as fishing, rafting, and rodeo.

Basketball and football thrive in the "Cowboys and Mormons" region. Church-supported sports leagues are a mainstay, and rodeo, hunting, and fishing are popular adult sports.

There is strong support for recreation in the "Pacific Cornucopia" region which has resulted in an availability of sports facilities. Children with athletic abilities benefit from this because of the opportunity to excel. California is a leading baseball player producer and adult participation in sports, both minor team and individual, is high throughout the entire region. Per capita high school participation is low because many of the region's fine young players are busy with independent teams or leagues.

American sports regions have also been developed specific to golf (Figure 2) (Rooney and Adams, 1989). These regions are based on three factors: the number of existing golf holes, which is used to measure supply and determine a region's carrying capacity (the number of adequately served golfers); the number of golf holes per capita by county; and the mix of private and public golf facilities. According to Adams and Rooney (1985), American golf had its start in the "Northern Heartland" region and nearly 40 percent of the nation's golf holes are here, with public
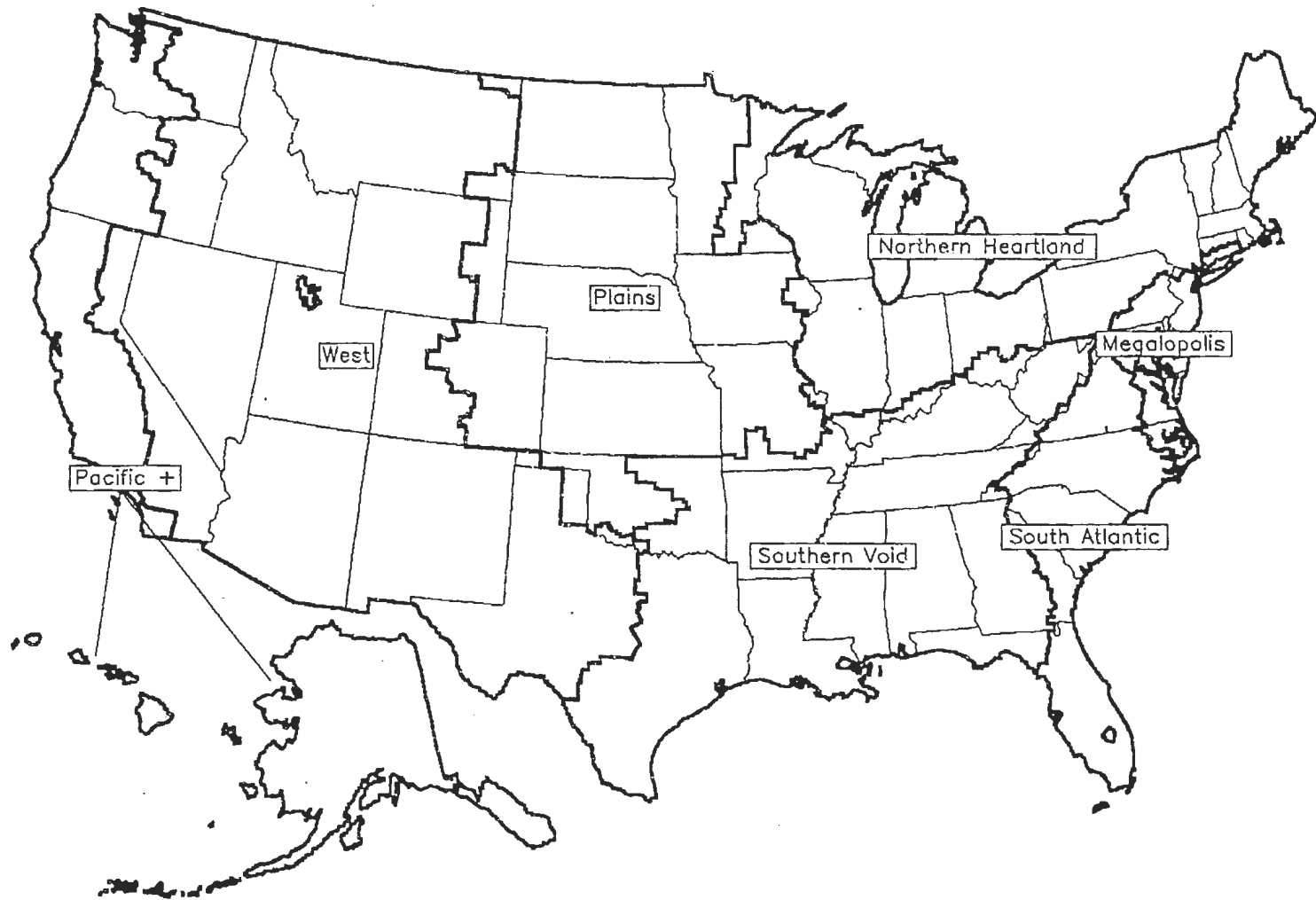
Figure 2. United States Golf Regions

widely available. Golf is extremely popular in Michigan and hole shortages are confined to metropolitan areas. The number of public golf holes in the "Southern Void" region is low and courses to serve the local residents are few. Golf is part of the sports culture, yet private courses dominate here, which contributes to the lack of access.

The "Plains" region is noted for the very high per capita access to golf and geographic access to golf is high because of the large number of nine hole golf courses distributed evenly over the Plains. Golf is an important part of the sport and social scene here, which helps to sustain current interest in the game.

In the "West" region, the rapid population growth has been coupled with increased facility construction to keep up with the high interest in the game. As a result, there are an abundance of courses available to resort vacationers and retirees who have settled in Phoenix, Scottsdale, Tucson, and Palm Springs.

The "Megalopolis" region is the worst served region in the United States because of an extremely high population which has put overwhelming pressure on existing courses, most of which are private. New course construction takes a back seat when competing for land which explains why the metropolitan areas of this region are severely lacking in the number of holes.

Finally, the "Pacific" golf region is characterized by low facility availability, however, the percentage of public holes is higher than in the Megalopolis region. While

construction of courses has increased significantly since 1950, it still has failed to serve the needs of the increasing population. It is the middle class golfer who is underserved because a large number of the public holes are at resorts, which have greens fees up to $200 a round.

CHAPTER III

DATA COLLECTION AND METHODOLOGY

Data Collection

Data at the county and five-digit zip code level in
this study come from several sources. Population data at
the county and state level were obtained from the United
States Census.

Data pertaining to golf is at the county and five-digit
zip code level. The Database of Golf in America was used to
obtain data on golf facilities and participants;
specifically, golf rounds played per year, golf holes by
county, and a golf course inventory for Kansas and Oklahoma.

Golf Digest and Golf World subscription data for 1992
were obtained from the New York Times Magazine Group,
Leisure Division, and Golf Magazine subscription data were
obtained from the Audit Bureau of Circulation.

The number of frequent golfers, those who play twenty
or more rounds per year, as well as a golfer index based on
the number of rounds played per year were obtained from
CLARITAS, a database containing market research statistics
for hundreds of variables. CLARITAS is a product of the

Claritas Corporation, a geodemographic and target-marketing research firm.

Golf participation rates and other data pertaining to participants at the state level were provided by the National Golf Foundation. The National Inter-Scholastic Athletic Administrators Association publishes high school and college athletic coaching directories. The 1992-1993 edition for Kansas and Oklahoma was utilized for the purpose of obtaining data on high school golf teams.

To supplement information on individual golf courses in Kansas and Oklahoma listed in the Database of Golf in America, a telephone survey was conducted. Nine hole golf courses in Kansas and Oklahoma were chosen using a random number table; respondents were asked a series of questions pertaining to their course and the role of the course in the community.

Methodology

The geographical distribution of golf holes, participants, golf rounds played, and supply and demand of golf in Kansas and Oklahoma were mapped. A Geographic Information System (GIS) was used to perform analysis of both absolute and per capita measures which were used in this study. The per capita index for variables used was calculated using the formula for location quotient (LQ):

$$\text{Per-Capita Index (LQ)} = \frac{c/p}{C/P}$$

where c is the variable count at the county level, p is the county 1990 population, and C is the total Kansas and Oklahoma county variable count and P is the total 1990 population for Kansas and Oklahoma.

Golf demand was calculated at the county level using the Rooney Golf Demand Index (GDI):

$$\text{Golf Demand Index (GDI)} = \frac{gd/p}{GD/P}$$

where gd is the number of Golf Digest magazine subscriptions at the county level and p equals the county 1994 projected population, and GD is the number of Golf Digest magazine subscriptions in the study area and P is the total Kansas and Oklahoma projected population.

Golf supply analysis was calculated at the county level using the Rooney Golf Supply Index (GSI), a per capita measure of golf holes:

$$\text{Golf Supply Index (GSI)} = \frac{h/p}{H/P}$$

where h is the number of golf holes at the county level and p is the 1990 county population, and H is the total number of golf holes for Kansas and Oklahoma and P is the 1990 population for the two states.

By dividing the GDI by the GSI, a unique index- the Rooney Golf Intensity Index (GII) is attained. This is a number measuring the need for golf holes in a geographic area, such as within a zip code or county. The GII:

$$\text{Golf Intensity Index (GII)} = \frac{GDI}{GSI}$$

shows undersupply or oversupply of golf holes. A value of 1.00 indicates that supply is in relative balance with demand, a value above 1.00 indicates that there is an undersupply of golf holes, and a value less than 1.00 shows that there is an oversupply of holes.

Golf participants in the Database of Golf in America are divided into three playing categories, Avid Core golfer, Core golfer, and Infrequent golfer. To determine the estimated number of golfers and the corresponding number of rounds per year by each category of golfer, Golf Digest (GD) subscriptions per county are weighted. To determine the corresponding number of rounds per year for golfer category, Golf Digest (GD) subscriptions are weighted and multiplied by the number of rounds per year:

```
Avid Core golfers =(GD*4.5)
Core golfers      =(GD*5.0)
Infrequent golfers=(GD*9.5)
Avid Core rounds  =(GD*4.5)*60 rounds per year
Core rounds       =(GD*5.0)*14 rounds per year
Infrequent rounds =(GD*9.5)*15 rounds per year
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Spreadsheet software on personal computer was utilized for manipulation of data, and maps were produced with

Atlas*GIS, a desktop geographic information system and computer mapping software, as well as Mapmaker, a mapmaking software, both products of Strategic Mapping, Inc. The cartographic analysis is used to reveal patterns of golf demand within each state, and also for revealing patterns of demand in rural and urban areas of the study area.

CHAPTER IV

AN ANALYSIS OF GOLF SUPPLY AND DEMAND

Introduction

The purpose of this chapter is to examine the
conditions that explain or account for the supply and demand
of golf in Kansas and Oklahoma. The analysis is organized
into two sections. The first section of this chapter
focuses on a comparison of golf in Kansas and Oklahoma, and
a comparison of rural and urban golf in the two states. The
second section consists of an examination of the principles
of central-place theory and the application of central-place
theory to the explanation of the supply of golf facilities
in Kansas and Oklahoma. Analysis of the results of a
telephone survey of nine hole golf courses in the study area
is used to support the three study hypotheses.

Golf in Kansas and Oklahoma

According to the National Golf Foundation, 1992 golf
participation in Kansas was 13.7 percent of the population
and Oklahoma was 9.3 percent of the population. With Kansas
and Oklahoma populations at 2,485,546 and 3,285,000,

respectively- a difference of nearly 800,000, Kansas clearly had a larger golfing population. Kansas, while having a lower population, has more golf holes than Oklahoma; 2,997 holes in Kansas and 2,547 in Oklahoma. The pattern of golf hole dispersion at the county level (Figure 3) in the two states is similar to that of population at the county level (Figure 4) and distinct rural and urban regions are apparent. The rural areas are more clearly identified by showing counties with 18 holes or fewer (Figure 5). In this study, rural counties have a population fewer than 49,000 and urban counties range in population from 49,000 to 627,000. Figures 6 and 7 show the private and public golf hole distribution in the study area. The patterns are very similar, however, the private golf holes are highly concentrated in the urban areas and the public golf holes are somewhat more dispersed throughout Kansas and Oklahoma.

In order to prove that Kansas golfers are better served than Oklahoma golfers, and that rural golfers in both states are better served than urban golfers, data were compared for several variables. In an attempt to create a demographic profile of the typical rural county in the study area, data at the county level was sorted by several variables. Four variables: 1) number of golf holes; 2) 1990 population; 3) number of golf rounds; and 4) 1989 average household income, were used in this study. The 1990 population, paired with golf holes, gave the best indication of expected population for counties with 18 or fewer holes. Therefore, for this study, Kansas and Oklahoma counties have been
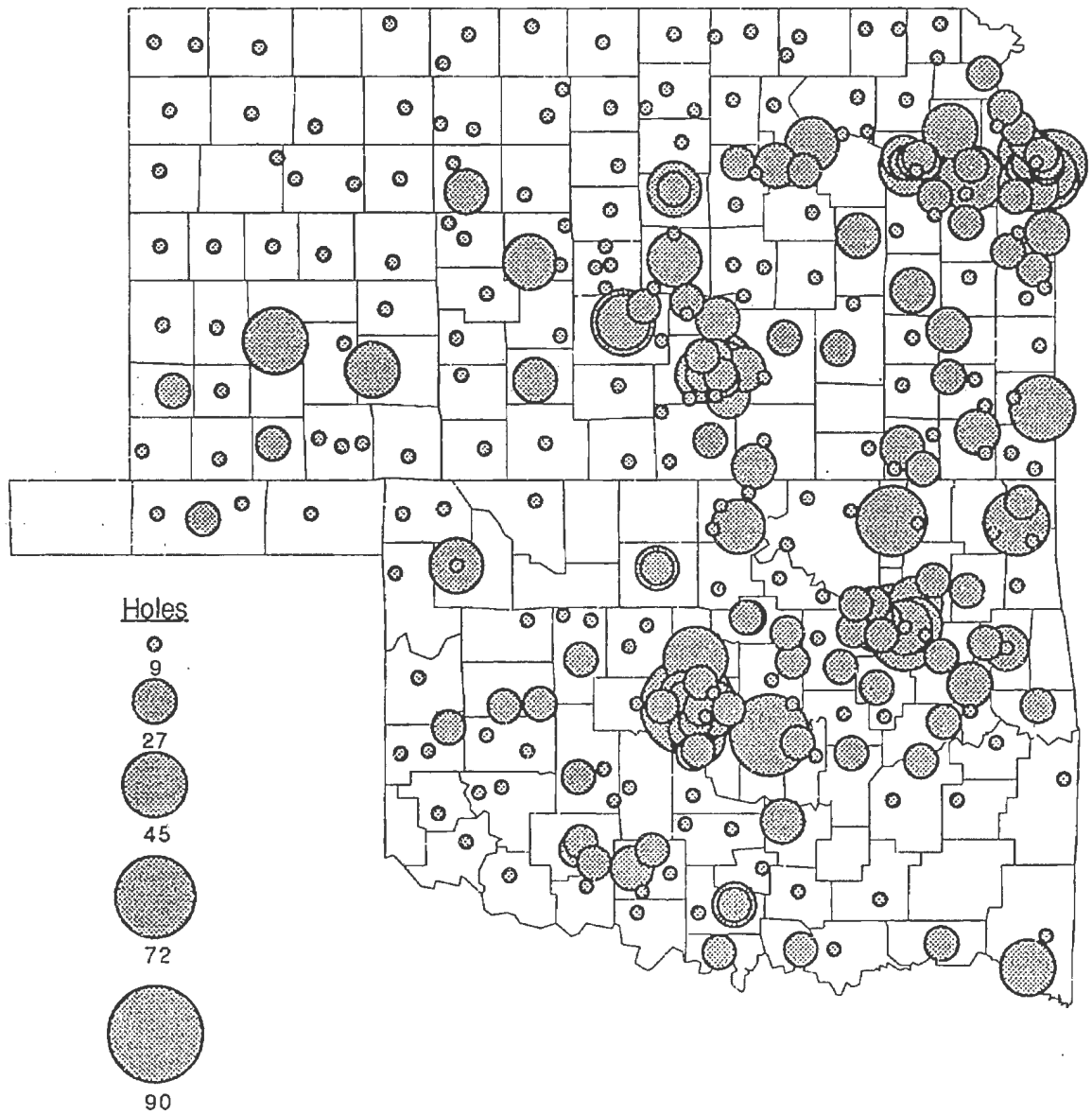
Figure 3. Number of Golf Holes by Zip Code
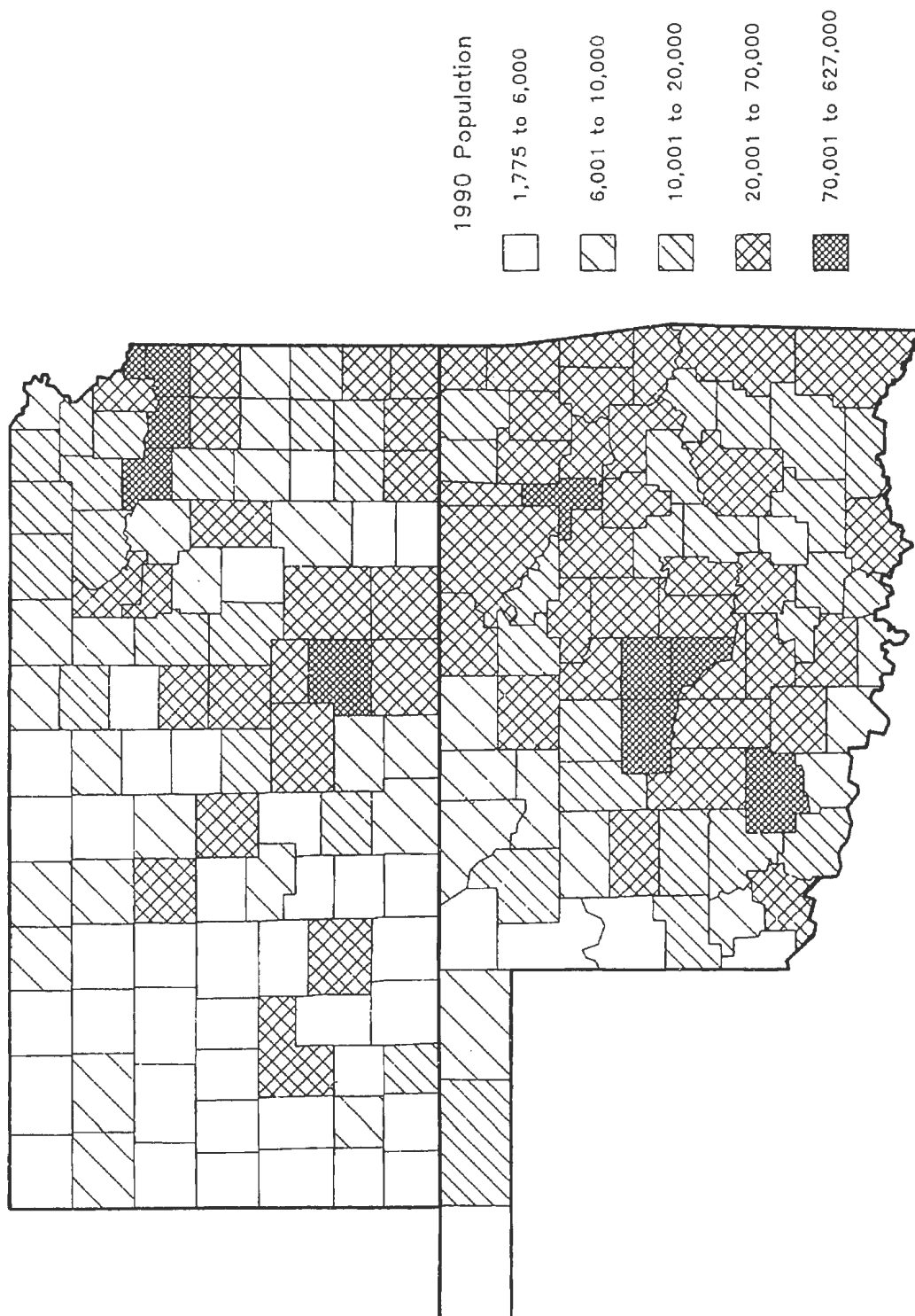
Figure 4. 1990 County Population

Number of Golf Holes

9

18
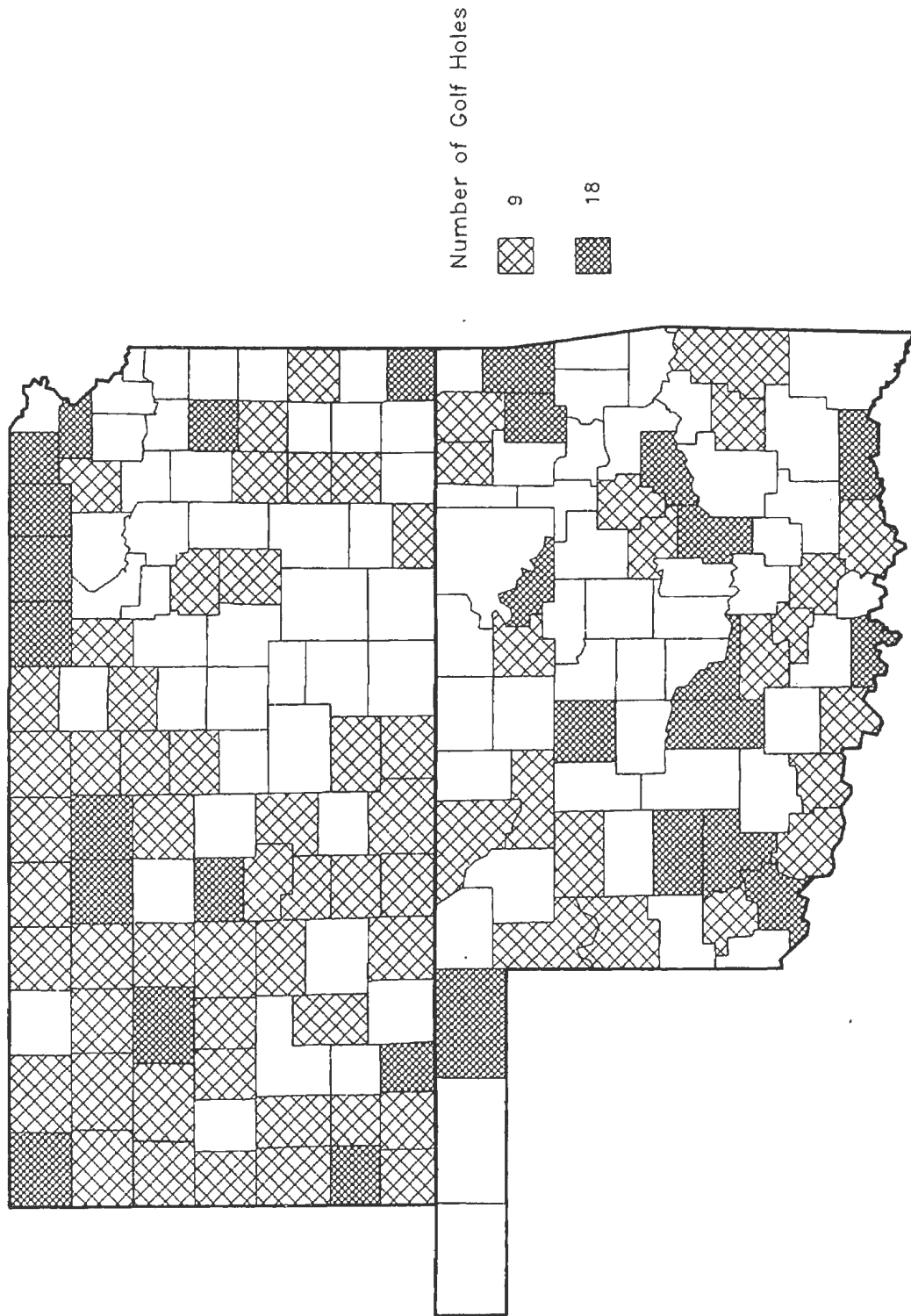
Figure 5. Counties With Fewer Than 27 Holes
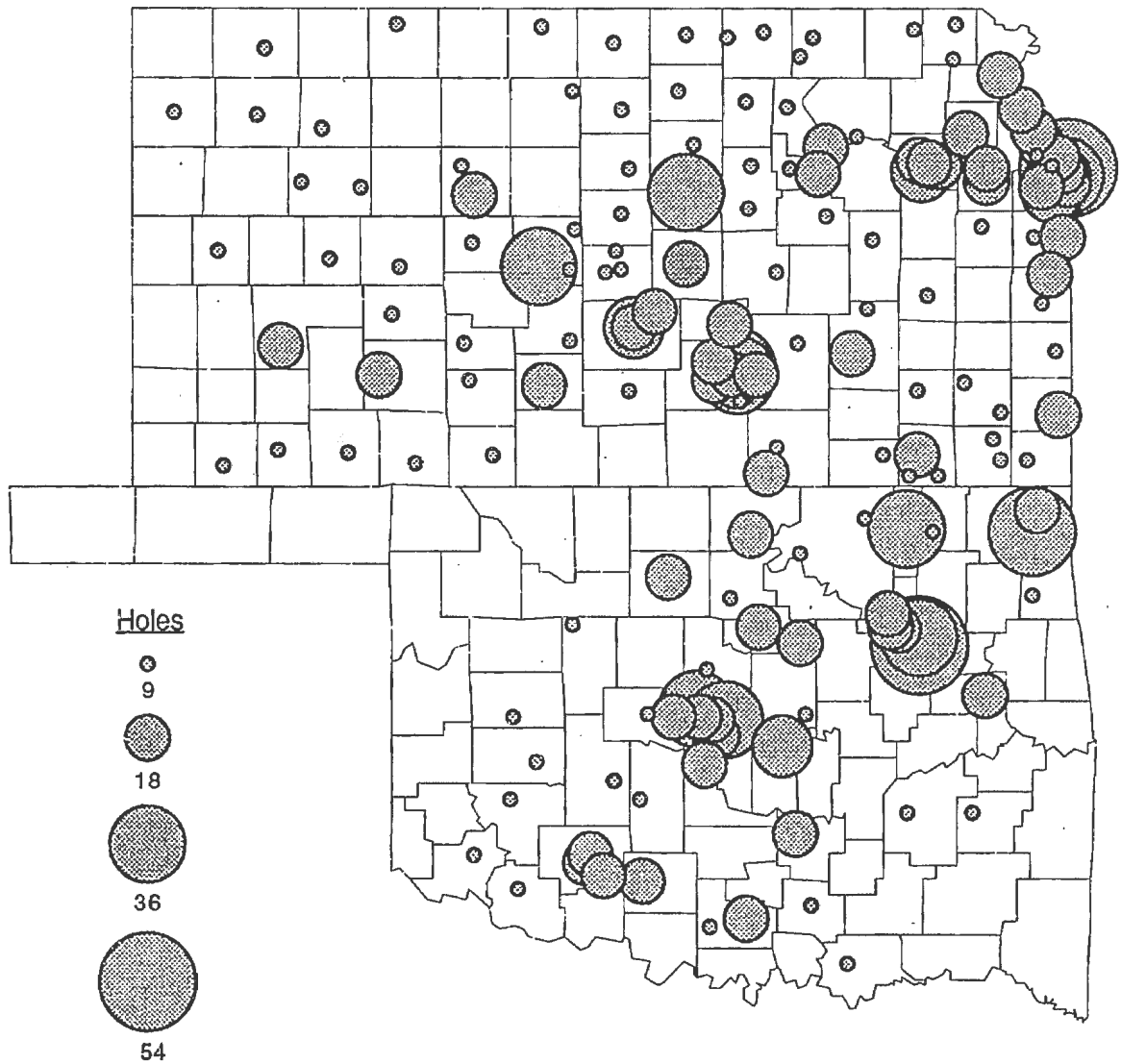
Figure 6. Private Golf Holes by Zip Code
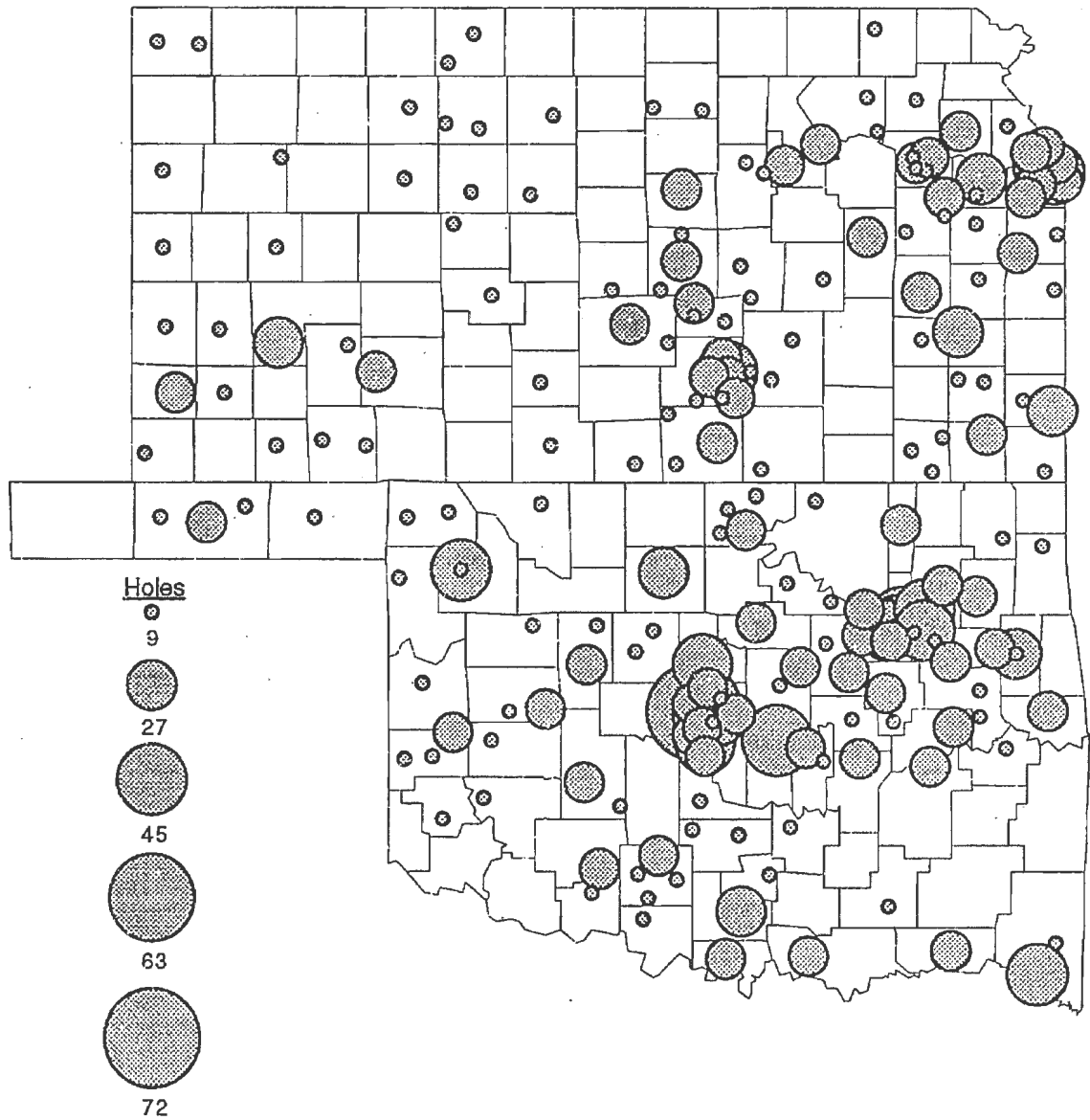
Figure 7. Public Golf Holes by Zip Code

sorted in order of population size (see Appendix A for Kansas and Oklahoma county and demographic data). In general, counties in Kansas having fewer than 10,000 population have only nine holes; counties in Oklahoma, in general, have nine holes if the population is fewer than 11,500. This alone shows that the threshold population for nine hole golf courses is lower in Kansas than in Oklahoma. Fewer people per county are required to support a course in Kansas.

The number of golf rounds played per county (Figure 8) is a good indicator of the rural versus urban pattern within the two states. The rounds played pattern follows with that of population and number of golf holes, which is expected; the number of rounds per county would generally be higher where there are more holes and/or a higher population. A total of 5,403,150 rounds of golf were played in Kansas in 1992; Oklahoma golfers played 5,505,127. This is a difference of approximately 102,000 rounds. Yet the population of Oklahoma is nearly 800,000 greater than Kansas. With 2.2 rounds per person in Kansas and 1.7 rounds per person in Oklahoma, there is more widespread interest in the sport and/or better access to holes in Kansas.

To make the comparison between golf in Kansas and Oklahoma, five population classes have been devised (Table I). By sorting counties in order of population, classes were determined based on where breaks in the numbers of holes occurred, such as with Class 1, with a population of 1,700 to 10,00. In general, the golf holes per county is
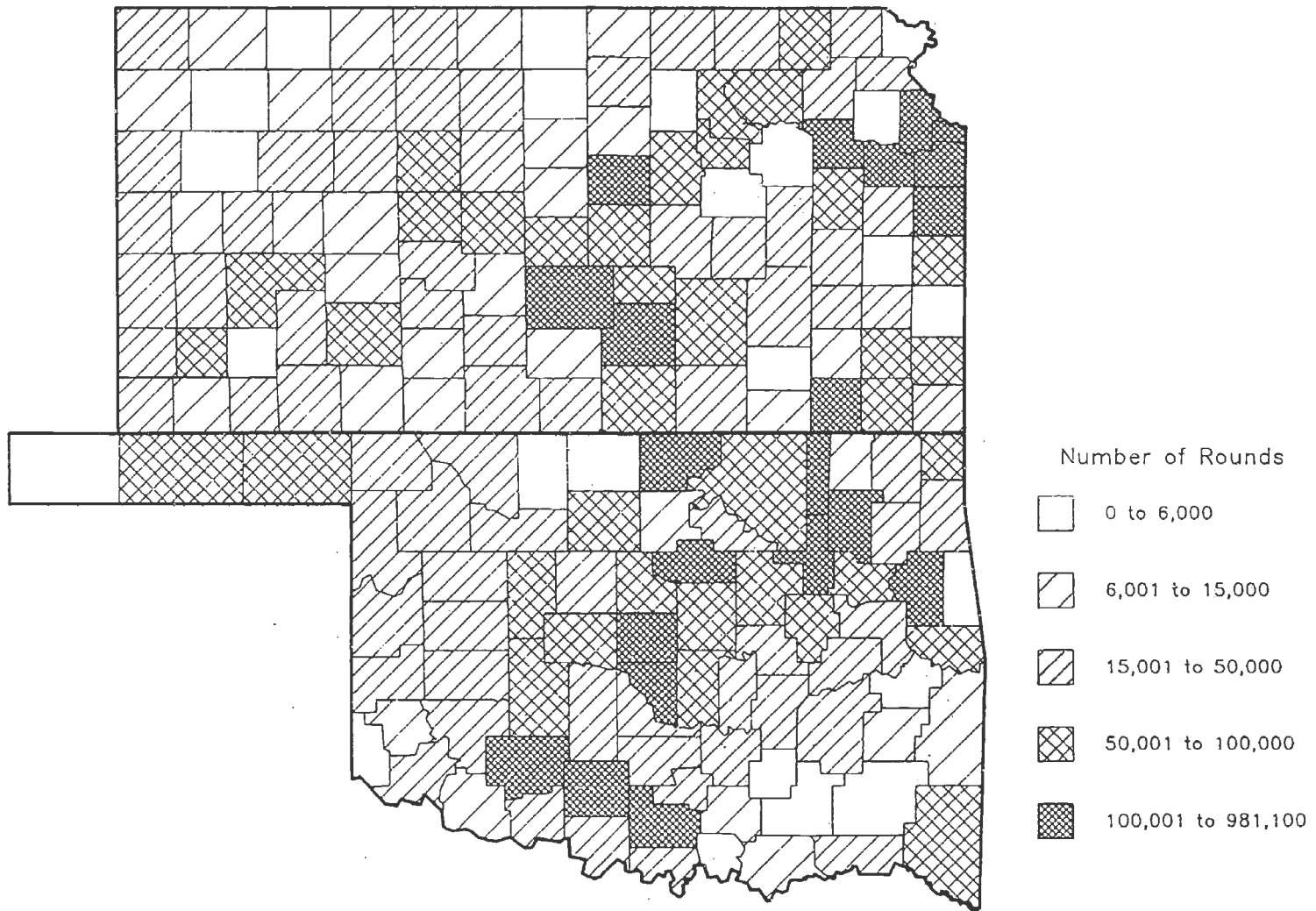
Figure 8. Number of Golf Rounds Per Year

Number of Rounds

0 to 6,000

6,001 to 15,000

15,001 to 50,000

50,001 to 100,000

100,001 to 981,100

TABLE I

AVERAGES OF COUNTY POPULATION CLASSES

	Kansas	Oklahoma
Number of Counties		
Class 1	61	16
Class 2	18	23
Class 3	16	25
Class 4	8	11
Class 5	2	2
Total	105	77
Total Population		
Class 1	311,612	102,318
Class 2	255,379	316,543
Class 3	470,757	870,458
Class 4	704,292	846,356
Class 5	743,506	1,149,325
Total	2,485,546	3,285,000
Number of Golf Holes		
Class 1	648	144
Class 2	396	360
Class 3	657	747
Class 4	648	621
Class 5	648	675
Total	2,997	2,547
Per Capita Holes Average		
Class 1	2.59	1.54
Class 2	1.67	1.09
Class 3	1.45	0.89
Class 4	0.97	0.81
Class 5	0.92	0.61
Average	2.01	1.22
Number of Golf Rounds		
Class 1	1,205,250	278,000
Class 2	657,150	585,500
Class 3	1,108,000	1,407,445
Class 4	1,220,750	1,194,500
Class 5	1,212,000	1,365,100
Total	5,403,150	4,830,545

TABLE I   CONTINUED

	Kansas	Oklahoma
Per Capita Rounds Average		
Class 1	2.63	1.52
Class 2	1.52	0.99
Class 3	1.33	0.88
Class 4	1.06	0.84
Class 5	0.92	0.65
Average	2.09	1.03

Key: Class 1=   1,700-10,000
       Class 2=   10,001-20,000
       Class 3=   20,001-49,000
       Class 4= 49,001-200,000
       Class 5= 200,001-375,000

nine for Class 1. Classes 1, 2, and 3 are designated as rural and Classes 4 and 5 are designated as urban. While Kansas does not lead in every category for each class, the numbers paint a good picture of Kansas as more of a golfing state than Oklahoma, particularly in the rural counties.

To determine the per capita holes class averages, the county per capita holes indices were averaged for each class. To determine the per capita rounds class averages, the county per capita indices were averaged for each class. In this case, the per capita index is county holes or rounds, divided by county population, divided by total holes or rounds in the study area, divided by the total population in the study area.

The per capita index for holes by county (Figure 9) and rounds by county (Figure 10) show a significant difference between Kansas and Oklahoma in terms of holes to population and golf rounds to population.

The state average for per capita holes is 2.01 in Kansas and 1.22 in Oklahoma, and the per capita averages for rounds are 1.87 in Kansas and 1.13 in Oklahoma (see Table I). The pattern of holes and rounds distribution is more even in Kansas and also high in the western part of the state where most county populations are low (under 10,000) and most counties average nine holes. Counties with a 1.00 per capita index for holes have 1,029 people per hole and approximately 0.60 people per rounds. For counties with an index of 2.00, the average number of people to one hole is 513 and the average number of people to rounds is 0.30.
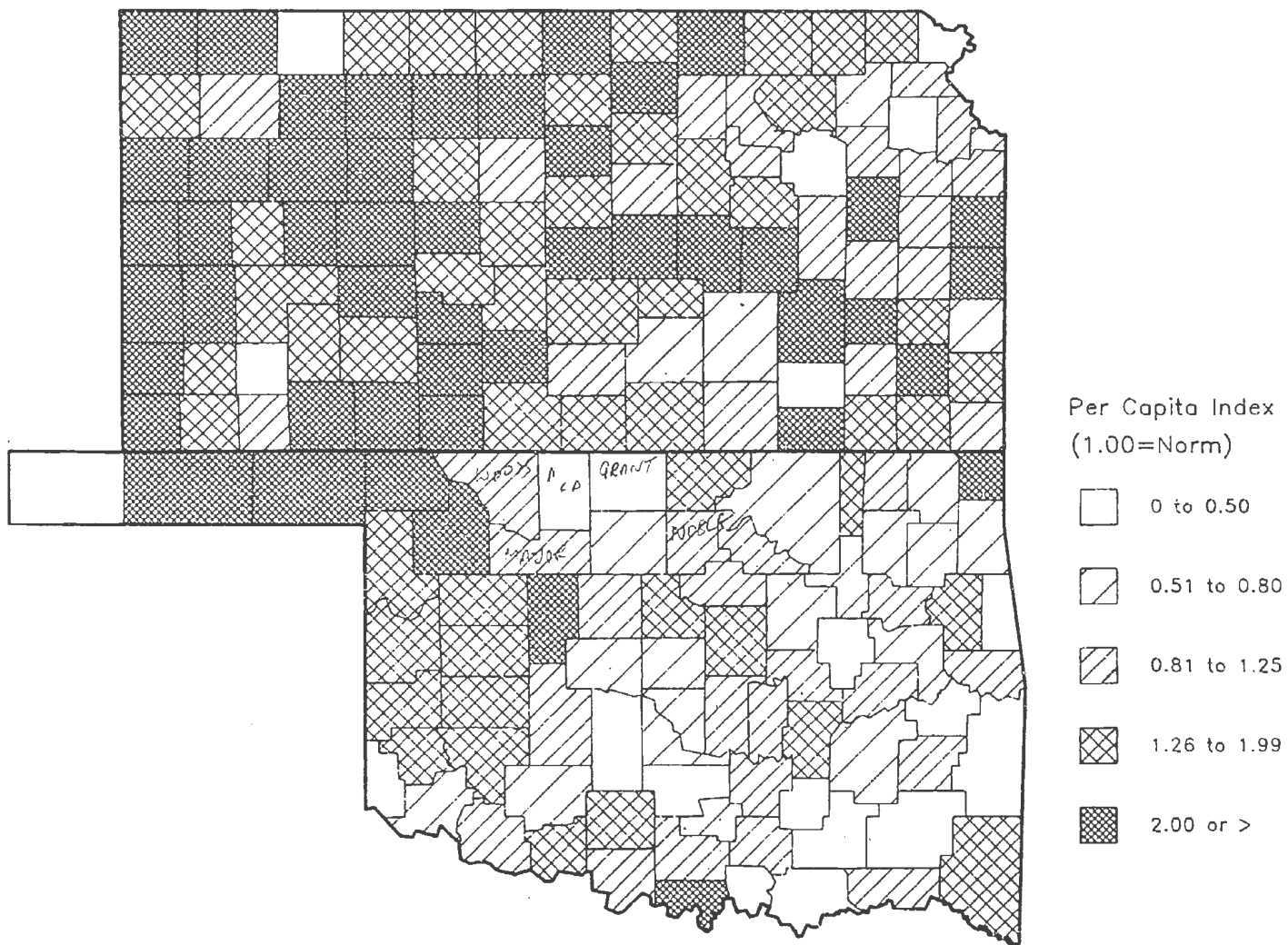
Figure 9. Per Capita Holes by County

Per Capita Index
(1.00=Norm)

☐ 0 to 0.50

▨ 0.51 to 0.80

▨ 0.81 to 1.25

▨ 1.26 to 1.99

▨ 2.00 or >
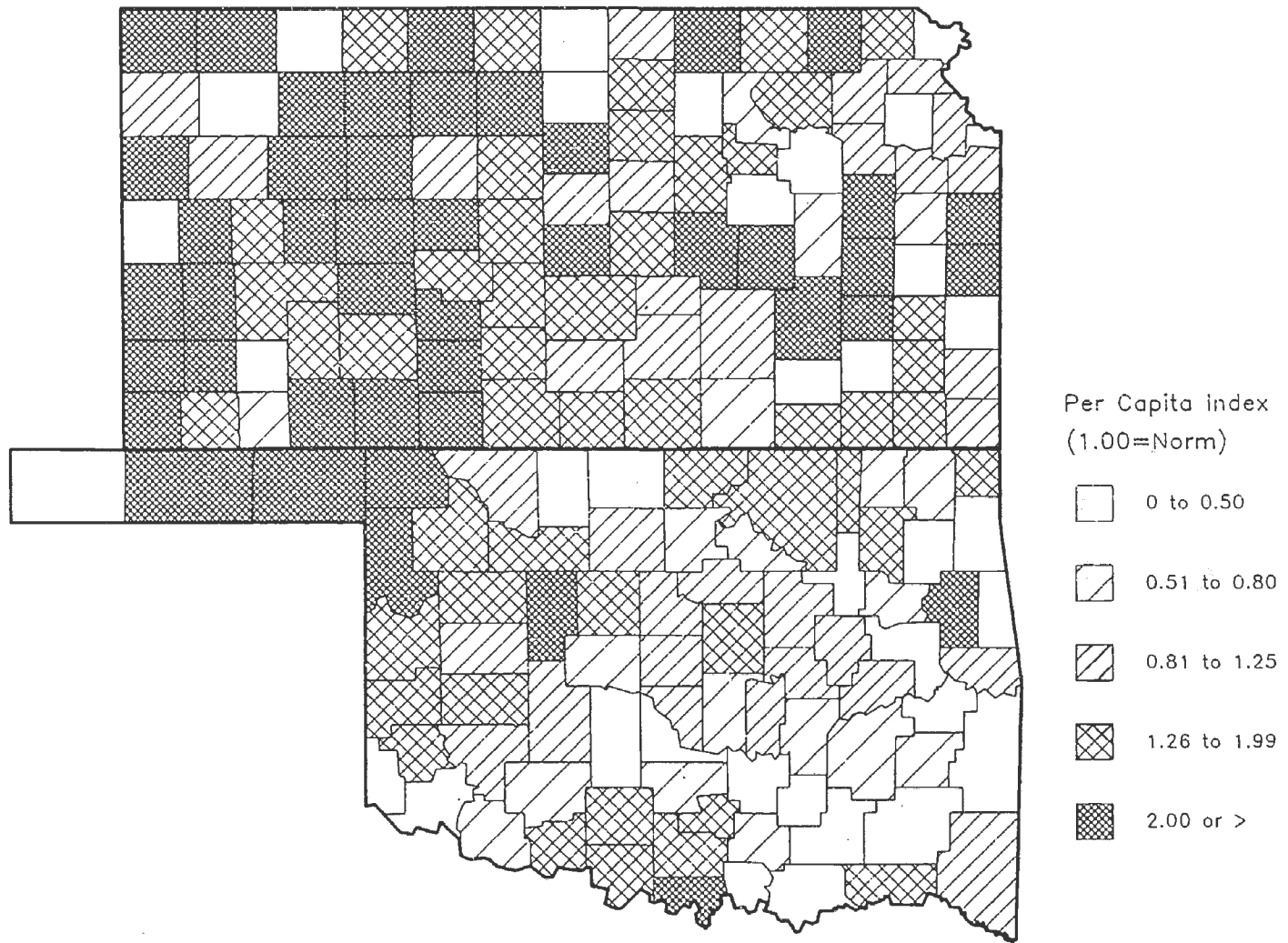
Figure 10. Per Capita Rounds by County

There are approximately 829 people per hole in Kansas and 1,289 per hole in Oklahoma, and while Oklahoma has a higher golf rounds total in 1992 (see Table I), the rounds to population average in Kansas is still higher.

Figures 11 and 12 show population per hole and population per round by county. The number of counties with 500 or fewer people per hole is higher in Kansas, and these counties are more evenly dispersed than those in Oklahoma in the same category. As for population per round, there are fewer people per round in western Kansas, although the low ratio counties are evenly dispersed in Kansas compared to Oklahoma.

Mapping the per capita distribution of golf-related magazine subscriptions by county highlights the difference in golf interest between the Kansas and Oklahoma. The total number of subscriptions to: Golf Digest, a monthly golf publication, Golf Magazine , a Golf Digest competitor that is also a monthly, and Golf World, a weekly golf news magazine published by Golf Digest, have been combined to create a map showing the per capita subscription rates (Figure 13). Total circulation for both states for the three magazines numbers 28,986, 24,016, and 2,821, respectively. Kansas per capita rates by county are more evenly dispersed across the state and only Johnson County, which includes Kansas City suburbs, has an index above 2.00. In Oklahoma, the per capita pattern is similar to that of golf hole dispersion. The subscription rates in relation to the population are high in the two urban areas of Oklahoma
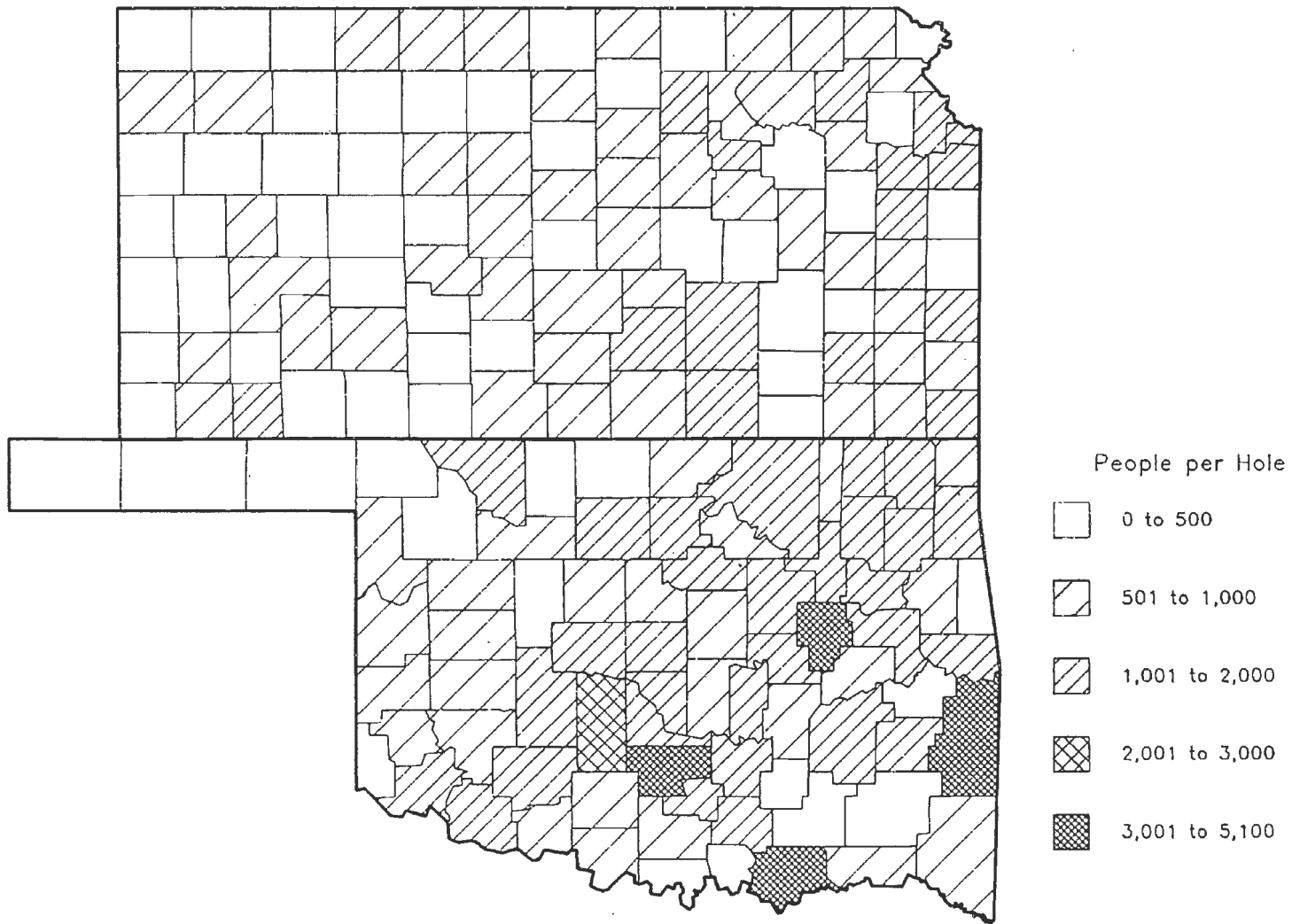
Figure 11. Number of People Per Hole by County

People Per Round

☐ 0 to 0.50

▨ 0.51 to 1.00

▧ 1.01 to 1.50

▩ 1.51 to 2.00

▦ 2.01 or >
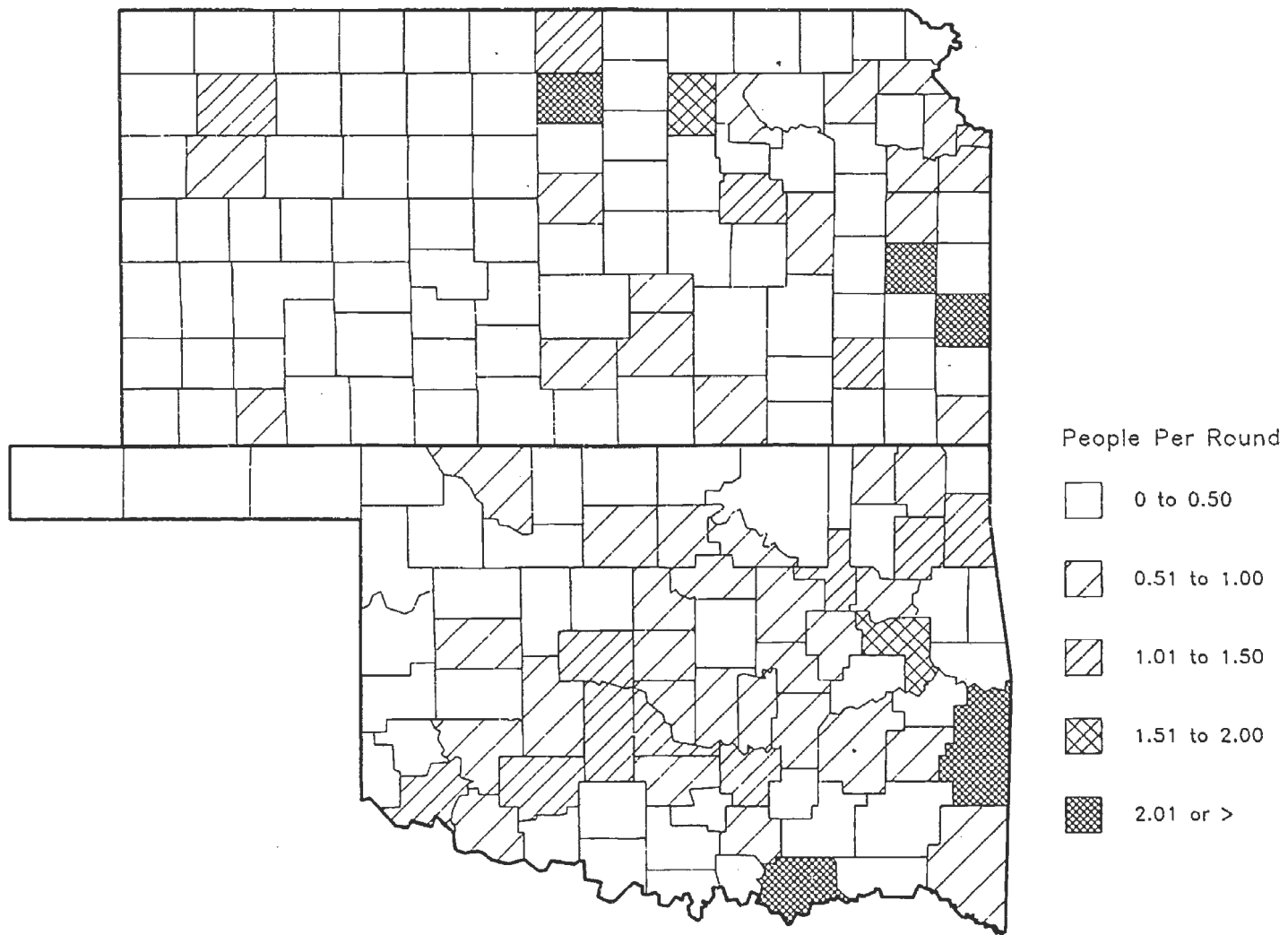
Figure 12. Number of People Per Round by County

Per Capita Index
(1.00=Norm)

☐	0 to 0.50
▨	0.51 to 0.80
▨	0.81 to 1.25
▧	1.26 to 1.99
▨	2.00 or >
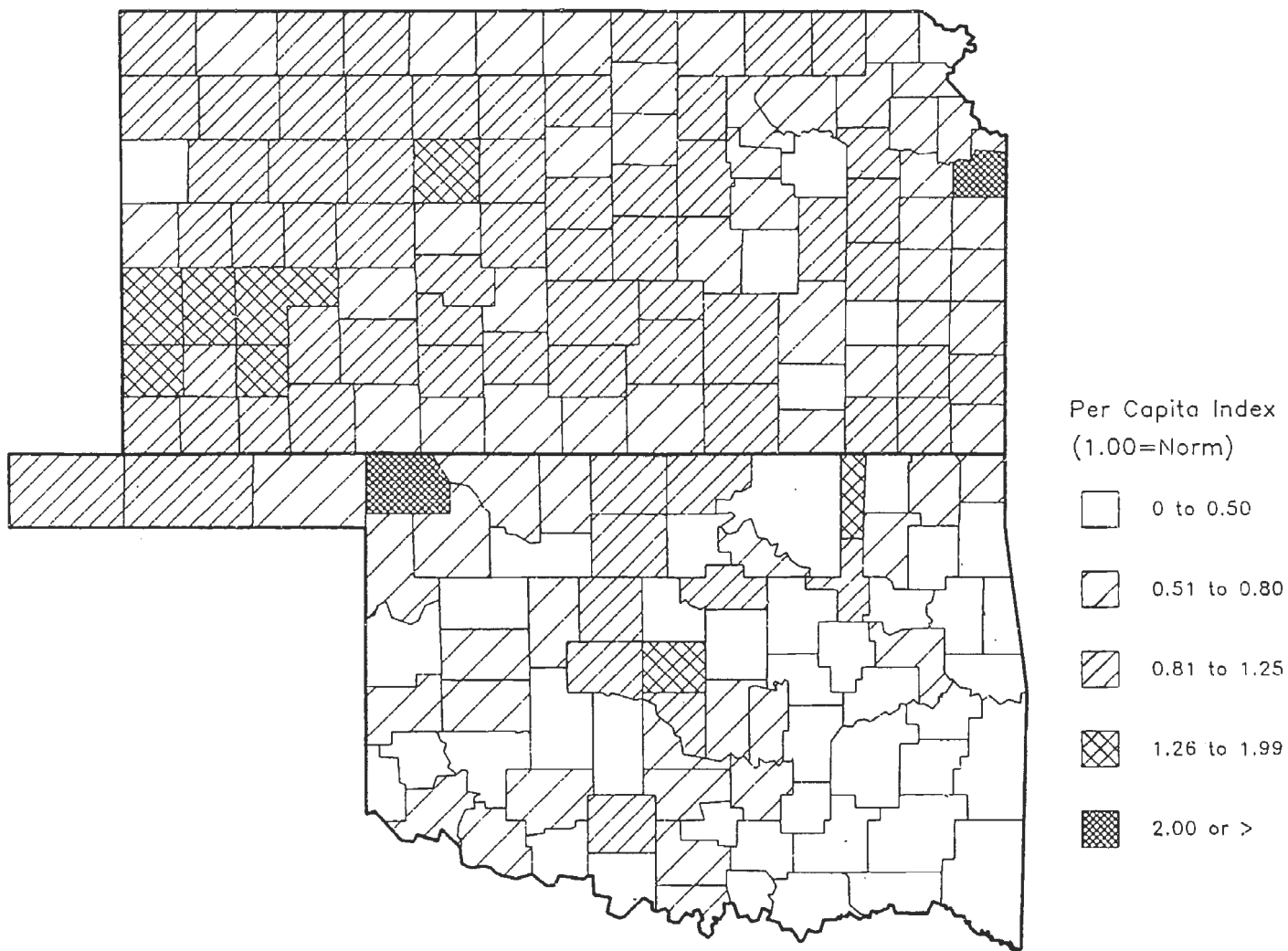
Figure 13.   Per Capita Magazine Subscriptions by County

and Tulsa counties, as well as in Harper county, in northwestern Oklahoma. There are far more counties with low per capita rates for golf magazine subscriptions in Oklahoma, indicating that there are very few subscribers in relation to the population of counties.

A more realistic indication of interest in golf in Kansas and Oklahoma may come from not looking at number of golf holes and rounds by county, but from mapping the geographic distribution of rounds played per year by "Avid Core" golfers, those who play sixty or more rounds of golf per year.

The number of Avid Core golfers per county is determined by multiplying the number of Golf Digest subscribers by 4.5. The total number of Avid Core golfers by county is then multiplied by 60 to obtain the number of Avid Core rounds per county. The per capita number of Avid Core golfers (Figure 14) and the Avid Core rounds (Figure 15) allows for a fair comparison of the two states despite the 800,000 population difference. In Kansas, 27 percent of the 105 counties have a per capita index over 1.00; in Oklahoma, only six percent of the 77 counties have an index over 1.00. Avid Core golfers comprise approximately 2.3 percent of the county population at a per capita index at or near 1.00. At an index at or near 2.00, Avid Core golfers comprise approximately five percent of the total county population. There are far more Avid Core golfers in the total population in Kansas. Several northwestern counties of Kansas have a per capita index over 1.00 and this in

Per Capita Index
(1.00=Norm)

☐ 0 to 0.50

▨ 0.51 to 0.80

▨ 0.81 to 1.25

▨ 1.26 to 1.99

▨ 2.00 or >
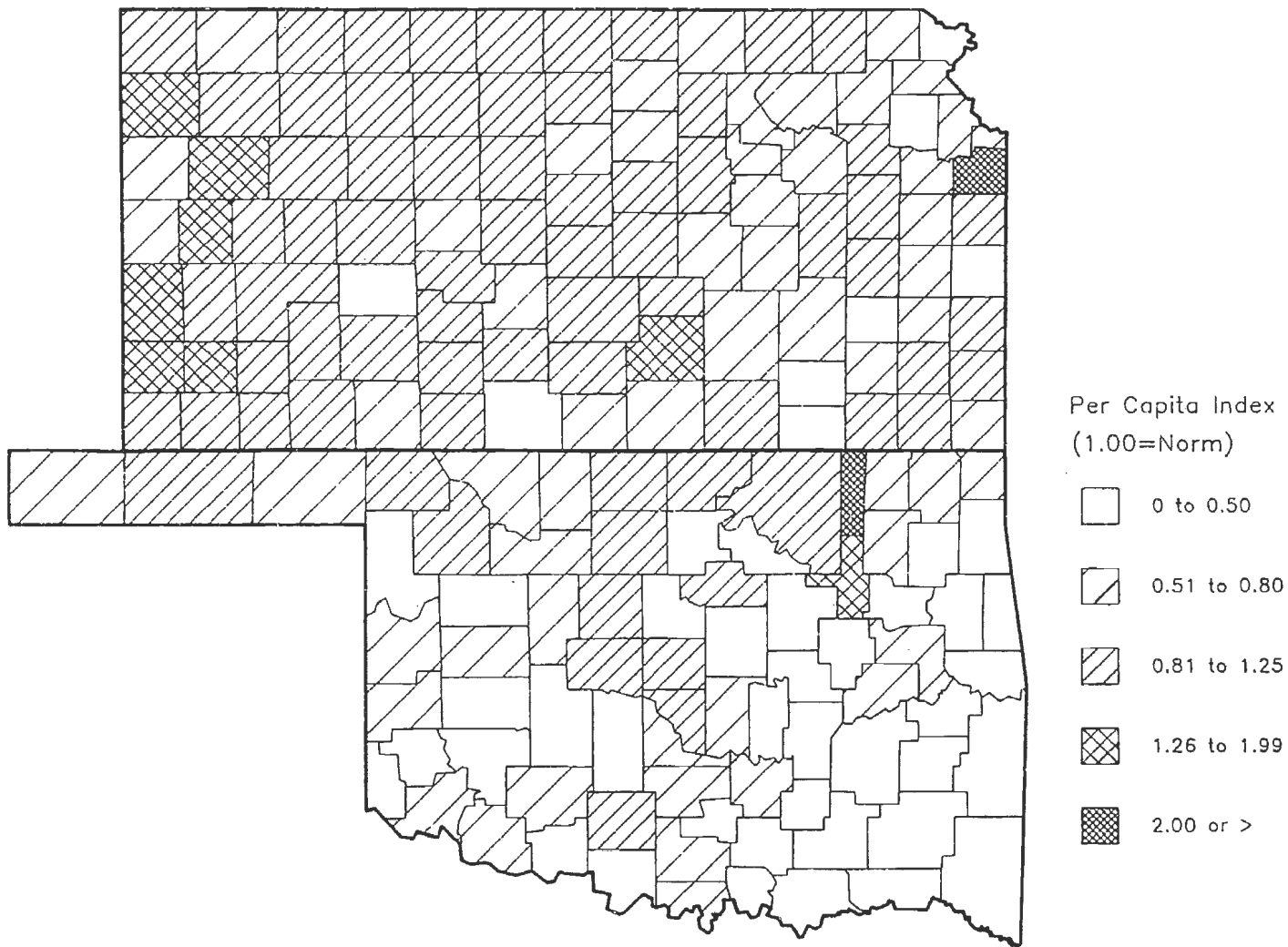
Figure 14. Per Capita Number of Avid Core Golfers

Per Capita Index
(1.00=Norm)

☐ 0 to 0.50

▨ 0.51 to 0.80

▨ 0.81 to 1.25

▨ 1.26 to 1.99

▨ 2.00 or >
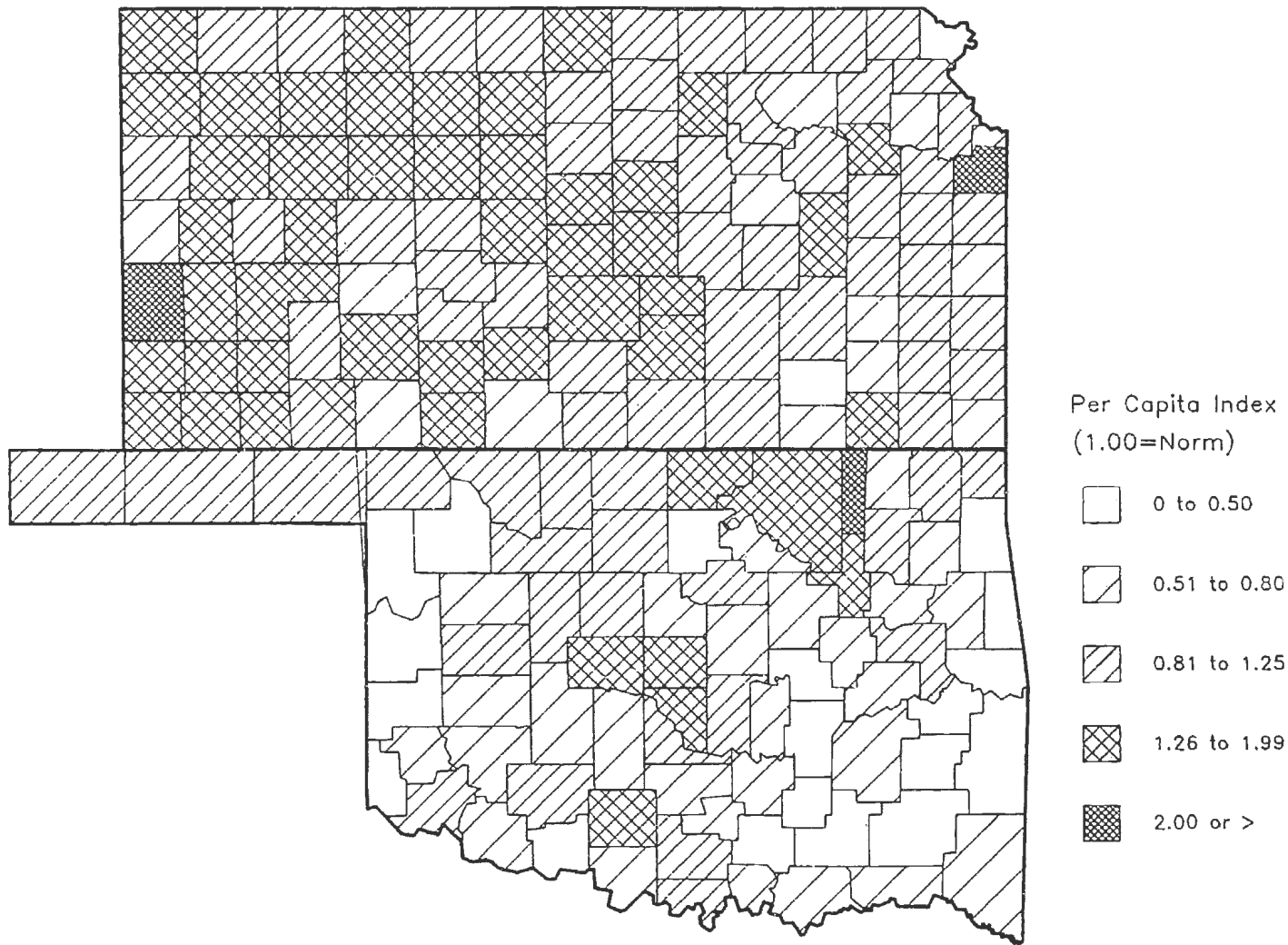
Figure 15. Per Capita Rounds Per Year by Avid Core Golfers

counties with primarily nine or eighteen holes. Several
counties in this region also have a high index for the per
capita number of rounds played by Avid Core golfers, which
is over 1.50. Two counties in northern Oklahoma, Kay and
Osage counties, move up to the highest category, when
comparing Figures 14 and 15. The rural counties are the key
to understanding the differences between Kansas and
Oklahoma, and the rural and urban areas in terms of per
capita rates for Avid Golfers. The majority of the rural
counties in Kansas have a population below 10,000 and have
at least one nine hole golf facility. Golf is more
accessible than in the urban counties.

The differences between Kansas and Oklahoma in terms of
golf interest can be illustrated further by using a unique
way of measuring the supply of golf holes and the demand for
golf at the county level. The Golf Supply Index (GSI)
(Figure 16) measures the supply of golf holes in a county
compared to the national average (which is 1.00). The GSI
is simply the per capita holes by county. Eighty-six
percent of Kansas counties are at or above the national
averages for supply of holes in relation to the population;
in Oklahoma, only 44 percent of the counties are at or above
the national norm.

The Golf Demand Index (GDI)(Figure 17) measures demand
or need for golf holes based on the national norm for
demand. Kansas clearly has a higher demand for golf holes,
particularly in the western half of the state. While 67
percent of the Kansas counties are at or above the national
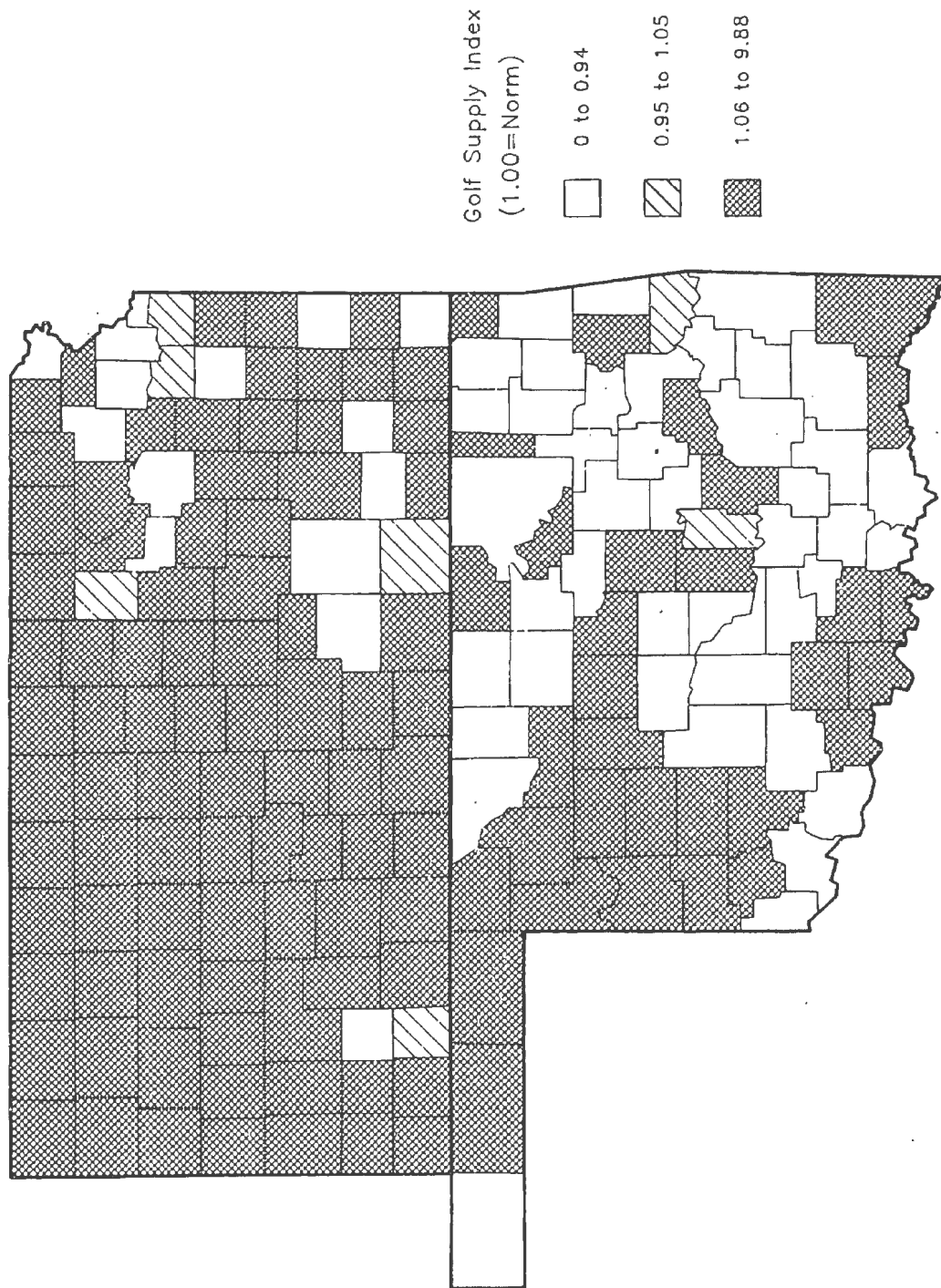
Figure 16. Golf Supply Index by County
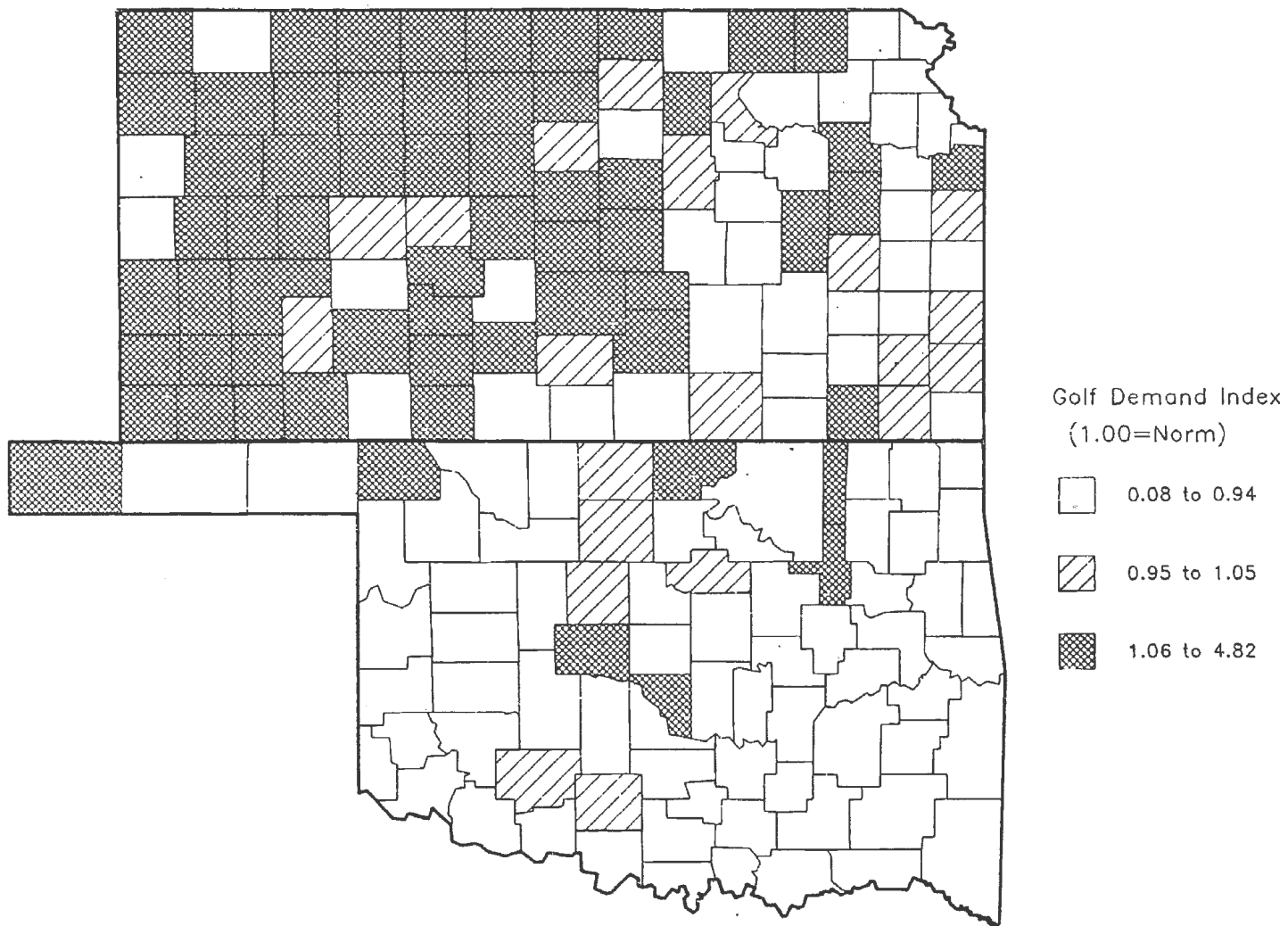
Figure 17. Golf Demand Index by County

norm, only 17 percent are in Oklahoma.

The Golf Intensity Index (GII)(Figure 18), which was developed by Rooney and enhanced by the Database of Golf in America, is simply GDI divided by GSI. The GII is an evaluation of the supply of golf holes in a market. In a perfect market, an index of 1.00 would indicate that the supply (holes) was in perfect balance with the demand for golf in that market. Values ranging from 0.95 to 1.05 suggest that supply and demand are in relative balance. A value below 0.95 indicates an oversupply of holes and a value above 1.05 indicates a need for additional holes to satisfy the increased demand. Obviously there is a greater need for additional holes in Oklahoma, as well as in eastern Kansas where there is more urbanization.

As a means for testing information for Kansas and Oklahoma from the Database in Golf in America, including the GDI, GSI, and GII, frequent golfers by county from another source has been mapped. (Figure 19) shows the number of frequent golfers by county based on market research and demographic data collected by the Claritas Corporation. The CLARITAS frequent golfer plays twenty or more rounds of golf per year. The counties with high numbers of this category of golfer follow the pattern of population. We would expect to find more frequent golfers in the highly populated counties. The CLARITAS Golfer Index (Figure 20) can provide more, however. The frequent golfer pattern is most similar to Figure 4, the number of rounds played by county. The CLARITAS Index is also based on frequent golfers (twenty or
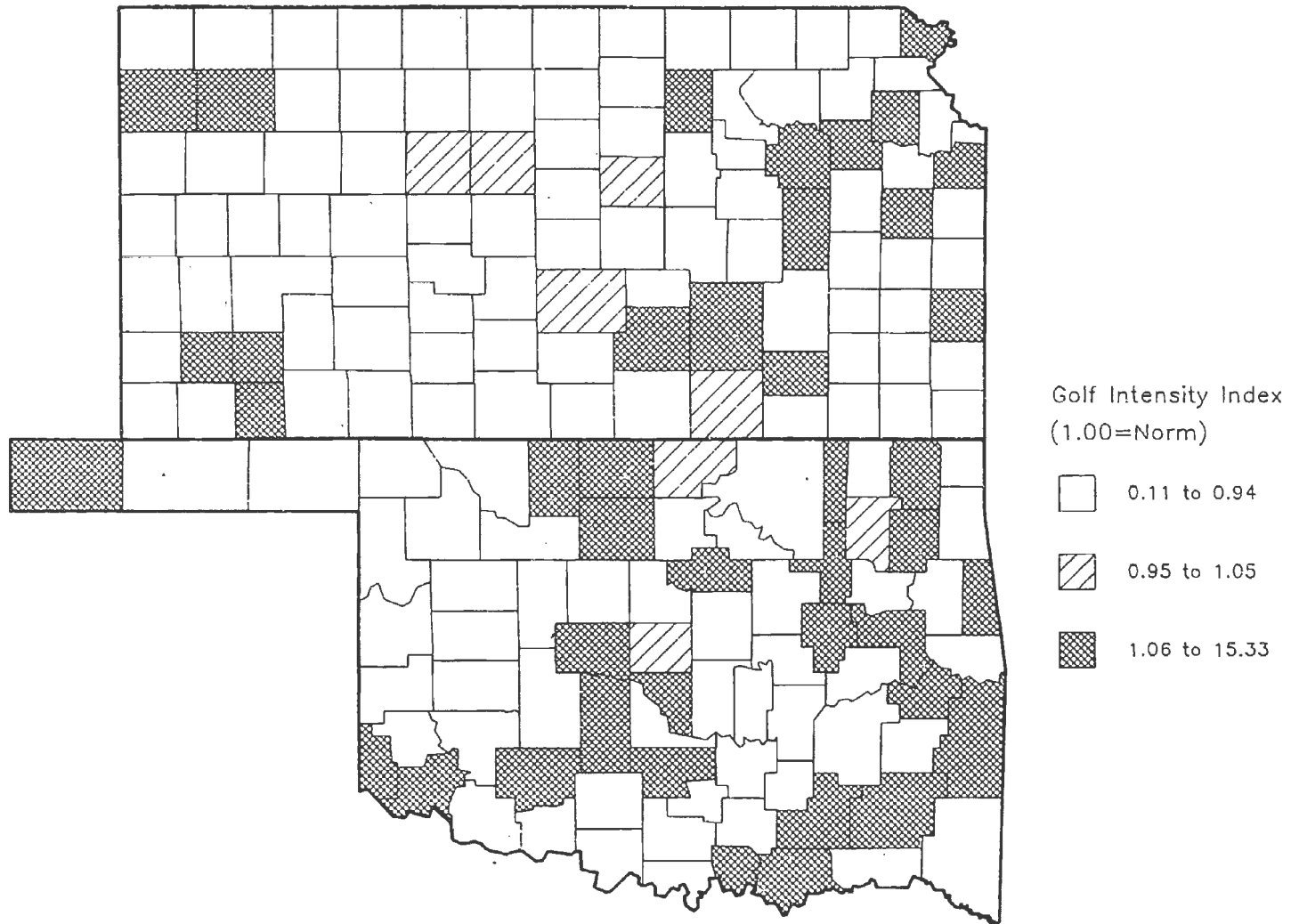
Figure 18. Golf Intensity Index by County

Golf Intensity Index
(1.00=Norm)

☐ 0.11 to 0.94

▨ 0.95 to 1.05

▦ 1.06 to 15.33
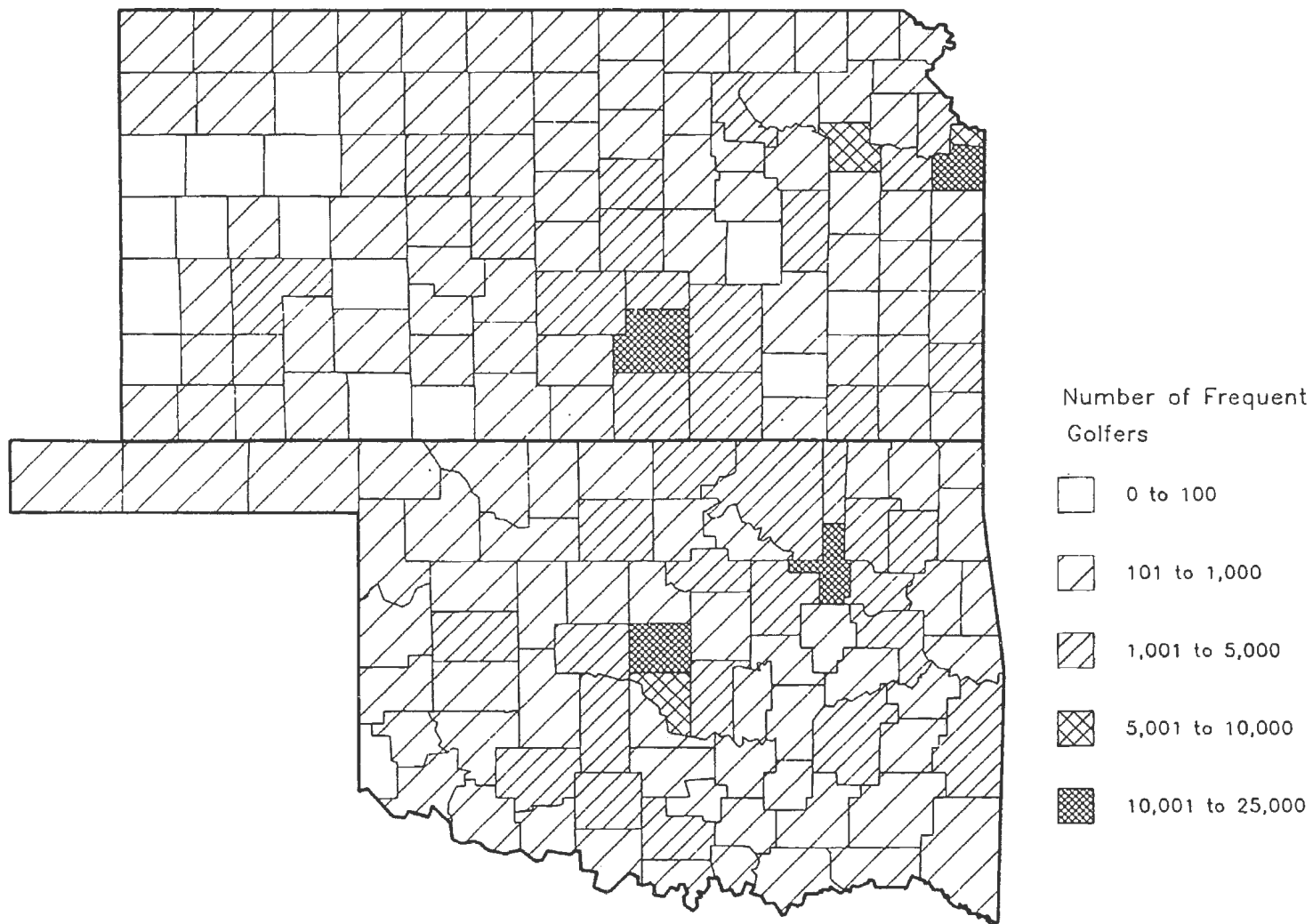
Figure 19. Claritas Frequent Golfers by County

Legend — Number of Frequent Golfers:
- 0 to 100
- 101 to 1,000
- 1,001 to 5,000
- 5,001 to 10,000
- 10,001 to 25,000
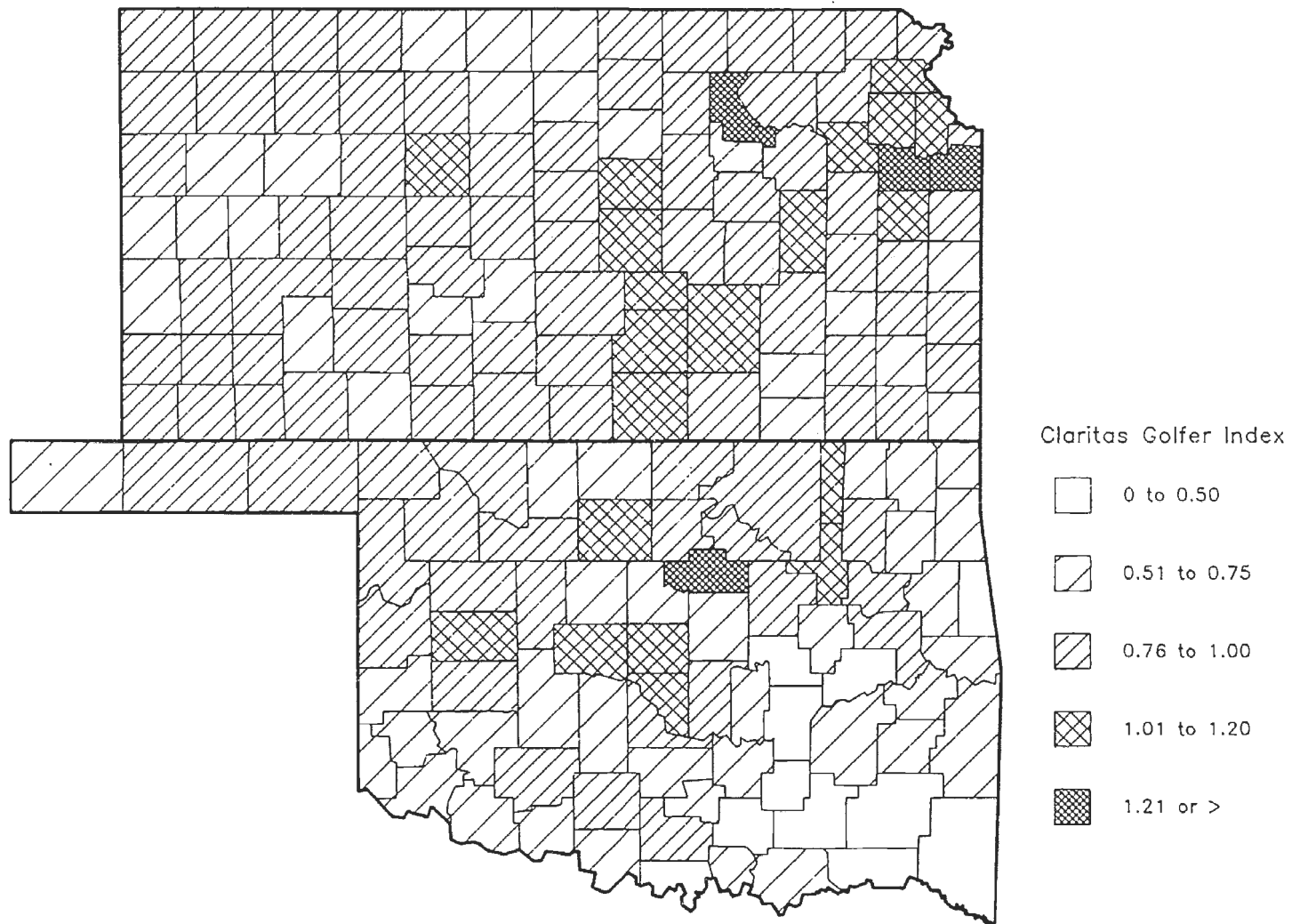
Figure 20. Claritas Golfer Index by County (20+rounds/year)

more rounds per year) and includes other variables as well in order to rank counties on an index compared with a national norm devised by Claritas.

In addition to the Database of Golf in America and CLARITAS, two other sources have data significant to this study. The National Golf Foundation (NGF) releases data on each state based on the results from 100,000 household telephone surveys which are conducted annually. According to the NGF, the latest participation rates for golf in Kansas and Oklahoma are 13.7 percent and 9.3 percent, respectively (NGF, 1992:68-69). Both states have shown an increase in participation of 1 percent or more since 1988 (ibid., 5). Just as total participation in golf is higher in Kansas, so is women's participation. The Kansas rate is 24.2 percent to 19.1 percent in Oklahoma; the NGF counts total participants in golf at 223,000 for Kansas and 258,000 for Oklahoma.

The percentage of total participants playing private holes is 23.1 percent for Kansas and 20.8 for Oklahoma. This can be attributed to the fact that Kansas has 1611 private holes compared to 864 in Oklahoma.

The other source for data to show the differences in golf interest and accessibility in Kansas and Oklahoma is the High School Coaches Directory for Kansas and Oklahoma which lists all high schools and the sports teams supported by each school for the 1992-1993 school year. Figure 21 shows every zip code in the study area that has at least one high school golf team listed in the Coaches Directory. The
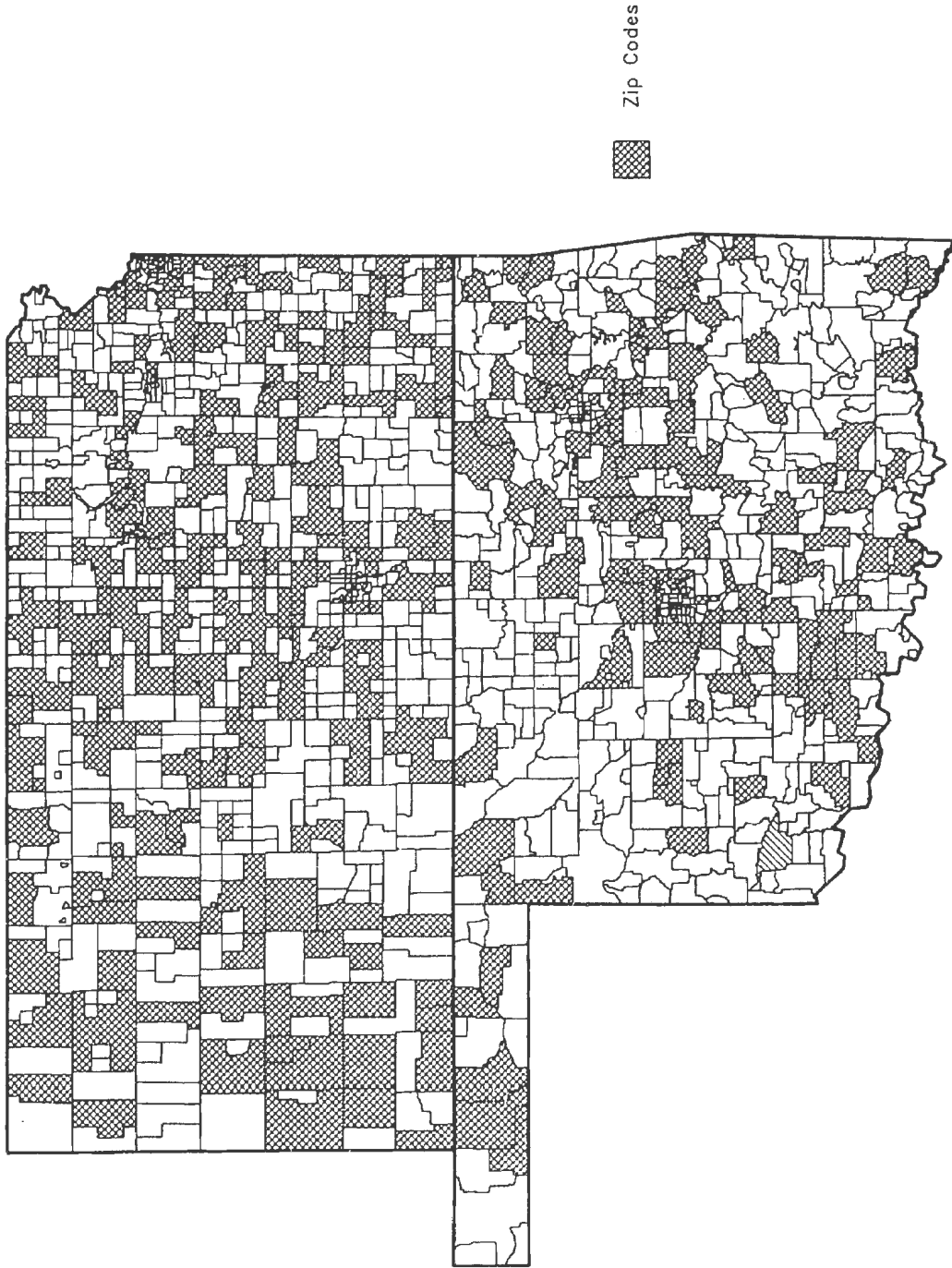
Figure 21. Zip Codes With at Least One High School Golf Team

distribution of golf teams in the two states is obvious. In Kansas, golf teams have a fairly even distribution across the state in both the urban and rural areas. The pattern of golf teams in Oklahoma is much more similar to the pattern of population by county and golf holes by county- the zip codes highlighted are in more urbanized areas.

High school golf is important as an indicator of golf interest. High school participants are more likely to continue play after high school. In Table II, the golf team zip codes were aggregated to the county level. The counties with golf teams were matched with the respective county population class. In Kansas, 82 percent of the Class 1 counties have at least one golf team. In the four remaining classes, 100 percent of the counties have at least one golf team. In Oklahoma, the concentration of golf teams is higher in the urban classes. Classes 4 and 5 have golf teams in 100 percent of the counties. However, the rural classes are not as well served as the same classes in Kansas. Only 56 percent of the Class 1 and 78 percent of the Class 2 counties have golf teams.

For the purposes of comparing urban golf in Kansas and Oklahoma, the counties in population Classes 4 and 5 were combined and are defined as the urban counties, with populations ranging from 49,001 to 375,000. The counties in Classes 1, 2, and 3 were combined and defined as the rural counties with populations ranging from 1,700 to 49,000. These two categories of counties are illustrated in Figure 22. The 10 counties in Kansas and 13 in Oklahoma

TABLE II

PERCENTAGE OF CLASS COUNTIES WITH
AT LEAST ONE GOLF TEAM

Class	Kansas	Oklahoma
1	82	56
2	100	78
3	100	92
4	100	100
5	100	100
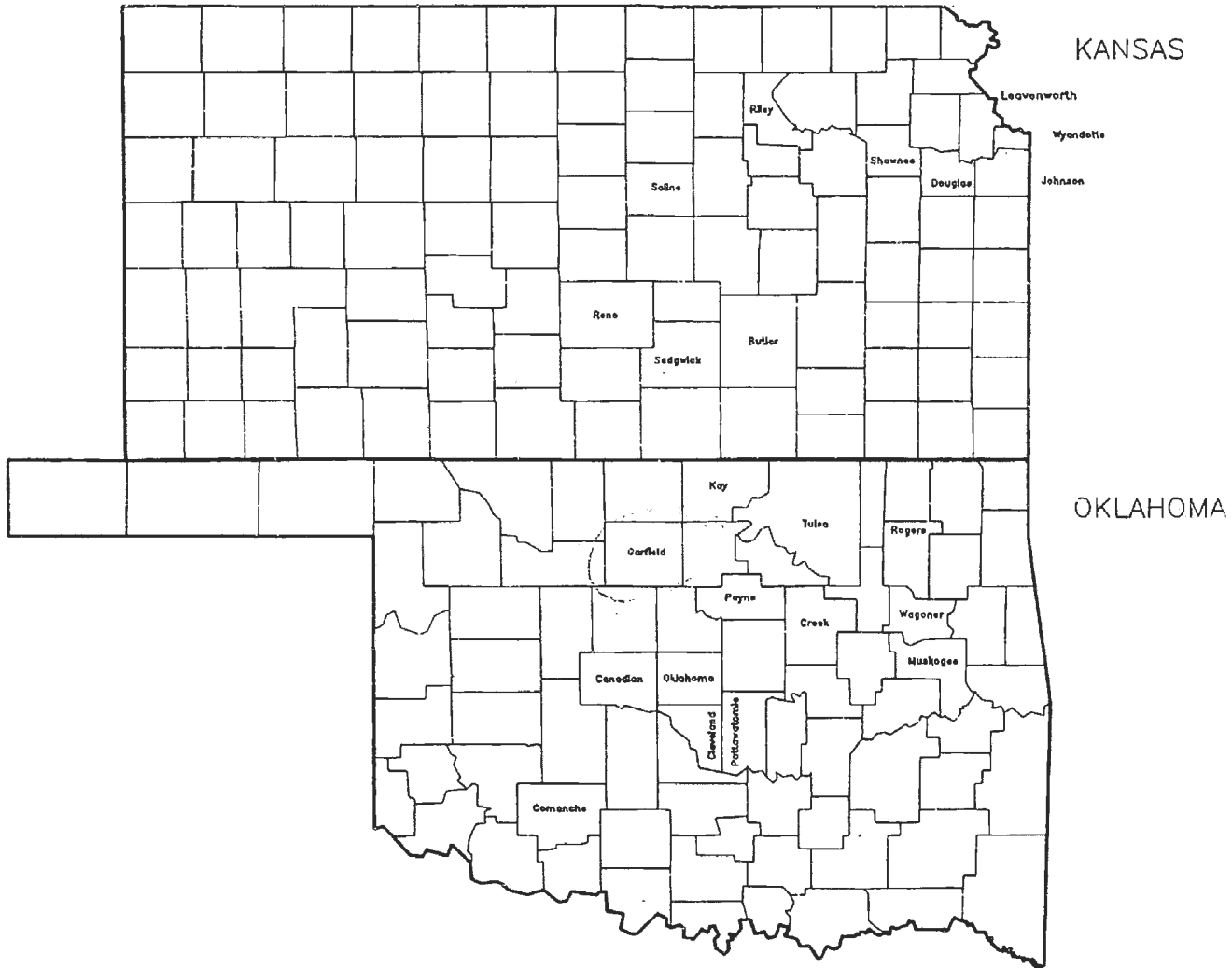
Figure 22. Urban Counties in Kansas and Oklahoma

(Table III) that are urban between 27 and 360 holes. The urban and rural counties were further divided by state to show the differences between rural and urban Kansas and rural and urban Oklahoma counties (Table IV), as well as to illustrate the fact that the rural golfers are better served than urban golfers. Kansas has higher per capita averages for golf holes in both rural and urban counties, as well as for per capita rounds played. There is a significant difference between the two states for the number of people per hole when comparing the number of people per hole in Kansas and Oklahoma and between rural and urban populations. The rural golfers in both states are better served than the urban golfers.

Central Place Theory

Walter Christaller, developer of central place theory, stated that the chief function or characteristic of a town is to be the center of a region. Settlements which are prominent centers of regions he called central places. The goods produced and the services offered at a central place are called central goods and services. They must be produced for the entire surrounding region (Getis, 1966:220).

The range of a good or service "is the distance the dispersed population is willing to travel to buy it at a central place," or the spatial extent of the good from the sale of the good from its location in the central place.

TABLE III

URBAN COUNTIES IN THE STUDY AREA

State	County	1990 Population	Golf Holes
Kansas	Butler	49,894	27
	Saline	50,353	54
	Riley	61,721	63
	Reno	64,510	81
	Leavenworth	66,204	54
	Douglas	76,173	72
	Shawnee	162,957	180
	Wyandotte	172,480	117
	Johnson	345,668	342
	Sedgwick	397,838	306
Oklahoma	Kay	51,229	63
	Wagoner	52,853	45
	Rogers	57,395	36
	Garfield	58,423	45
	Pottawatomie	61,059	72
	Payne	63,578	54
	Creek	67,892	45
	Muskogee	69,773	45
	Canadian	76,594	45
	Comanche	119,336	72
	Cleveland	168,224	99
	Tulsa	522,416	315
	Oklahoma	626,909	360

TABLE III CONTINUED

State	County	Major City	Number of Rounds
Kansas	Butler	Wichita	99,500
	Saline	Salina	110,000
	Riley	Manhattan	87,000
	Reno	Hutchinson	197,000
	Leavenworth	Leavenworth	118,000
	Douglas	Lawrence	128,000
	Shawnee	Topeka	358,250
	Wyandotte	Kansas City	123,000
	Johnson	Overland Park	598,000
	Sedgwick	Wichita	614,000
Oklahoma	Kay	Ponca City	153,500
	Wagoner	Wagoner	68,000
	Rogers	Tulsa	128,000
	Garfield	Enid	87,000
	Pottawatomie	Shawnee	73,000
	Payne	Stillwater	104,000
	Creek	Tulsa	100,000
	Muskogee	Muskogee	45,000
	Canadian	El Reno	75,000
	Comanche	Lawton	115,000
	Cleveland	Norman	246,000
	Tulsa	Tulsa	384,000
	Oklahoma	Oklahoma City	981,100

TABLE IV

RURAL AND URBAN COUNTY AVERAGES

	Kansas	Oklahoma
Rural Counties	95	64
Urban Counties	10	13
1990 Population-Rural	1,037,748	1,289,319
Urban	1,447,798	1,995,681
% of Population-Rural	41.8	39.2
Urban	58.2	60.8
Golf Holes-Rural	1,701	1,251
Urban	1,296	1,296
% of Holes-Rural	57	49
Urban	43	51
Golf Rounds-Rural	2,970,400	2,270,945
Urban	2,432,750	2,559,600
% of Rounds-Rural	55	47
Urban	45	53
Public Holes-Rural	810	900
Urban	576	792
Private Holes-Rural	891	360
Urban	720	504
Per Capita Holes-Rural	2.22	1.13
Urban	0.96	0.78
Per Capita Rounds-Rural	2.06	1.01
Urban	0.97	0.8
Number of People to Hole-Rural	558	1,014
Urban	1,153	1,417

The range has both an upper limit, the maximum radius of sales beyond which the good or service price is too high for it to be sold, and a lower limit, also called the threshold. The threshold level of a good or service is the number of consumers necessary to maintain a profit to support the production and distribution of the good from the central place (Getis, 1966:220-221).

With central place theory it is assumed that each good will have its own range because of the differences in prices which increase at different rates as the distance increases from the central place, and also because threshold levels change depending on the particular good or service.

The good or service in this study is golf in Kansas and Oklahoma. The range of golf is the distance people in the study area are willing to travel to play golf at a particular golf course. The threshold level of golf is the minimum number of people and the minimum number of golf rounds required to support a particular golf course.

Christaller stated that each central place has a complimentary region which encloses the range of the good. He assumed that the central place would have a monopoly within that complimentary region because of the price at which that good or service could be offered. In an ideal situation, each central place would have a circular market area, with the central place in the center. However, because these circular markets, placed next to each other, would have unserved areas in between, he devised that hexagons would best fit the model. That way, each would fit

together, there would be no overlap, and no unserved areas.
Therefore, the hexagon is the shape of the complimentary
region of central places (Getis, 1966:222).

Christaller also devised that there is a hierarchy of
central places which defines the distinct steps of centers
providing distinct groups of goods and services. Consumers
will drive varying distances depending on the desire for a
good or service. Settlements of a small size with a small
complimentary region will provide low order goods and
services. Higher order goods and services are provided at
metropolitan areas (Berry, 1967:20).

If it assumed that each golf course is located at a
central place, then the range and threshold for each golf
course, with the good or service being golf, can possibly be
determined. Golf does not behave along the lines of classic
central place theory. The range and threshold may not be as
predictable as those for other goods and services, such as
food and hospital care; the concept of personal preference
when choosing a golf course comes into play here.
Furthermore, in Kansas and Oklahoma, it has been observed
that the majority of golf holes in the state are in rural
counties, where there is only one golf facility per county.
The explanation for concluding that the supply and demand of
golf in Kansas and Oklahoma is a function of central place
theory has to be that each golf course serves an
identifiable market. The rounds played at a golf course
include those by patrons who are not regular, repeat
customers. However, it is probable that the majority of the

rounds are played by those who live within the range of that particular golf course, and that golf courses, in general, operate where there is a threshold population large enough to support the facility.

For the purpose of determining the threshold number of rounds and population for golf courses in Kansas and Oklahoma, and to support the two other hypotheses in this study, that Kansas golfers are better served than Oklahoma golfers, and rural golfers are better served than urban golfers, a telephone survey was conducted to gather information.

Twenty-one randomly selected nine hole golf courses in each state were surveyed. Golf Professionals or others familiar with golf course operations were asked a series of questions (see Appendix B) pertaining to facts about the courses, services offered, and the role the golf course has in the community.

Two questions on the survey provide answers that are relevant to determining the threshold and range of those surveyed golf courses. The number of nine hole rounds played will assist in the determination of a threshold level for nine hole golf courses, and distance in miles traveled to play the course, along with the courses listed as competition for customers can be used to define the range of the course.

Selected results for the survey are listed in Table V. For the surveyed Kansas courses, the nine hole rounds played per year range from 1,000 to 17,000; in Oklahoma, the nine

TABLE V

TELEPHONE SURVEY AVERAGES
SELECTED RESULTS

	Kansas	Oklahoma
Rounds	10,883	23,714
Length of Season (Months)	10	11
Greens Fees-Weekday	$8.00	$10.00
Weekend	$11.00	$12.00
Yearly Maintenance Costs	$58,483	$102,643
Percentage Golfers Female	26	15
Average Distance Driven (Mi)	18	16
Membership Cost-Individual	$362.00	$434.00
Family	$434.00	$464.00
Number of Tournaments Per Year	6	7
Corporate/Charitable Events Per Year	8	7
Number of Golf Leagues	2	1
Number of Participants in Leagues	53	51
Number of Participants in Women's Associations	29	27
Greens Surface-Bent	18	18
Bermuda	0	1
Sand	3	2

hole courses surveyed have greater demand pressure on them, with rounds played per year ranging from 1,000 to 60,000. The average rounds played for Kansas is 10,883 and 23,714 The survey courses were further divided into those from urban or rural counties to better illustrate the differences between the two states in terms of threshold rounds. In Kansas, rounds played for urban courses averaged 8,900. Four of the surveyed 21 courses were in urban counties. Of those four, one course has rounds estimated at only 1,000 per year because it is privately-owned, in a rural area, and is operated entirely on a volunteer basis. Oklahoma urban courses, however, averaged far above Kansas for nine hole rounds played per year, at 25,000.

In terms of rural course rounds played, the Kansas courses averaged 11,900 while the Oklahoma courses averaged 23,100; there is far less demand on the rural Kansas courses that were surveyed, again because Oklahoma has fewer rural golf holes than Kansas. This also this indicates that the Kansas courses surveyed have overall threshold rounds levels much lower than that of Oklahoma. These Kansas courses require fewer rounds and a lower population in order to keep the golf course in operation. There are two explanations for this. First, there is greater interest in golf in Kansas, especially in rural Kansas, as evidenced by the National Golf Foundation participation rates; Kansas is higher than Oklahoma. Secondly, many of the rural golf courses are minimally maintained, with few or no employees and sand greens to reduce costs. As a result, fewer rounds

per year are required to generate the profit necessary to maintain the course. The low threshold of rounds and population supports the placement of Kansas in the "Sports for Sport's Sake" region. In the "Sports for Sport's Sake" region, "participation is the key concept...in this sparsely populated region and inexpensive golf courses" allow a large percentage of the population the opportunity to play golf (Rooney and Pillsbury, 1992:32). There are slight differences in average distance in miles driven to play the golf course. The overall average is 18 miles in Kansas and 16 miles for Oklahoma. But, when separated into rural and urban, Oklahoma urban courses average 50 miles while Kansas urban courses average 12.5 miles. For the rural courses, the difference is not as significant: 19.5 for Kansas and 15.5 for Oklahoma.

The range for these courses is approximately 2 to 50 miles, with an average of 18 miles for all surveyed golf courses. The total average rounds played per year is 17,950. Fourteen courses were unable to provide an estimated number of nine hole rounds per year because they do not record such information. Some are so rural, in fact, that they do not have a clubhouse or pro shop on the premises and do not have a Golf Professional. Greens fees are paid through a membership or at a "drop box." Patrons pay using the honor system because the operating budget is not high enough to include employees, in some cases. This was the case in Kansas more than Oklahoma; seven Kansas respondents stated that their course had a "drop box," while

there were only two such responses for the surveyed Oklahoma courses.

Because only three golf courses in counties with a population under 10,000 were able to report rounds played, the threshold rounds for the these courses, cannot be determined. However, the threshold population can be determined at the county level. The populations for counties containing these courses have been averaged and, again, the differences between Kansas and Oklahoma are evident. The average threshold population for nine hole counties in Kansas is 6,456 and 11,195 in Oklahoma. The average threshold population for counties with greater than nine holes in Kansas is 17,807 and 31,584 in Oklahoma.

Several of the interviewees reported that, because they are located in very rural locations, the courses are in operation as a result of donations of labor and supplies or through the financial support of the town, as a municipal course. Also, it was reported that several courses are not self-supporting, however, the course is kept in operation because of local interest. This was the case with more of the Kansas survey respondents.

Ninety-three percent of the respondents stated that their golf course was an important recreation facility in the community that should be maintained even when it fails to show a profit.

The county populations of the survey courses ranged from 2,394 to 162,957, with an average county population of 83,474 for urban counties, and 18,862 for rural counties.

CHAPTER V

CONCLUSIONS

The purpose of this study was to determine what
specific conditions explain or account for the supply and
demand of golf in Kansas and Oklahoma. Several variables
were used in this study to create a demographic profile of a
typical county in Kansas and Oklahoma. The 1990 population
was the best indicator of the number of holes to expect at
the county level. Therefore, counties were sorted by
population showing that, in general, rural Kansas counties
with at least nine holes have a lower population than rural
Oklahoma counties with at least nine holes.

As a result of mapping data in the study, including the
number of golf holes, rounds, Avid Core golfers, and number
of people per hole, distinct golf interest and participation
patterns have become evident in Kansas and Oklahoma and the
differences between the two states better defined.
Accessibility to golf and participation in the game is high
in the rural areas of western Kansas, particularly in the
northwestern counties that may have fewer than ten thousand
people. Participation in Oklahoma is higher in the
northwestern rural counties, as well as in the urbanized
counties surrounding and in between Oklahoma and Tulsa

counties.

Kansas per capita rates for variables related to golf used in the study area are, in general, higher than Oklahoma. Furthermore, the pattern shows a more even distribution of overall supply and demand for golf in Kansas than in Oklahoma. Rural Kansas counties have threshold levels for number of rounds and population that are lower than Oklahoma, indicating that rural golf courses in Kansas require fewer rounds per year and a lower county population base to remain in operation.

Urban areas in the study area are not as well served as the rural areas. Per capita rates are lower than for the rural areas and accessibility to golf holes is also lower because of the high population base. Number of rounds played per year in the urban areas is also high, indicating that there is considerable pressure on the existing courses. When comparing the number of people per hole, Kansas is lower than Oklahoma and rural areas are lower than the urban areas in both states.

The Rooney Golf Supply Index and Golf Demand Index, when mapped, follow the same general pattern as variables such as population and per capita holes presented in this study, which gives credibility to the two indices as accurate indications of actual golf supply and demand in Kansas and Oklahoma. The supply of golf in Kansas is almost entirely above the national norm, which indicates that there are enough golf holes to provide adequate accessibility, except for in the urban counties where the per capita holes

index is low. The demand for golf, as indicated by the Golf
Demand Index, was found to be much higher in Kansas,
particularly in the western half of the state. Furthermore,
demand above the national average was more evenly
distributed in Kansas, while in Oklahoma, demand was
concentrated in urban areas with an inadequate hole supply.

The results of the telephone survey of nine hole golf
courses also supported these conclusions. The threshold
rounds and county population levels for the surveyed golf
courses were lower in Kansas than in Oklahoma. The
principles and assumptions of central place theory can, to
some degree, be applied to the concepts of supply of, and
demand for golf. Golf facilities exist where there is a
demand for golf. Interest and participation in the game is
higher in Kansas. Consequently, there are more golf holes
which are more evenly distributed across the state. Golfers
will drive farther to play golf in Kansas and fewer rounds
are required to maintain the golf course.

The differences between Kansas and Oklahoma support the
placement of Kansas in the Rooney and Pillsbury ,"Sports for
Sport's Sake" sports region, where sports participation and
not recognition is the key. The Oklahoma counties along the
Kansas border, particularly those on the western half, may
also be influenced by Kansas. Instead of the state border
as the boundary between the "Sports for Sport's Sake" and
the "Texas Southwest" regions, in which Rooney and Pillsbury
placed Oklahoma, those border counties may be more
appropriate to the "Sports for Sport's Sake" region.

Mapping data pertaining to golf in Kansas and Oklahoma affords the opportunity to spatially analyze the existing supply and demand of golf. By having a solid understanding of the factors that create golf interest-- supply and demand, analysis of golf markets can be improved, which may increase the accessibility of golf.

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APPENDIXES

APPENDIX A

GOLF COURSE TELEPHONE SURVEY

Public Facility Survey

Name of course:_____

Estimated total number of nine hole rounds played per year:_____
Length of season:_____
Greens fees: weekday_____   weekend_____
Annual golf course maintenance budget:_____
Percentage of female golfers (best guess):_____
Average distance golfers travel to play course (in miles):_____

Do you have a membership plan?   *Yes No*

       Cost of individual membership $_____ family membership $_____

Approximately how many tournaments do you sponsor?_____

Do you sponsor corporate or charitable outings?   *Yes No*   How many:_____

Do you have golf leagues?   *Yes No*   How many?_____

       Average # of golfers per league:_____

Does the club have leagues/clinics for junior high or HS golfers?   *Yes No*

Does the club have a women's association?   *Yes No*

       Approximately how many women participate?_____

Greens surface: *Bent   Bermuda   Sand   Other*

Do you have a clubhouse?   *Yes No*   Is it open year round?   *Yes No*

If your course is municipal, is there interest in the community to expand
      it to 18 holes? *Yes No*

In which ways is the golf course a service to the community?_____
_____

Is your golf course an important recreation facility in the community that should be
      maintained even when it fails to show a profit?   *Yes No*

Would there be much local opposition if your golf course were to be closed? *Yes No*

Which golf course or courses represent your competition for customers?_____
_____

Private Facility Survey

Name of course:_____

Estimated total number of nine hole rounds played per year:_____
Length of season:_____
Greens fees: weekday_____   weekend_____
Annual golf course maintenance budget:_____
Percentage of female golfers (best guess):_____
Average distance golfers travel to play course (in miles):_____
What is the waiting time to become a member?_____

Do you have a membership plan?   *Yes   No*

    Cost of individual membership $_____   family membership $_____

Approximately how many tournaments do you sponsor?_____

Do you sponsor corporate or charitable outings?   *Yes   No*   How many?_____

Do you have golf leagues?   *Yes   No*   How many?_____

        Average # of golfers per league:_____

Does the club have leagues/clinics for junior high or HS golfers?   *Yes   No*

Does the club have a women's association?   *Yes   No*

        Approximately how many women participate?_____

Greens surface: *Bent   Bermuda   Sand   Other*

Do you have a clubhouse?   *Yes   No*   Is it open year round?   *Yes   No*

Is there interest in the community to expand your golf course to 18 holes?   *Yes   No*

In what ways is the golf course a service to the community? _____
        _____

Is your golf course an important recreation facility in the community that should be
        maintained even when it fails to show a profit?   *Yes   No*

Would there be much local opposition if your golf course were to be closed?   *Yes   No*

Which golf course or courses represent your competition for customers?   _____
        _____

APPENDIX B

KANSAS AND OKLAHOMA COUNTY GOLF AND DEMOGRAPHIC DATA

KANSAS COUNTY DATA

County	Total Holes	Private Holes	Public Holes	1990 Population	People Per Hole
Allen	27	0	27	15,114	560
Anderson	9	0	9	8,022	891
Atchison	18	18	0	17,451	970
Barber	9	0	9	6,569	730
Barton	54	54	0	31,193	578
Bourbon	9	9	0	15,164	1,685
Brown	18	18	0	11,076	615
Butler	27	9	18	49,894	1,848
Chase	9	0	9	2,919	324
Chautauqua	9	9	0	4,482	498
Cherokee	18	9	9	21,970	1,221
Cheyenne	18	0	18	3,428	190
Clark	9	9	0	2,580	287
Clay	9	9	0	9,120	1,013
Cloud	27	9	18	11,239	416
Coffey	9	9	0	8,847	983
Comanche	9	9	0	2,354	262
Cowley	36	27	9	36,651	1,018
Crawford	54	18	36	37,012	685
Decatur	0	0	0	4,109	0
Dickinson	36	18	18	19,796	550
Doniphan	0	0	0	8,871	0
Douglas	72	36	36	76,173	1,058
Edwards	9	9	0	37,994	422
Elk	0	0	0	3,508	0
Ellis	36	27	9	26,990	750
Ellsworth	9	9	0	5,953	661
Finney	45	18	27	31,710	705
Ford	36	18	18	26,721	742
Franklin	18	9	9	22,048	1,225
Geary	27	9	18	29,703	1,100
Gove	18	18	0	3,310	184
Graham	9	0	9	3,731	415
Grant	9	0	9	6,708	745
Gray	9	0	9	5,421	602
Greeley	9	0	9	1,775	197
Greenwood	27	27	0	7,906	293
Hamilton	9	0	9	2,476	275
Harper	9	0	9	7,380	820
Harvey	54	18	36	30,647	568
Haskell	0	0	0	4,011	0
Hodgeman	9	9	0	2,168	241
Jackson	9	0	9	11,736	1,304
Jefferson	0	0	0	16,561	0
Jewell	9	9	0	4,446	494
Johnson	342	207	135	345,668	1,011
Kearny	9	0	9	4,104	456
Kingman	9	9	0	8,808	979
Kiowa	9	9	0	3,721	413
Labette	36	18	18	25,375	705

County					
Lane	9	9	0	2,364	263
Leavenworth	54	36	18	66,204	1,226
Lincoln	9	9	0	3,477	386
Linn	36	27	9	8,010	223
Logan	9	0	9	3,233	359
Lyon	36	9	27	34,629	962
McPherson	54	18	36	27,358	507
Marion	27	9	18	12,580	466
Marshall	18	18	0	12,225	679
Meade	27	9	18	4,292	159
Miami	54	27	27	23,275	431
Mitchell	9	9	0	7,330	814
Montgomery	63	36	27	40,084	639
Morris	9	9	0	6,222	691
Morton	9	0	9	3,481	387
Nemaha	18	9	9	10,630	591
Neosha	36	18	18	18,144	504
Ness	9	9	0	4,228	470
Norton	9	9	0	6,398	711
Osage	36	0	36	15,908	442
Osborne	18	9	9	5,251	292
Ottawa	9	9	0	5,717	635
Pawnee	9	0	9	7,452	828
Phillips	9	0	9	6,745	749
Pottawatomie	27	9	18	16,048	594
Pratt	27	18	9	10,361	384
Rawlins	9	9	0	3,595	399
Reno	81	36	45	64,510	796
Republic	9	9	0	6,835	759
Rice	36	27	9	10,864	302
Riley	63	45	18	61,721	980
Rooks	18	0	18	6,236	346
Rush	18	9	9	3,766	209
Russell	9	0	9	8,118	902
Saline	54	36	18	50,353	932
Scott	9	0	9	5,517	613
Sedgwick	306	153	153	397,838	1,300
Seward	18	9	9	19,084	1,060
Shawnee	180	99	81	162,957	905
Sheridan	9	9	0	3,223	358
Sherman	9	9	0	6,807	756
Smith	9	9	0	5,367	596
Stafford	9	9	0	5,307	590
Stanton	18	0	18	2,394	133
Stevens	9	9	0	48,991	544
Sumner	36	0	36	25,191	700
Thomas	9	9	0	8,335	926
Trego	9	0	9	3,818	424
Wabaunsee	0	0	0	6,728	0
Wallace	9	0	9	1,971	219
Washington	18	18	0	7,140	397
Wichita	27	27	0	2,845	105
Wilson	9	9	0	11,398	1,266
Woodson	9	0	9	3,985	443
Wyandotte	117	63	54	172,480	1,474

OKLAHOMA COUNTY DATA

County	Total Holes	Private Holes	Public Holes	1990 Population	People Per Hole
Adair	0	0	0	20,282	0
Alfalfa	0	0	0	6,533	0
Atoka	0	0	9	13,486	0
Beaver	18	9	9	7,063	392
Beckman	36	0	36	19,914	553
Blaine	27	0	27	12,840	476
Bryan	9	9	0	33,355	3,706
Caddo	27	9	18	32,650	1,209
Canadian	45	45	0	76,594	1,702
Carter	54	27	27	46,760	866
Cherokee	54	0	54	36,227	671
Choctaw	18	0	18	16,230	902
Cimarron	0	0	0	4,025	0
Cleveland	99	18	81	168,224	1,699
Coal	0	0	0	6,018	0
Comanche	72	54	18	119,336	1,657
Cotton	9	0	9	6,828	759
Craig	9	0	9	14,771	1,641
Creek	45	0	45	67,892	1,509
Custer	36	9	27	29,052	807
Delaware	18	9	9	28,709	1,595
Dewey	9	0	9	6,051	672
Ellis	9	0	9	5,165	574
Garfield	45	18	27	58,423	1,298
Garvin	9	0	9	29,332	3,259
Grady	18	18	0	43,738	2,430
Grant	0	0	0	6,051	0
Greer	9	0	9	6,547	727
Harmon	0	0	0	4,084	0
Harper	36	0	36	4,391	122
Haskell	0	0	0	11,935	0
Hughes	18	0	18	14,316	795
Jackson	18	18	0	30,541	1,697
Jefferson	9	0	9	7,487	832
Johnston	9	9	0	10,980	1,220
Kay	63	18	45	51,229	813
Kingfisher	18	0	18	15,221	846
Kiowa	18	9	9	11,577	643
Latimer	9	9	0	10,738	1,193
Le Flore	9	9	0	45,864	5,096
Lincoln	36	9	27	29,782	827
Logan	45	9	36	30,397	675
Love	18	0	18	8,008	445
McClain	18	0	18	25,416	1,412
McCurtain	45	0	45	36,140	803
McIntosh	18	0	18	17,724	985
Major	9	0	9	8,677	964
Marshall	0	0	0	11,812	0
Mayes	18	0	18	35,265	1,959
Murray	9	0	9	12,543	1,394

Muskogee	45	18	27	69,773	1,551
Noble	9	9	0	11,550	1,283
Nowata	9	9	0	10,624	1,180
Okfuskee	9	0	9	11,412	1,268
Oklahoma	360	126	234	626,909	1,741
Okmulgee	9	0	9	39,453	4,384
Osage	27	18	9	40,044	1,483
Ottawa	63	63	0	32,452	515
Pawnee	18	0	18	16,919	940
Payne	54	36	18	63,578	1,177
Pittsburg	27	9	18	43,579	1,614
Pontotoc	27	18	9	34,796	1,289
Pottawatomie	72	27	45	61,059	848
Pushmataha	0	0	0	11,852	0
Roger Mills	9	0	9	5,470	608
Rogers	36	0	36	57,395	1,594
Seminole	27	0	27	27,727	1,027
Sequoyah	36	0	36	36,021	1,001
Stephens	63	18	45	41,822	664
Texas	54	0	54	17,316	321
Tillman	9	9	0	10,821	1,202
Tulsa	315	144	171	522,416	1,658
Wagoner	45	0	45	52,853	1,175
Washington	54	36	18	41,054	760
Washita	18	9	9	12,213	679
Woods	9	0	9	9,920	1,102
Woodward	45	0	45	19,749	439

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