URBAN PARK PLANNING: A CASE STUDY OF STILLWATER, OKLAHOMA

By

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1971

Submitted to the Faculty of the Graduate College
of the Oklahoma State University
in partial fulfillment of the requirements
for the Degree of
MASTER OF SCIENCE
May, 1973

URBAN PARK PLANNING: A CASE STUDY

OF STILLWATER, OKLAHOMA

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PREFACE

This thesis is concerned with reviewing the past and present urban park planning strategies in the belief that they need revision in order to become effective tools for future planning of urban recreation. Specifically, this research demonstrates, by means of a case study of Stillwater, Oklahoma, the ineffectiveness of the variables used in present park standards, tests several demographic, socio-economic, and land use variables which might affect urban recreation activity, and summarizes these factors which should be included in park strategies for Stillwater, Oklahoma.

The planning implications of the findings of this thesis are considerable. First, the proposed planning strategy should be considered for actual use by the city of Stillwater. Second, this planning strategy should be tested in the same type of city as Stillwater for a possible formulation of a park standard for these city types. Finally, the components of this planning strategy might be considered and/or tested as primary determinants of urban recreation activity in all cities.

A note of thanks for guidance is given to my faculty advisory committee: Dr. Richard Hecock, Dr. Keith Harries, and Dr. John Rooney. In particular, great appreciation is extended to Dr. Richard Hecock for his invaluable advice, time, and patience. In addition, thanks is given to Mr. James Stine for his cartographic advice, and to Dr. Steve Tweedie for statistical assistance.

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CHAPTER I

INTRODUCTION

The Problem and Justification

Many agree that the present allocation of land uses in the American city does not provide sufficient space for the full range of leisure time pursuits by all urban dwellers.[1] The Outdoor Recreation Resources Review Commission demonstrated that urban recreation areas have the highest demand and the lowest allocation of land of any type of recreational setting.[2] Most planners can and do point to crime and juvenile delinquency, the flight from the city, air, noise, and water pollution, and other major urban problems as evidence that certain urban amenities are lacking. They argue that satisfaction with urban living would be enhanced by making more open space in general, and more parks in particular, available to the public.[3] Their argument is strengthened by the fact that urban dwellers are spending a greater portion of their disposable income for recreation.[4] Moreover, leisure time will likely increase for all ages and that while some of this leisure time will be in large blocks, large amounts of leisure time will materialize as a result of the shorter work weeks and work days. This type of leisure time increments generates demand for urban and regional parks rather than larger resource-based parks located far from the city.[5]

Several processes at work in the city conspire to prevent an ade-

quate supply of urban open space and park acreage. The development process that is associated with the urbanization of our population has resulted in nearly eliminating the natural landscape from the urban scene.[6] In the extreme case, rapid development plus attendant speculation presents a growing urban area with a totally man-made landscape; that is, a built up, paved over, intensely used environment area with no parks.[7] This explains the fact that when urban planners are called in they find few open spaces and an apparent inability to develop any feasible open space plans.[8]

An associated problem for land in recreational activities has been the difficulty of measuring its value in the market place.[9] In addition, those who have made greatest use of urban parks, that is the elderly, the young, and the ghetto dweller, are not the ones who pay for the parks. Thus, low priorities have been attached to the allocation of land for park purposes by developers and taxpayers. In turn, public agencies charged with the responsibility of providing and maintaining space for parks encounter the problem of low priority claims to urban financial resources for these purposes.[10]

It seems clear that the current supply of open space and park land is unsatisfactory in terms of its ability to fulfill present or projected demands for recreation space by the urban populace. It seems equally clear that considerable progress needs to be made in the area of providing such space for leisure time pursuits if the city is to improve its livability. This thesis is concerned with reviewing the present planning strategies, practices and standards, in the belief that they inhibit the provision of adequate park space. In particular, the City of Stillwater, Oklahoma parks system will be studied in con-

siderable detail. The study concludes with a prediction of additional park needs for the city of Stillwater and a commentary of how park standards for the United States need to be altered.

Planning and Provision of Urban Parks

A large portion of urban park land first came into existence in New England towns where public ownership of common pastures gradually developed into city parks. In 1828, cities began to purchase open space specifically for park areas. Even though land acquisition started at this early date, park facilities and public acceptance of city parks did not evolve until the turn of the century. From this time until the 1940's larger cities which had already acquired some park areas expanded their park acreage relatively faster than did the populations of the same cities. However, many cities had made no attempts to develop any city parks; thus, the adequacy for park land in all cities was far from satisfactory. Since 1940, the Second World War and economic recessions restricted legislative bodies from providing funds for the establishment of recreation resource agencies capable of making and implementing plans. Therefore, during the post war period of maximum urban growth in general and suburban development in particular there were virtually no examples of recreation land acquisition. This resulted in many new residential areas having no area for parks and the acquisition of land in the older parts of the city proved to be difficult if not impossible because of skyrocketing costs and competition from commercial land uses.[11] Therefore, to solve the existing problems, starting in the late 1950's planners' attention increasingly focused upon the need for park sufficiency standards.

Growing from George Butler's work of the early 1940's, these standards have called for the use of two variables extensively: acreage per capita and distance from the park.[12] Based upon the premise that these variables are meaningful and workable, many cities and states have adopted such standards, as shown in Table I.[13]

TABLE I

NATIONAL, REGIONAL, AND LOCAL PARK STANDARDS

National Park Standards by George Butler	Neighborhood Parks 1 acre/1000 population Size 3-5 acres	Playgrounds 1 acre/800 population Size 3-5 Acres	City-wide parks, 2½-4 acres/1000 population 50,000 population/park
Dallas, Texas Park Standards	Neighborhood Parks 1-2 acres/1000 population	Playfields 1-2 acres/ 1000 population	Large city parks, 5 acres/ 1000 population
New York Park Standards	Neighborhood playgrounds, 1 acre/800 population, 5 to 14 yrs. old. Minimum size 2 acres	Community Parks 1 park/80,000 population Minimum Size 10 acres	
South Carolina Park Standards	Neighborhood Parks 2 acres/1000 population. Minimum size 5 acres. Service Radius = .5 miles	Community Parks. 3 acres/1000 population Minimum size 25 acres Service radius = 2.5 miles	
Kentucky Park Standards	Playgrounds 2.5 acres/1000 population. Minimum size 7 acres. Serves a neighborhood.	Playfields 2.5 acres/1000 population Minimum size 25 acres Serves a community	

Yet, common sense indicates the use of arbitrary distance standards and population-serving capabilities as major inputs in the park location planning process to be too simplistic a solution for such a complex problem as recreation space allocation; this intuition is further substantiated by contemporary research.[14] For example, there is tentative evidence that population density is not the key to understanding or predicting park use; rather, demographic and socio-economic characteristics of target populations must be considered. It makes little intuitive sense to provide playlots in urban regions containing the elderly or the young singles; the same could be said for high income areas where people seem to need fewer public facilities because of accessibility to their own private open space and play equipment.[15] On the other hand, it has been shown that middle income families exhibit the strongest attraction to urban parks presently, in part because they are currently the best-served by park facilities.[16] Other research has shown there to be a spatial and functional hierarchy in park systems, analogous to central place systems. It has been shown that all types of urban parks, regardless of location, size, and intended functions, maintain a playground function (low order) which serves young children and/or families with young children.[17]

Present recreation standards also make the tacit assumption that parks of a given functional or locational type do not vary in quality. However, intuitive judgments suggest that some parks are more attractive in respect to the quality and maintenance of facilities than others; one would expect a child or any other park patron to respond to such differences. It has been shown that neighborhood parks designed in such a way to create excitement and challenge will not only attract a

greater volume of visitors, but also the parks themselves can often accommodate more people.[18]

In spite of the apparent precision of existing standards, it can be shown that measuring a standard distance radius from a park's edge gives a considerable different hinterland than measurement from the center of the park. An elongated park containing the same area as a round park would provide park land in closer proximity to a considerable greater amount of urban territory and its inhabitants. Moreover, use of an arbitrary distance standard ignores the realities of urban accessibility, such as street patterns and time-distance relationships. These standards assume that people have direct accessibility to the park, whereas in reality travel on streets to the park is circuitous; furthermore, existence of major streets may serve as a physical and visual barrier to park users. Therefore, even though residences might be located within the theoretical hinterland, the effective distance between the resident and park may be greater than that which is tolerable to residents. An associated notion is the fact that travel time spent going to and from these areas is a more relevant measure of accessibility than distance. It also seems logical that visibility of the park not only may enhance park attractiveness, but also may increase the number of urban residents who are attracted to the park.

Present standards also ignore locational characteristics of city parks. For example, large urban parks centrally located within the city will serve a much greater proportion of the population within a radial distance than those located on the city edge; in the same way, neighborhood parks located centrally within a residential area will serve more population than those with a location periphal to the

neighborhood. Also, inherent in location is the distance between parks. Intuitive judgment shows that if parks are located in too close proximity, they may compete with one another, restricting each from achieving optimal use. On the other hand, if parks are located too far apart, the resultant situation is that segments of the population are not served by parks.

Appreciating the inadequacies of the present standards used in park planning, this thesis will answer the following questions in a case study of Stillwater, Oklahoma:

a) What factors have determined the present distribution of parks? In particular, have Stillwater park standards served as a guideline for the park system?

b) What future park plans are anticipated by the city?

c) How are Stillwater parks used?

d) What is the size and shape of actual park hinterlands? Moreover, do these actual hinterlands differ from theoretical hinterlands, as described in current standards?

e) Do all park types serve a neighborhood function?

f) Is park use a function of population density, total population, and age structure?

g) Is park use a function of housing value?

h) Is park use a function of land use variables, in particular, the percentage of area in gross open space and the percentage of area and number of open space parcels?

i) Is park use a function of locational characteristics, such as location within the city, park accessibility and visibility, and existence of major streets?

j) Is the distance between parks important to determine the extent of over-served areas?

The answers to these questions constitute a critique of present Stillwater park standards and will provide a new strategy for future neighborhood park planning. This strategy will be employed to evaluate the present science of Stillwater parks and will identify the location of needed parks.

Data on Stillwater park use, measured in terms of the number and types of visitor, were obtained by surveying parks at different times during the day over a three week period in February and March. In addition, information was obtained by conducting interviews at selected parks over a three week time period in May and June. In all 32 observations were made and 244 interviews were administered.

Chapter II is a description of the park system and includes the following: the present distribution of parks and factors which have determined their existing locations; the variations in park attendance by the type of park in relation to day of the week, time of day, and weather conditions, such as temperature, wind velocity, and cloud cover; specification of the type of visitor according to family or non-family status and age; a description of theoretical and actual park hinterlands. Chapter III will examine present park use as a function of demographic, socio-economic, land use, and locational characteristics of actual park hinterlands. The results from the analysis of all variables affecting park use lead to a formulation of the planning strategy which is employed in Chapter IV to identify the location for new parks.

FOOTNOTES

[1]Marion Clawson, "A Positive Approach to Open Space Preservation," American Institute Planners Journal, XXVIII (May, 1962), pp. 124-125; Lowdon Wingo, "Recreation and Urban Development: A Policy Perspective," Annals of the American Academy of Political and Social Science, Vol. 352 (March, 1964), p. 138; Lisle Mitchell, "An Empirical Study of Urban Recreation Units: Playgrounds As Central Places" (unpub. Ph.D. dissertation, Ohio State University, 1967), p. 3; Nobert Dee and Jon C. Liebman, "A Statistical Study of Attendance at Urban Playgrounds," Journal of Leisure Research, II (1970), p. 145.

[2]Charles Zuhorst, The Conservation Fraud (New York, 1970), pp. 73-74.

[3]Lowdon Wingo, p. 129; Ken L. McHarg, "The Place of Nature in the City of Man," Annals of the American Academy of Political and Social Science, Vol. 352 (March, 1964), p. 12; Lawrence Levine, "Conservation in Metropolitan Areas," American Institute Planners Journal, XXX (August, 1964), p. 206; Edwin J. Staley, "Determining Neighborhood Recreation Priorities: An Instrument," Journal of Leisure Research, I (1969), p. 69.

[4]James W. Kitchen and John W. James state that per capita recreation expenditures have increased 120 percent from 1929-1968; during this same time period percentage of disposable income spent on recreation has increased from 5.20 to 5.71 percent of each dollar. This appears in their work, An Analysis of Consumer Expenditures on Recreation 1929-1980, Research Report No. 4, Department of Park Administration, Texas Technology University, pp. 4, 5, 21-23.

[5]Marion Clawson and Jack L. Knetsen, Economics of Outdoor Recreation (Baltimore, 1966), p. 134.

[6]U. S. Department of the Interior, Bureau of Sports, Fisheries, and Wildlife, Man and Nature in the City (Washington, D. C., 1968), p. 12; George D. Butler, "Adequate Land Reserves for Parks and Recreation," American Journal of Economics and Sociology, XV (April, 1956), p. 286.

[7]Clawson, "A Positive Approach to Open Space Preservation," pp. 125-126; Marion Clawson, "Open (uncovered) Space as a New Urban Resource," The Quality of the Urban Environment, ed. Harvey S. Perloyr (Baltimore, 1970), pp. 152-156; Kevin Lynch, The Image of the City (Cambridge, Mass., 1960), p. 110. George Macinko, "Saturation: A Problem Evaded in Planning Land Use," Science, Vol. 149 (July, 1965),

p. 516; Jere Stuart French, "The Decline and Deterioration of the American City Park," Parks and Recreation, V (August, 1970), pp. 24-28.

[8]Clawson, "A Positive Approach to Open Space Preservation," pp. 128-129.

[9]Clawson and Knetsen, pp. 38, 77.

[10]Marion Clawson, Land and Water for Recreation (Chicago, 1963), p. 19.

[11]Clawson and Knetsen, pp. 195-196; Clawson, Land and Water for Recreation, pp. 19-20.

[12]George D. Butler, Introduction to Community Recreation (New York, 1940), p. 141.

[13]U. S. Department of the Interior, Bureau of Outdoor Recreation, Outdoor Recreation Space Standards (Washington D. C., 1967), pp. 1-15.

[14]Douglas H. Sessoms, "An Analysis of Selected Variables Affecting Outdoor Recreation Behavior Patterns," Social Forces, XLII (October, 1963), pp. 112-115; Henry Hightower, "Recreational Activity: Toward A Spatial and Aspatial Methodology for Urban Planning" (unpub. Ph.D. dissertation, University of North Carolina at Chapel Hill, 1965); Donald McAllister, "Evaluating the Size and Spacing of Urban Public Service Centers: The Case of Local Recreation Facilities" (unpub. Ph.D. dissertation, University of California at Los Angeles, 1970); William Hurdon, "Determining Neighborhood Recreation Priorities: A Comment," Journal of Leisure Research, I (Winter, 1969), pp. 189-193; R. L. Ranken and J. A. Sinclein, "Casual Factors in the Demand for Outdoor Recreation," The Economic Record, XLVIII (September, 1971), pp. 8-10; Edwin J. Staley, pp. 69-75; Norbert Dee and Jon C. Liebman, pp. 145-159.

[15]Semmons, p. 112; Dee and Liebman, pp. 146-148; McAllister, pp. 1-50; Ranken and Sinden, pp. 69-70; Staley, p. 69; Hightower, pp. 46-91.

[16]Hendon, pp. 189-193.

[17]Lisle Mitchell, "Toward A Theory on Urban Recreation," Proceedings of the Association of American Geography, Vol. I (1969), pp. 103-109.

[18]Clawson and Ketsch, p. 165.

CHAPTER II

STILLWATER PARKS AND THEIR USE

The Development of the Stillwater Park System

At the present time there are twelve developed parks in the Stillwater system, the locations of which are identified in Figure 1. The parks vary considerably in terms of their size and facilities (Table II). They were acquired as development progressed, accounting for the fact that the west-central portion of Stillwater, the city's oldest residential development, has the greatest number of parks. All park land with the exception of Boomer Lake and Couch Parks was acquired by developers deeding residual land to the city for the purpose of park development. Couch and Boomer Lake Parks' land was acquired by the city in 1930 for the purpose of a fair grounds and land fill area, respectively. These areas have been and presently continue to be developed as parks.[1]

The forces relevant to determining present park locations have not produced the kind of plan that would enable equal distribution of parks throughout the city. In 1967 city planners realized that more effective measures had to be taken to stimulate adequate park development, so they set up neighborhood park standards. These standards are similar to those developed by George Butler; there should be 1 to 15 acres in each park, within a half mile radius of

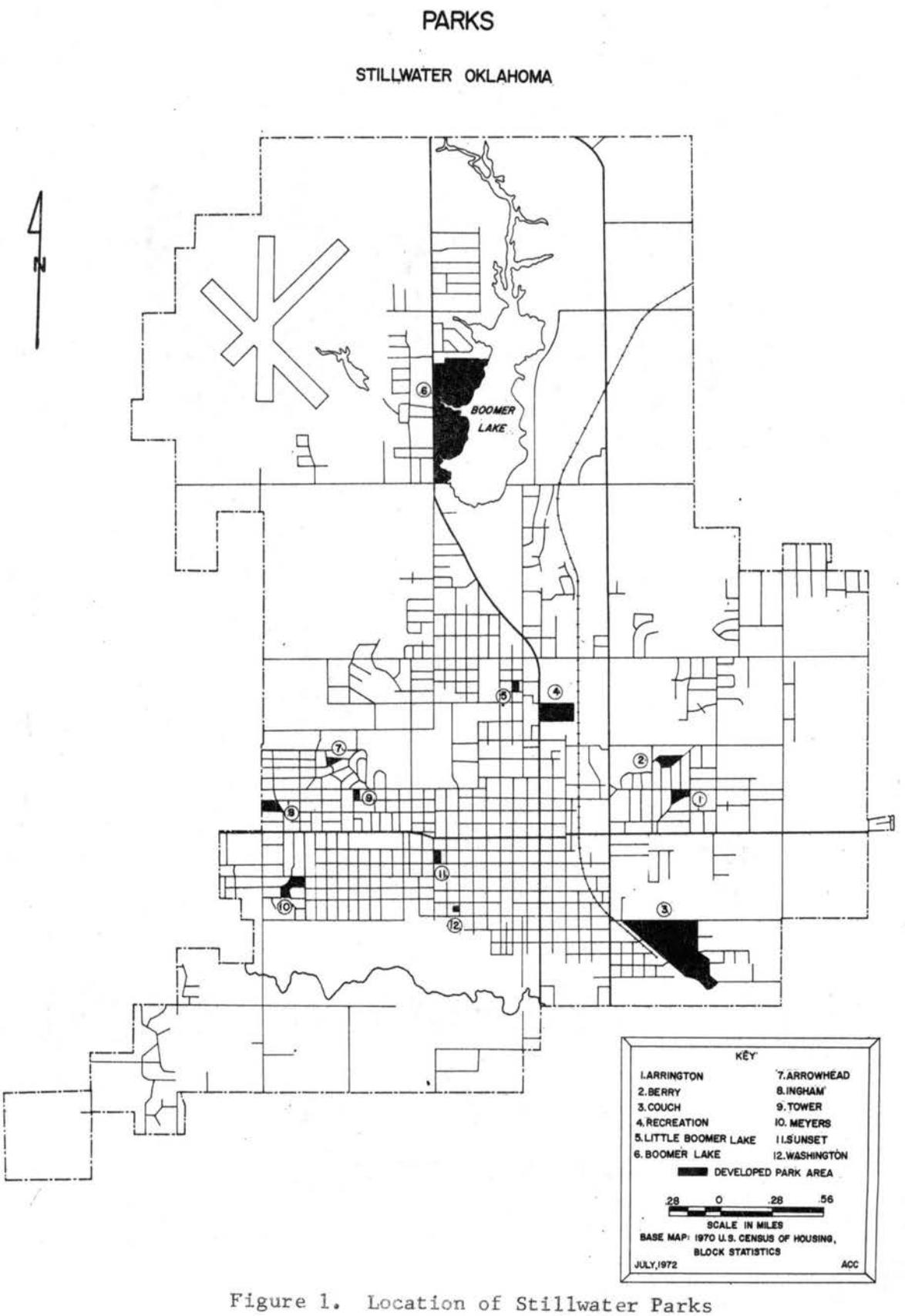

Figure 1. Location of Stillwater Parks

TABLE II

PARK AREA AND RECREATION FACILITIES

Parks	Developed Area	Boat House	Cooking Grills	Recreation Building	Picnic Shelters	Baseball Field	Basketball Court	Picnic Tables	Tennis Courts	Swings	Rope Swing	Jump Horse	Horse Swing	Jungle Gym	Slide	Teeter Totter	Sand Box
Recreation	12					XX	X	X	XXX	X				X	X	X	X
Couch	68		X	X	X	XXXX		X		X							X
Boomer Lake	300	X	X	X	X			X		X			X	X	X	X	X
Arrington	9							X		X	X	X		X	X		X
Berry	3									X	X	X		X	X		X
Washington	1						X	X		X		X					
Tower	1						X	X	XX	X							
Sunset	1									X		X	X	X	X		
Meyers	3					X		X		X		X		X	X		
Ingham	2									X				X	X		
Little Boomer	1							X		X					X		X
Arrowhead	3									X				X	X	X	X

residences, with 2 acres per 1,000 of the total population, and recreation facilities in each park for both active and passive recreation.[2]

Present plans for future park development do not indicate that these standards are being followed. For example, present plans include two new parks in Southern Stillwater, facility development at Sanborn Lake, and further facility development at Couch Park and east of Boomer Lake. There has been no specific facility development in the two new parks, even though land acquisition has taken place. Planners anticipate that residential development will be directed east and west from present city boundaries; therefore, planners are in doubt that development of these parks would be beneficial to a large portion of one population and subsequently they have postponed any plans for facility development. Generally, there is not a financial problem in dealing with park land acquisition because federal aid can be obtained. However, development of park facilities and maintenance is financially difficult, since city funds must pay in full for it.[3]

Stillwater Park Use

There is considerable variation in visitation at different parks in the system (Figure 2 and Table III). The three largest parks, Recreation, Couch and Boomer Lake have considerably greater visitation than all others.[4]

As might be expected weather conditions apparently affected visitation to a considerable extent. For example, on a warm, spring sunny day parks attracted more visitors than on a cool cloudy day (Figures 3, 4, 5).[5] It is interesting to note that regardless of weather

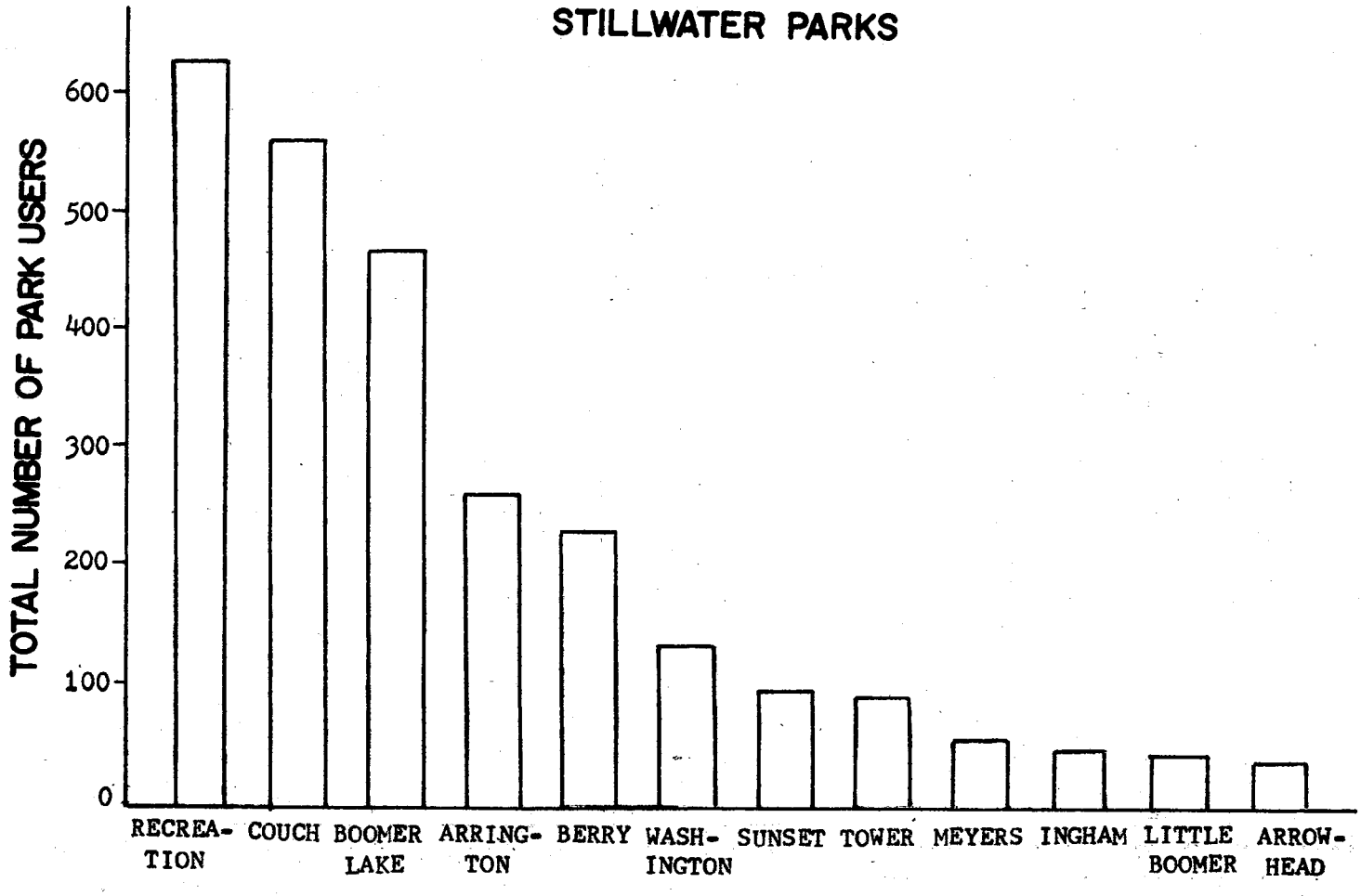

Figure 2. Total Number of People Observed in Parks
(32 Observations in Parks)

TABLE III

THE VARIATION OF TOTAL OBSERVATIONS BETWEEN LARGE PARKS AND ALL OTHER PARKS UNDER ALL TIME AND WEATHER CONDITIONS

Variables	F	Df	F_{01}	F_{05}	Significance Level	Sum of Deviations
Weekday	55.6	1,334	6.74	--	1%	
Weekend	85.1	1,94	6.91	--	1%	
Weekday 10AM-3PM	5.6	1,90	6.76	3.89	5%	
Weekday 3PM-6PM	4.7	1,144	6.81	3.91	5%	
Temp. $\leq 60^{\circ}$	94.6	1,174	6.79	--	1%	
Temp. 61°-70°	4.6	1,160	6.80	3.91	5%	
Temp. 71°-80°	5.1	1,88	6.93	3.95	5%	
Wind $\geq$ 20 MPH	3.3	1,100	6.92	3.94	Not Significant	Community=+2.3 Neighborhood= -10.9
Wind $<$ 20 MPH	5.9	1,321	6.73	3.88	5%	
Cloudy	44.1	1,72	7.01	--	1%	
Clear	8.0	1,359	6.73	--	1%	

conditions the difference in attendance presisted between the three large parks and the other parks (Table III).

Day of week and time of day also produced variations in visitation (Figures 6 and 7). All parks exhibited significant differences between weekday and weekend use and between weekday use from mid-day to late afternoon. These findings are consistent with prevailing patterns of leisure time availability which provide recreation peaks after school and work and on weekends.

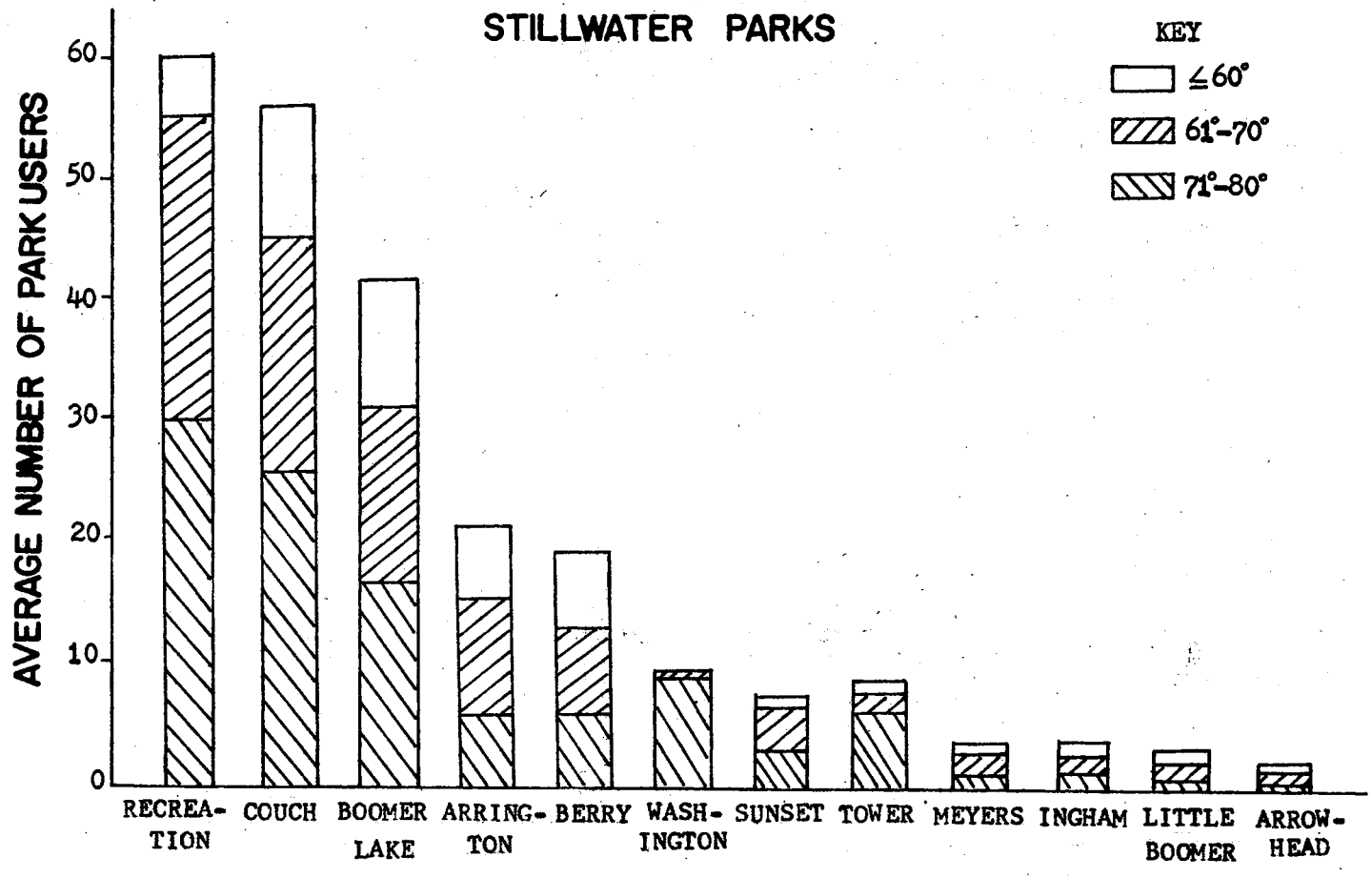

Figure 3. Average Park Visitation in Relation to Temperature
Note: For statistical data refer to Tables XIII and IX in the Appendix.

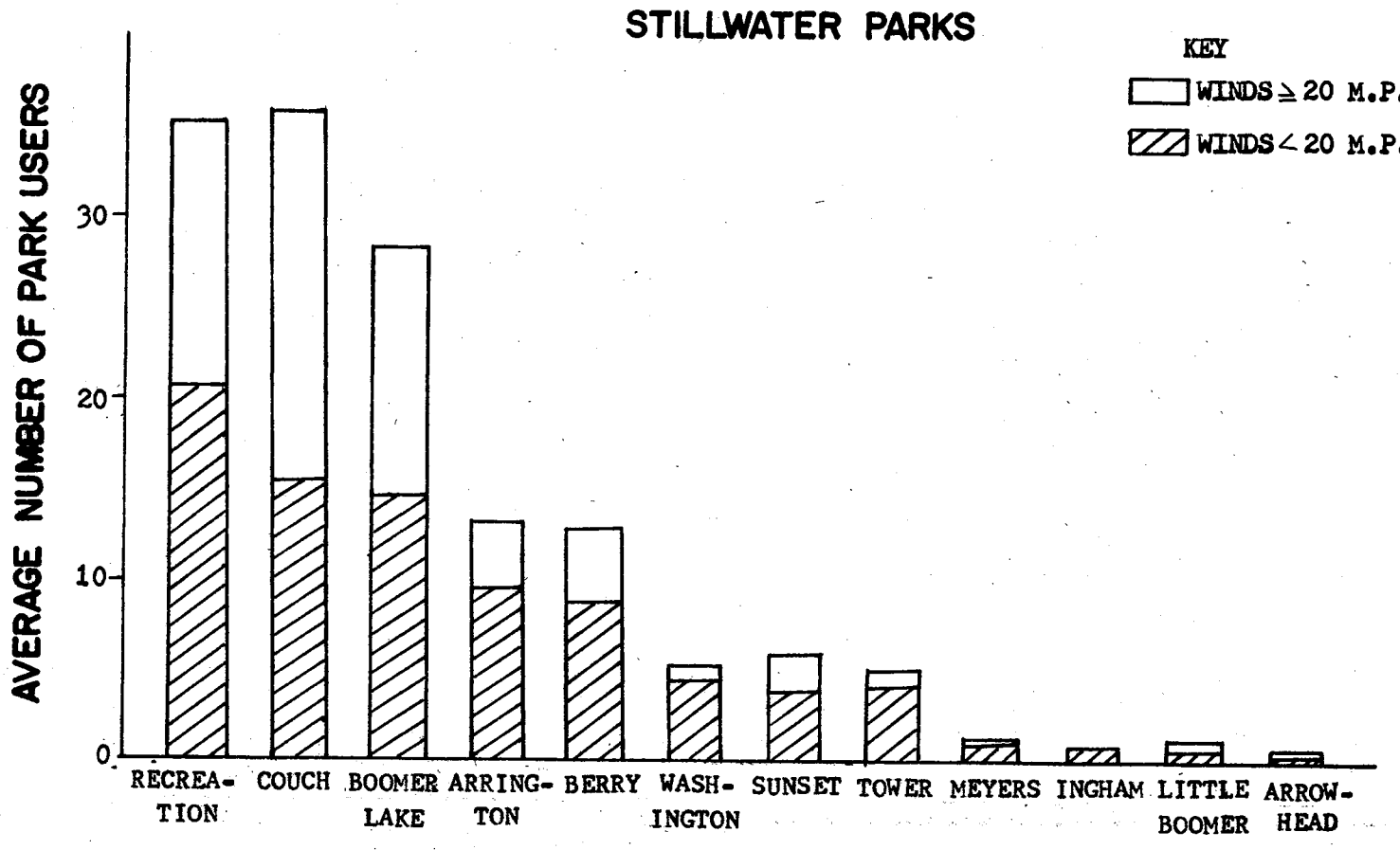

Figure 4. Average Park Visitation in Relation to Winds
Note: For statistical data refer to Tables XIII and XIV in the Appendix.

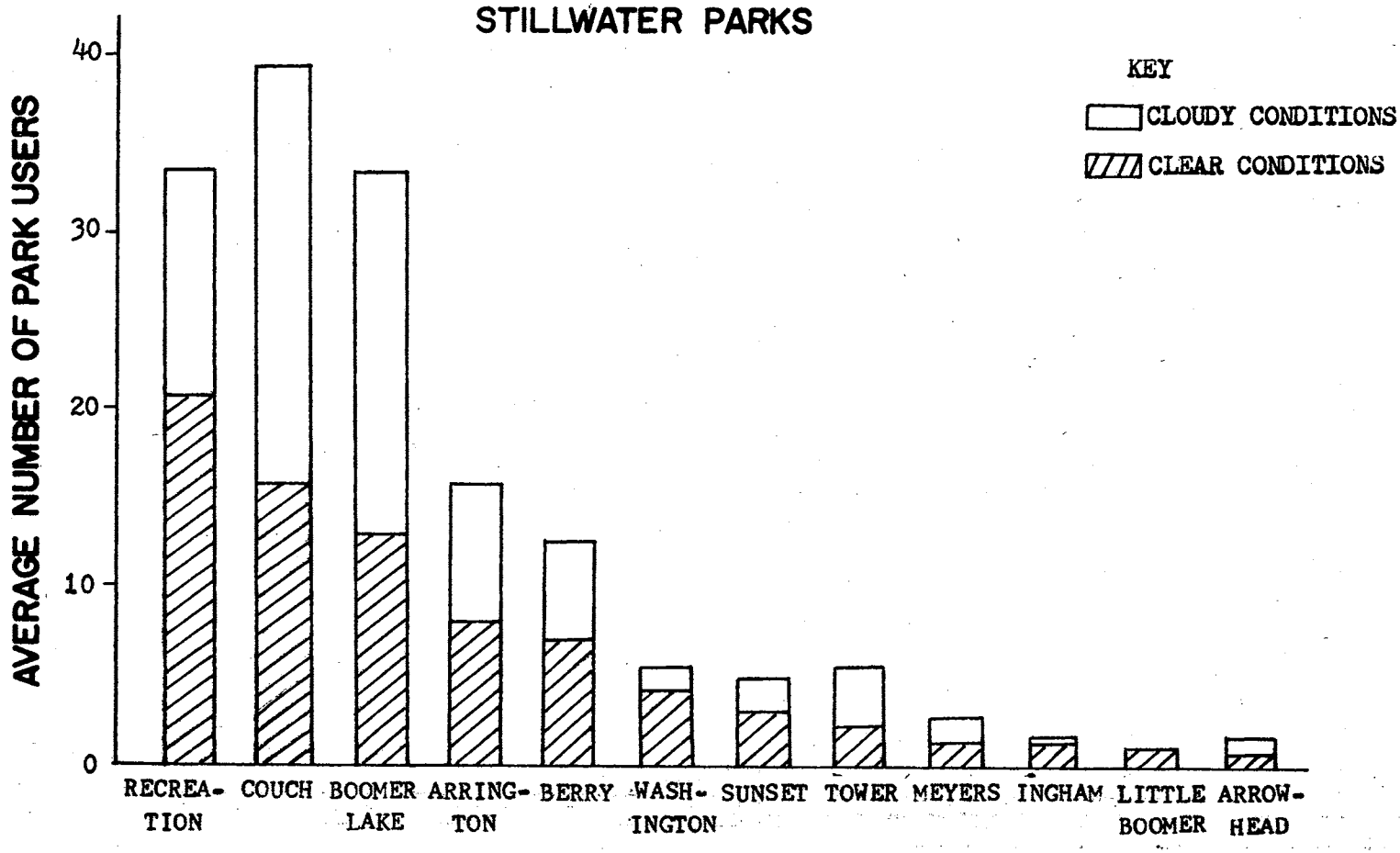

Figure 5. Average Park Visitation in Relation to Celestial Conditions
Note: For statistical data refer to Tables XIII and XIV in the Appendix.

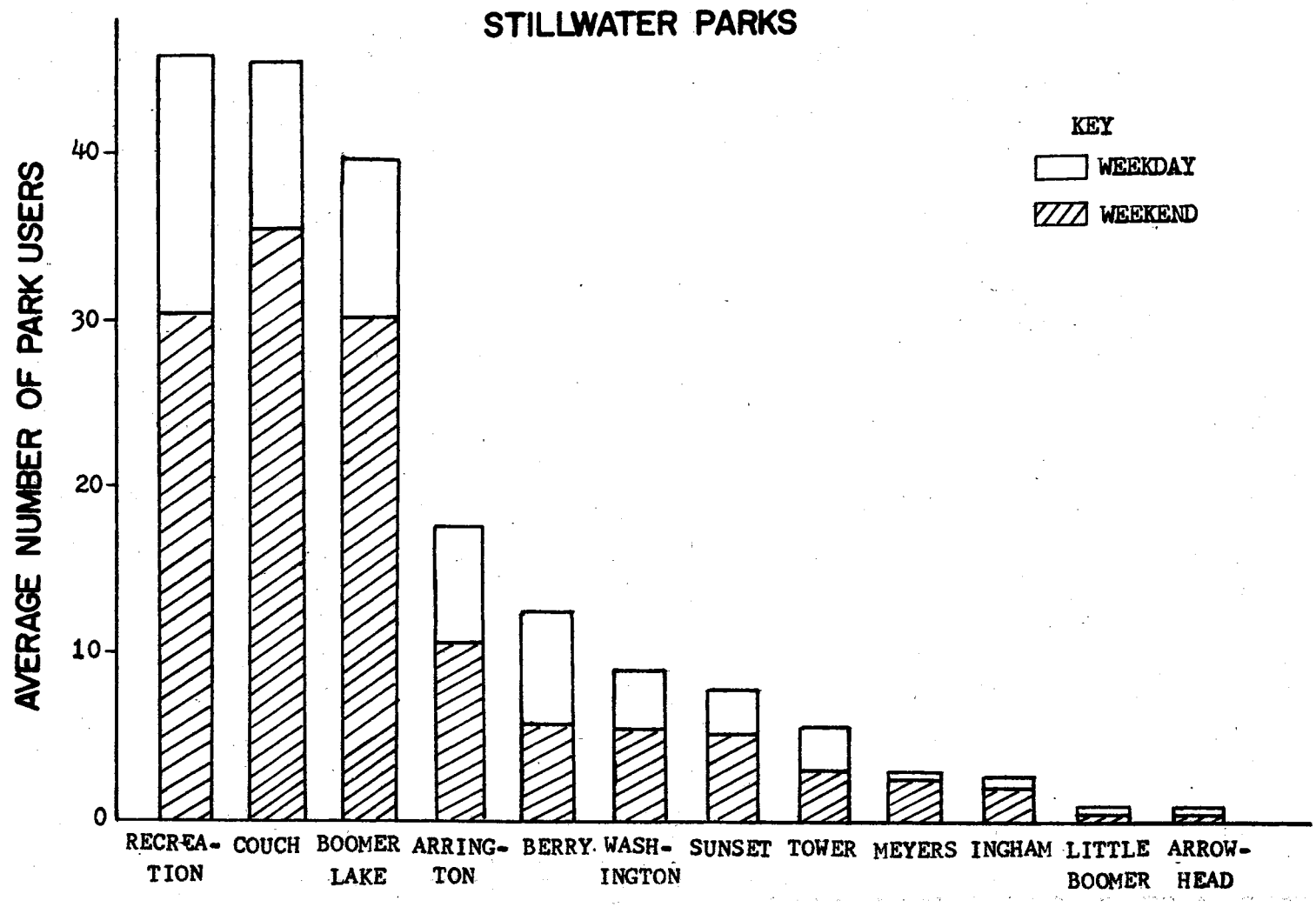

Figure 6. Average Weekday and Weekend Park Use
Note: For statistical data refer to Tables XIII and XIV in the Appendix.

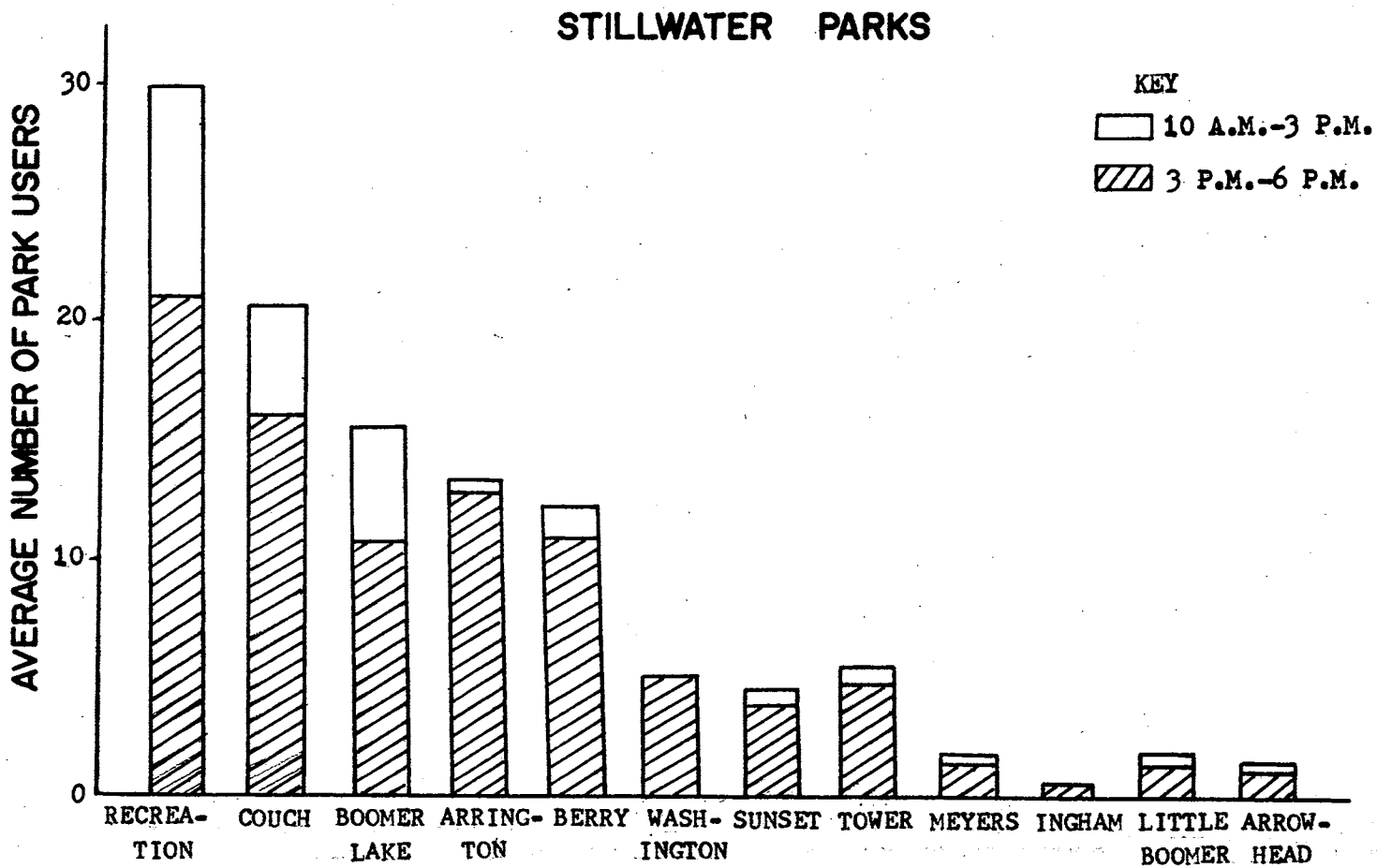

Figure 7. Average Park Visitation Between 10 A.M.-3 P.M. and 3 P.M.-6 P.M.
Note: For statistical data refer to Tables XIII and XIV in the Appendix.

Stillwater Park Users

There is considerable variation in the types of users at different parks (Figures 8, 9, 10). For example, the average age of visitors at Recreation, Boomer Lake, and Couch Parks was 16 to 25 years, while the average age at smaller parks was under 15 years. More specifically, at Recreation, Boomer Lake, and Couch Parks the age grouping was more evently distributed while the remainder of the parks were chosen by the young set.

Visitor grouping at different parks also varied significantly, and expectantly so in light of the age patterns.[6] For example, at all parks, with the exception of Recreation Park which attracted families with small children, there was a predominance of non-related friends. The high proportion of non-related friends from the ages of 16 to 25 years at Recreation, Boomer Lake, and Couch Parks might be explained by all or some of the following factors: facilities in these parks meet the recreational needs of this user type, a large percentage of Stillwater residents are university students, and this age group is usually most active in recreational pursuits. On the other hand, these parks attracted no non-related friends under the age of five years; this could be a result of major streets serving both as a physical barrier to children crossing them unaccompanied by an adult as well as a visual barrier to parents who would want to watch their children from home. In the case of all other parks, the visitation pattern of young non-related friends suggests that these park facilities are presently most attractive to this age group, and the parks are situated so that children can use the parks unaccompanied by an adult. In

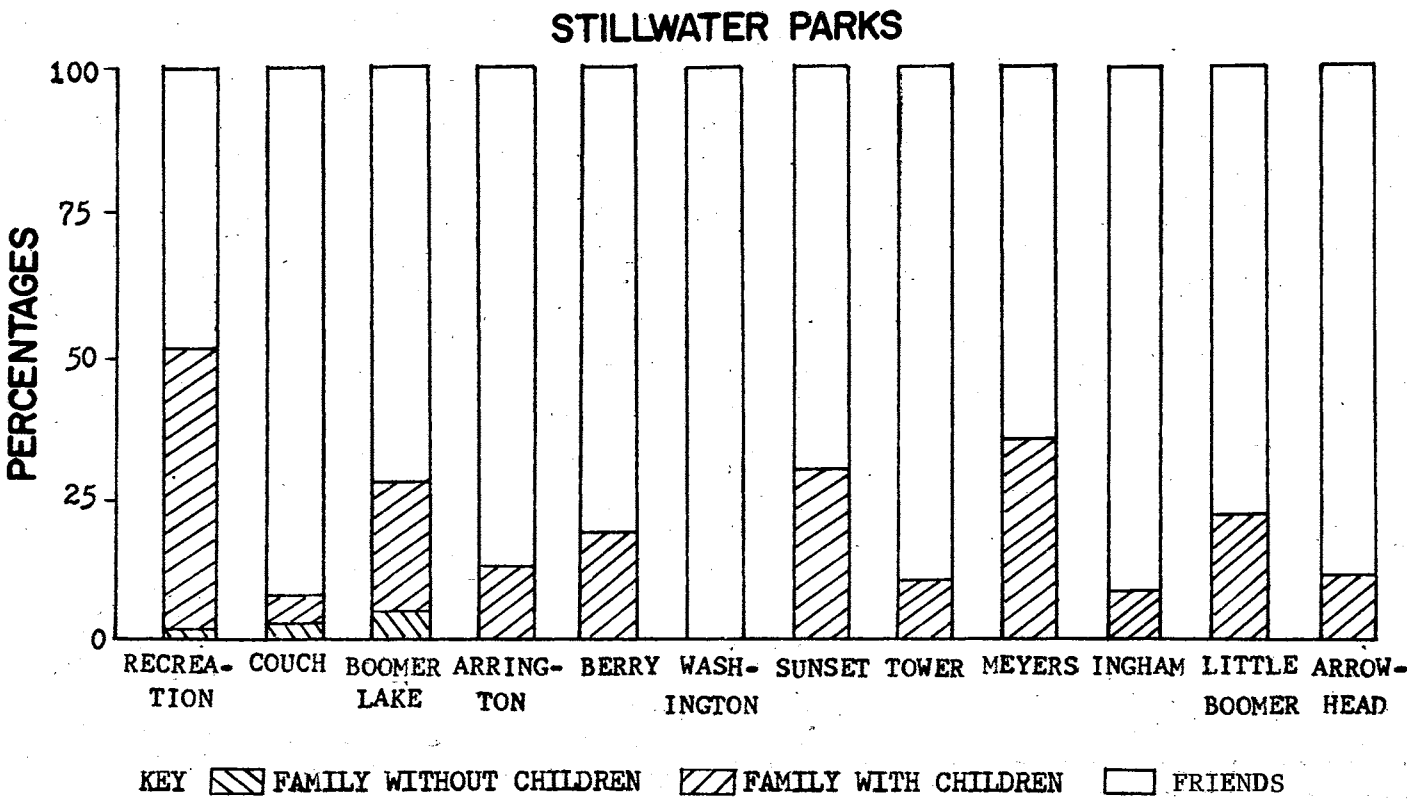

Figure 8. Percentage of Types of Park Users
Note: Percentages based on total number of people observed in parks. For statistical data refer to Tables XV, XVI, and XVII in the Appendix.

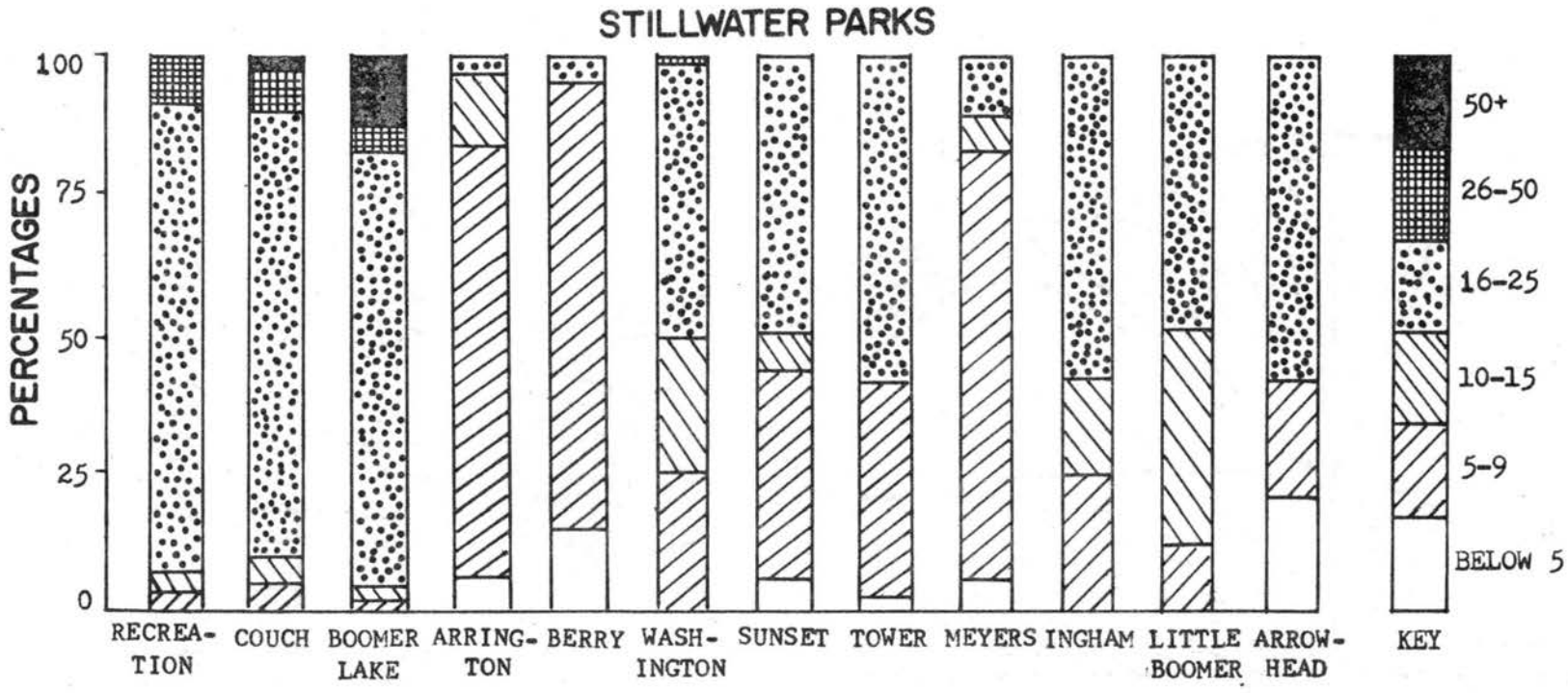

Figure 9. Percentage of Non-related Friends According to Age in Years Observed in Parks Note: Percentages based on the following total number of friends observed in each park, respectively: 266, 507, 329, 218, 176, 120, 64, 79, 26, 31, 23, 24. For statistical data refer to Tables XV, XVI, and XVII in the Appendix.

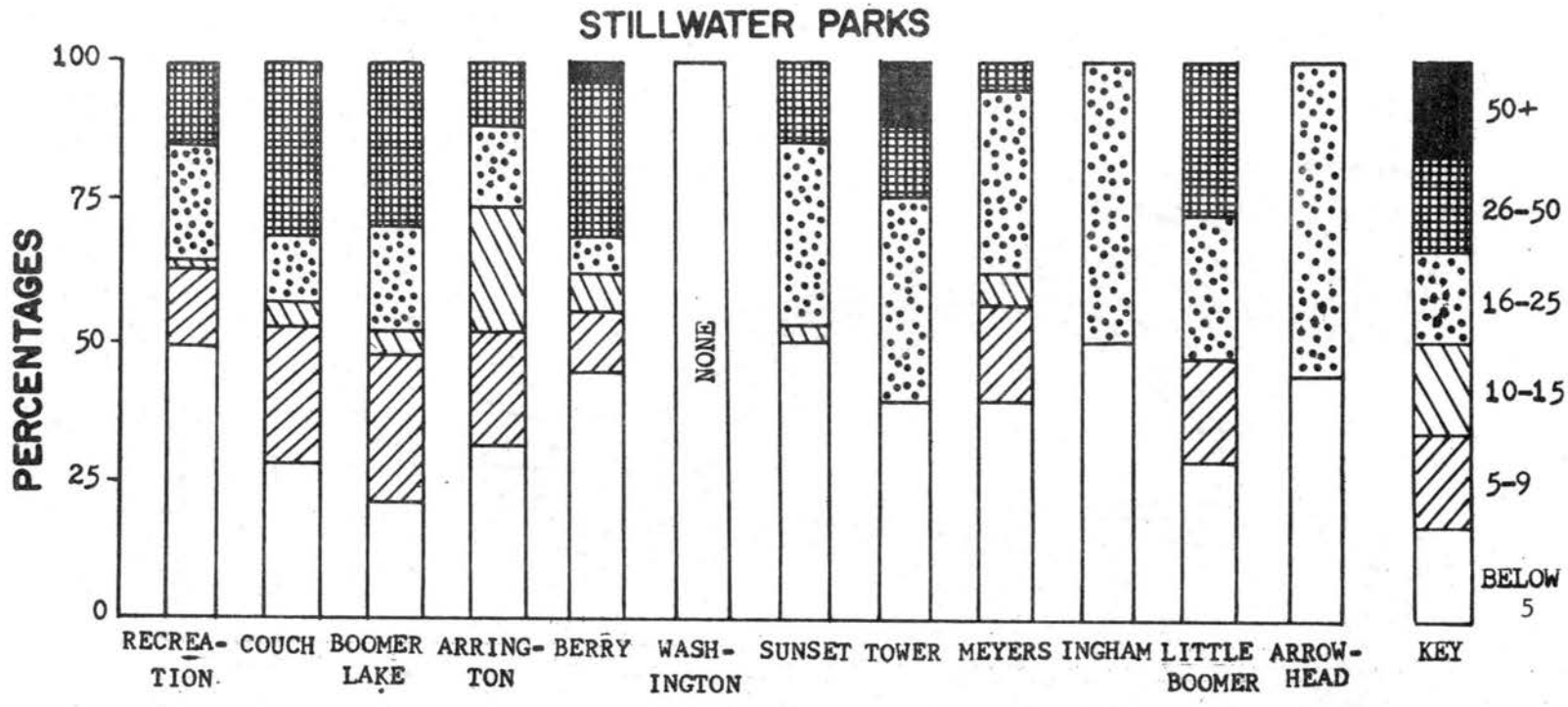

Figure 10. Percentage of Families with Children According to Age in Years Observed in Parks
Note: Percentages are based on the following total number of families with children observed in each park respectively: 346, 43, 113, 34, 38, 0, 28, 8, 14, 2, 7, 3. For statistical data refer to Tables XV, SVI, and XVII in the Appendix.

addition, the absence of non-related friends over the age of 50 years indicates these parks do not provide the passive recreational needs of this age group.

Among the family groups those with small children were the most active participants in all parks; this suggests not only the level of recreational activity pursued by this group, but also that this group's recreational need is being fulfilled by urban recreation facilities. Another common family visitation pattern was the low participation of families without children. It follows that this group is generally inactive and/or unsatisfied in any kind of urban recreation activity.

The Service Area

As might be expected Recreation, Boomer Laker, and Couch Parks had a considerably large hinterland than other parks (Figures 11, 12, 13, 14). It is also noteworthy that these parks did not draw visitors from nearby. The remaining parks had relatively small hinterlands, rarely exceeding a radius of 3 blocks for 90% of the patrons (Tables IV and V).

The size and shapes of all park hinterlands varied (Figures 11, 12, 13, 14). Among the large parks Recreation Park was the only one to have a radial hinterland (Figure 12). Nonetheless, the greatest proportion of users in this particular park came from the northwest and west sections of the city which are demonstrably lacking in parks. In the case of Boomer Lake and Couch Parks, the size and shape of their hinterlands were similar. More specifically, the hinterlands maintained skewed shapes with users coming predominately from one

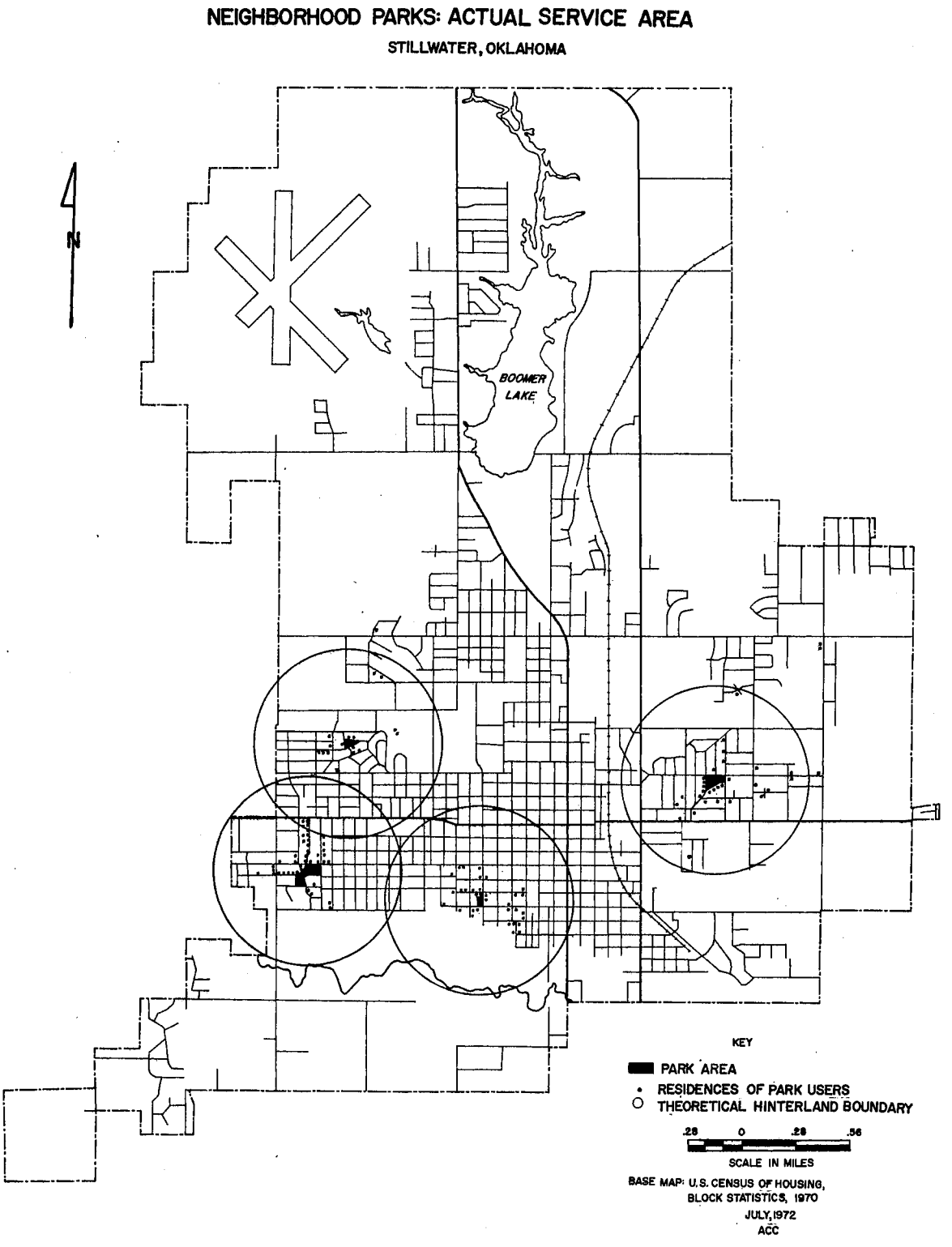

Figure 11. Neighborhood Parks: Theoretical Hinterland Boundaries and Actual Residences of Park Users

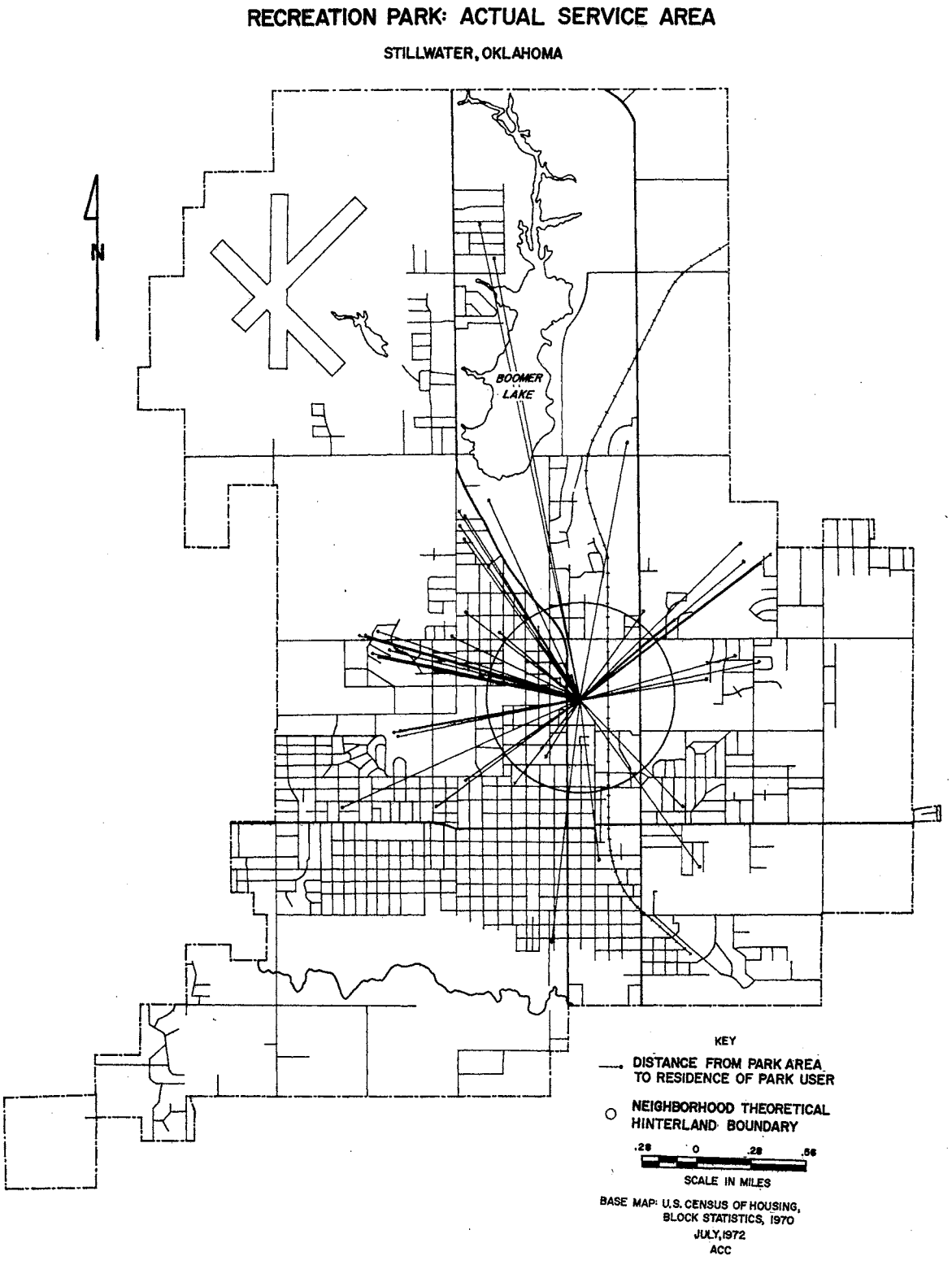

Figure 12. Recreation Park: Actual Service Area

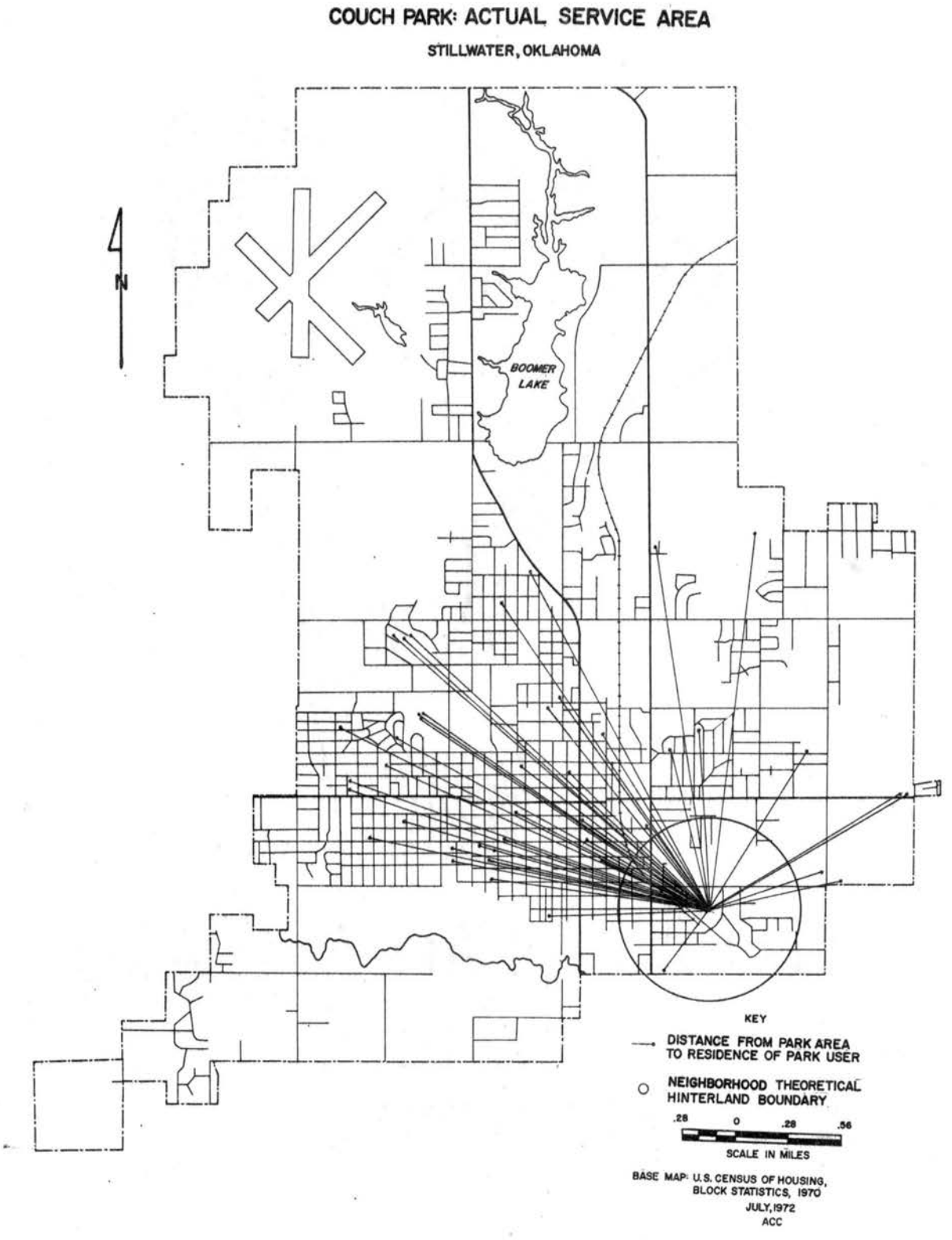

Figure 13. Couch Park: Actual Service Area

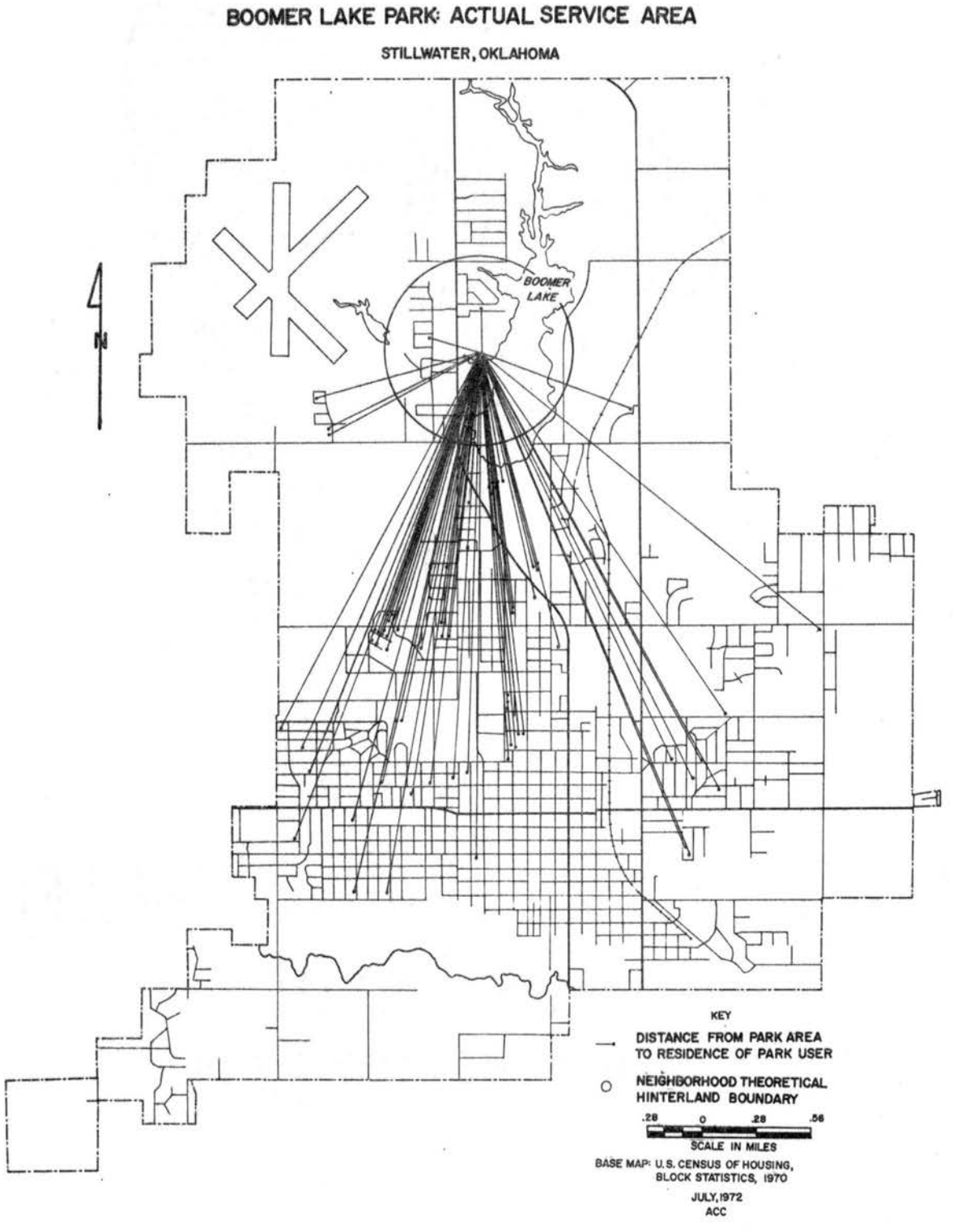

Figure 14. Boomer Lake Park: Actual Service Area

TABLE IV

DISTANCE FROM PARK AREA TO RESIDENCES OF PARK USERS

Park	Median Number of Street Crossings	Median Distance in Miles	Range of Distance in Miles	Average Distance in Miles
Arrington	2	.28	.02-1.79	0.47
Washington	2.2	.28	.01-.56	0.21
Arrowhead	2.2	.17	.02-1.48	0.27
Couch	--	2.12	.56-4.09	2.11
Boomer Lake	--	2.18	.06-5.15	2.24
Recreation	--	1.85	.11-2.80	1.59

Note: For distance measurement 90% of the actual cases closest to the park area were examined.

TABLE V

SIZE OF ACTUAL HINTERLANDS (DISTANCE IN MILES)

Park	North	South	East	West	North-east	North-west	South-east	South-west
Recreation	2.63	2.52	1.85	2.46	2.41	2.35	2.07	2.80
Couch	0	0	1.68	1.57	3.81	4.09	2.40	0
Boomer Lake	.50	4.41	0	1.79	0	0	5.15	4.93
Arrington	1.79	0	1.12	.06	0	.06	0	.84
Washington	.39	.17	.39	.50	0	.50	0	.56
Arrowhead	1.18	.39	.50	.31	0	0	.17	0

direction, southeast and northwest, respectively.

On the other hand, hinterlands of other parks did not vary in size and shape; that is, they were all relatively the same (Figure 11). However, close inspection shows that Arrington Park has an above average hinterland in terms of size. This particular hinterland results from the park attracting users from relatively great distances from the east and north areas that are unserved by any parks. In the case of Washington and Meyers Parks, the hinterlands are relatively small.[7] In both these cases there is a high concentration of users immediately surrounding the park from all directions. Finally, Arrowhead Park is the smallest in size except for the extension of the hinterland in a north direction to an area unserved by park facilities.

These actual park hinterlands show that Stillwater neighborhood park planning standards have not been followed (Figures 11, 12, 13, 14). For example, in Recreation, Boomer Lake, and Couch Parks there was not a significant amount of park users within the theoretical neighborhood boundaries. This leads to the conclusion that these large parks are not serving a neighborhood function in theoretical terms. In the case of all other parks 90% of all park users resided within the theoretical hinterland boundaries. Further interpretation shows that a majority of the park users were never in closer proximity than one half mile (Table IV). This demonstrates that these theoretical neighborhood park hinterlands, as set up by Stillwater, are not accurate and serve as a poor guideline for park planning.

Neighborhood and Community Parks

There appears to be two types of parks in Stillwater. The community parks, larger and equipped with many differnet kinds of facilities and offering a wide range of organized activities, attract larger crowds and have large hinterlands but do not serve their immediate neighborhoods. Stillwater by most measures would seem to be well served by this type of facility.

The remaining parks are relatively small with very limited facilities and activities, and based on their use patterns are clearly neighborhood-oriented. Even though these neighborhood parks differ significantly in visitation rates, all of them have low numbers of visitors consistently.[8] Their hinterlands are very small; often only a few blocks. Given these hinterlands it seems likely that many areas are unserved by neighborhood parks in Stillwater and that increments to the park systems in Stillwater are needed.

FOOTNOTES

[1]Park and Recreation Department, Stillwater, Oklahoma, interview with superintendent, July, 1972.

[2]U. S. Department of Housing and Urban Development, Stillwater Comprehensive Plan, A Report for the Oklahoma Industrial and Park Development, Oklahoma Project No. P-41 (Stillwater, Oklahoma, 1967), p. 48.

[3]Park and Recreation Department, Stillwater, Oklahoma, interview with superintendent, July, 1972.

[4]F test showed the following significant differences at the 1% level between these three parks and all other parks: F=7.32 where $Df_{1,382}$ and $F_{01} = 6.70$.

[5]The sum of deviations were given where the F test did not account for the negative and positive deviations. These deviations should demonstrate the significant difference.

[6]The type of person using the park was categorized into the following three classes: non-related friends, families without children, and families with children.

[7]Information pertaining to the resident location of Meyers Park users was taken from data collected in a study conducted by Ray Mill and Jerry Overton on "Park and Neighborhood Characteristics: Case Study Three Parks in Stillwater" (unpub. seminar paper for Geography 5330, Oklahoma State University, 1971), p. 16.

[8]F test showed the following significant difference at the 1% level of park use among neighborhood parks: $X^2 = 294.96$ where Df = 9 and $X^2_{01} = 21.666$.

CHAPTER III

FACTORS AFFECTING USE OF STILLWATER PARKS

Community Parks

Community parks serve a large number of Stillwater residents from all walks of life and of all ages. These parks all have city-wide drawing power; that is, hinterlands for these parks are large (Figures 12, 13, 14). Another way of looking at this is that they draw to a large extent on the same markets. It follows that socio-economic conditions, demographic structure, and land use patterns (Figures 15 and 16) within their hinterlands are essentially the same and thus do not differentially affect the use at the three parks (Tables VI and VII).[1]

Even though these parks are associated with city-wide drawing power, the shapes of their hinterlands do vary. This is probably a result of their location within the city. For example, Recreation Park's radial hinterland is associated with central city location, while the other two parks, located on the periphary of the city, have skewed hinterlands.

It is an important feature of these parks that nearly all patrons arrive by automobile. This substantiates the earlier findings that the friction of distance is low and these parks do not serve their surrounding neighborhoods. Since automobile access is essential, it follows that good roads promote high use. A well developed street

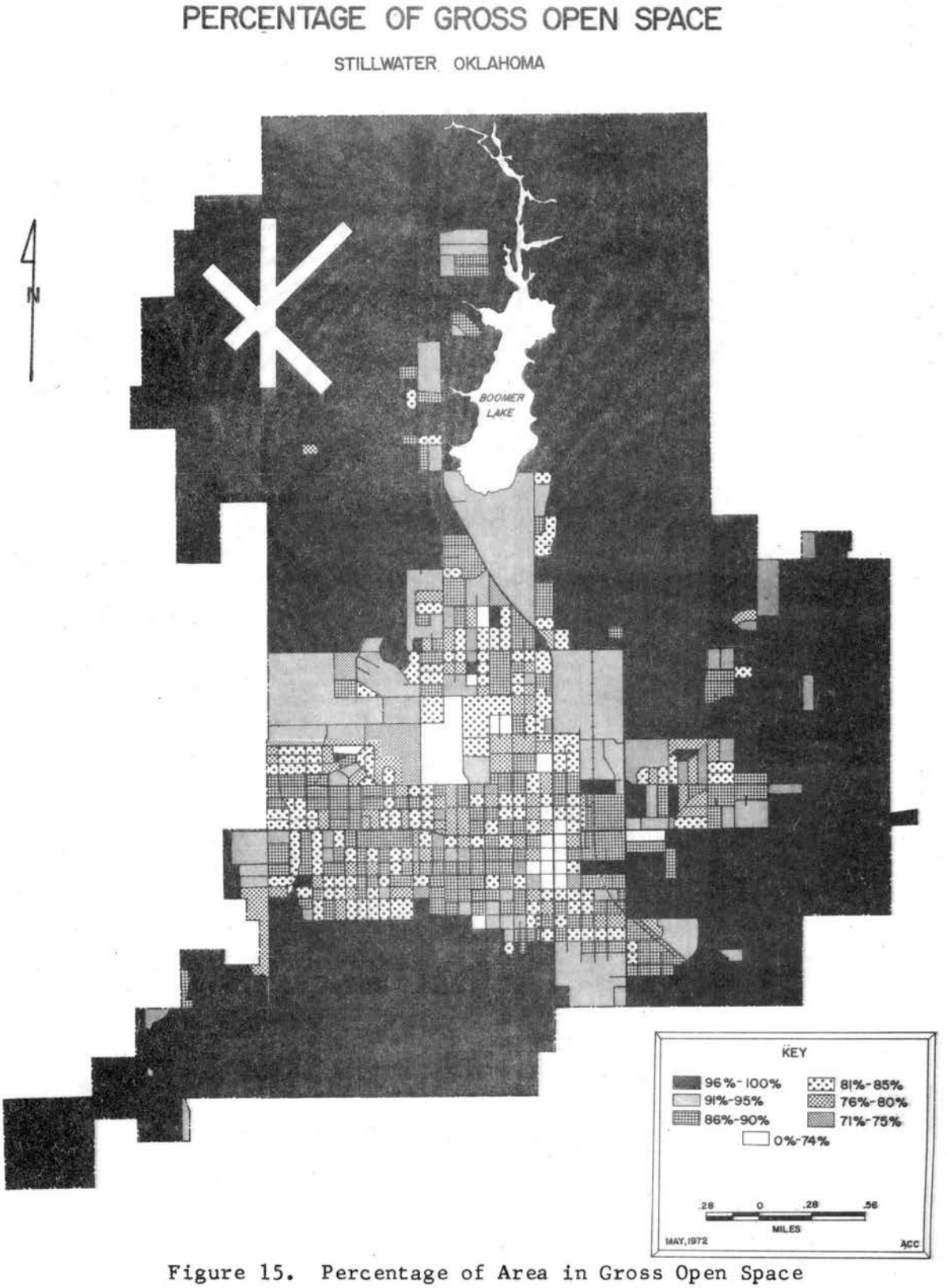

Figure 15. Percentage of Area in Gross Open Space

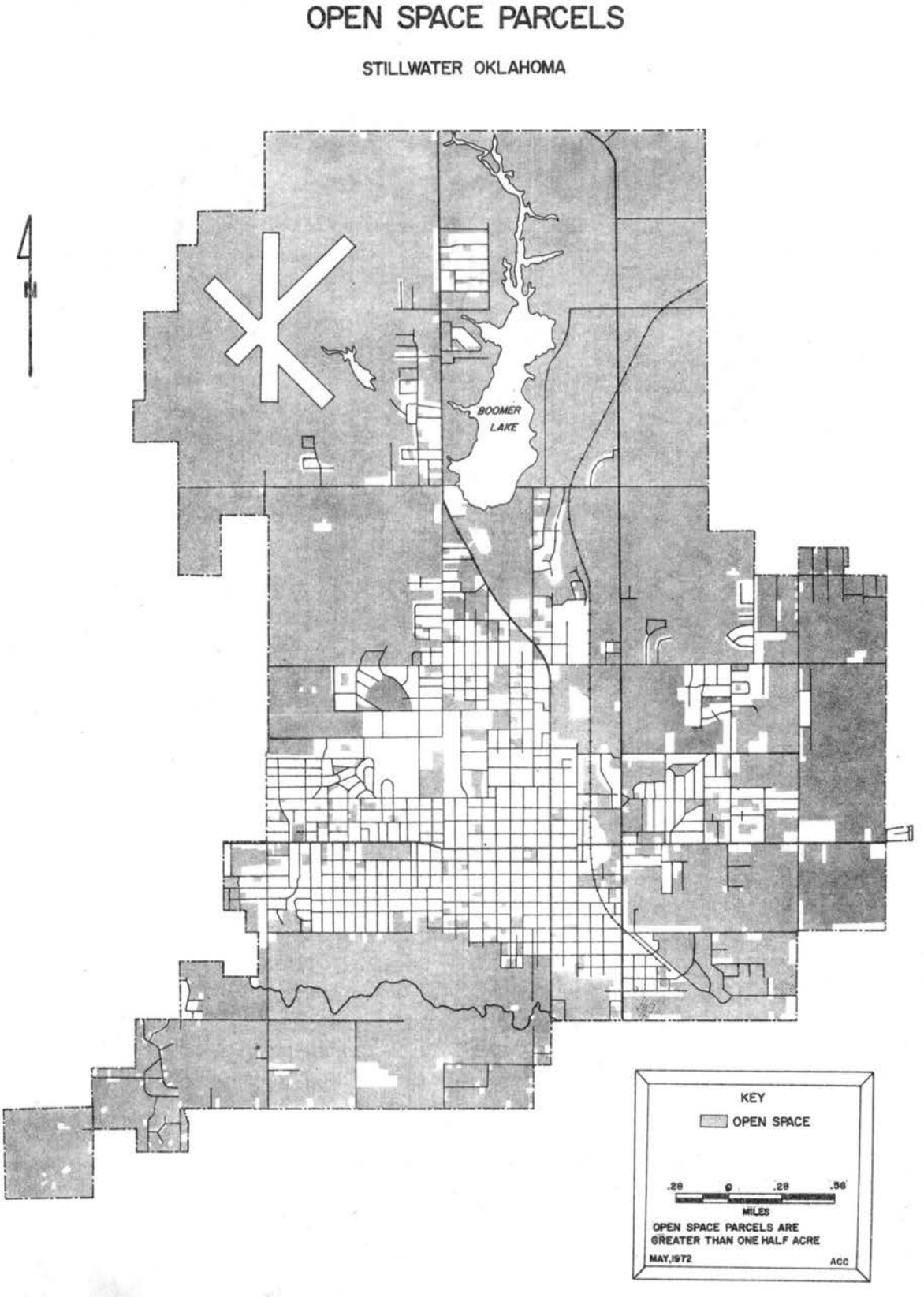

Figure 16. Open Space Parcels

TABLE VI

ONE WAY ANALYSIS OF VARIANCE ON DEMOGRAPHIC AND SOCIO-ECONOMIC CHARACTERISTICS IN ACTUAL COMMUNITY PARK HINTERLANDS

Variable	F	Df	F_{01}	F_{05}	Significance Level
Total Population	1.51	142	--	3.06	Not significant
Population Density	3.96	139	4.76	3.06	5%
Housing Value	15.31	96	4.82	--	1%
Age 0-4	2.07	142	--	3.06	Not significant
Age 5-9	1.10	142	--	3.06	Not significant
Age 10-15	1.22	142	--	3.06	Not significant
Age 16-25	6.67	142	4.75	--	1%
Age 26-50	2.85	142	--	3.06	Not significant
Age 50+	2.92	142	--	3.06	Not significant

TABLE VII

ONE WAY ANALYSIS OF VARIANCE ON LAND USE CHARACTERISTICS IN ACTUAL COMMUNITY PARK HINTERLANDS

Variable	F	Df	F_{01}	F_{05}	Significance Level
Percentage of Area in Gross Open Space	7.3405	159	4.75	--	1%
Number of Open Space Parcels	3.2151	159	4.75	3.06	5%
Percentage of Area in Open Space Parcels	5.4671	83	4.88	--	1%

pattern of major streets serve these parks (Figure 1).

It is also interesting to note that these same streets effectively serve as boundaries to neighborhood visitation. This phenomenon is particularly evident in the case of Couch and Boomer Lake Parks (Figures 13 and 14, respectively). The lack of a neighborhood function is also related to the fact that all these community parks have fragmented access problems. In the case of Boomer Lake Park the lake forms an effective barrier to people from east and south directions. In Recreation Park there is no direct access to the residential locations immediately south of the park because of a drainage ditch. Similarly, Couch Park has a floodplain development to the south.

Neighborhood Park Hinterlands

An analysis of hinterland shape and size for the four different neighborhood parks indicates that some important factors seem consistently influential. For example, park hinterlands are truncasted by major thoroughfares (Figure 11). However, as seen in the case of Arrington Park, the greater number of smaller streets immediately adjacent to the park increases accessibility and subsequently use. In addition, a location non-central to a neighborhood results in a skewed hinterland since the number of potential park users is lessened at least in one direction. This situation is exemplified in Washington Park's hinterland. Finally, if more than one park is located within a neighborhood, there is conflicting use among the parks (Figure 17). For example, the residents within the area between Berry and Arrington Parks have approximately the same distance to travel to either park.

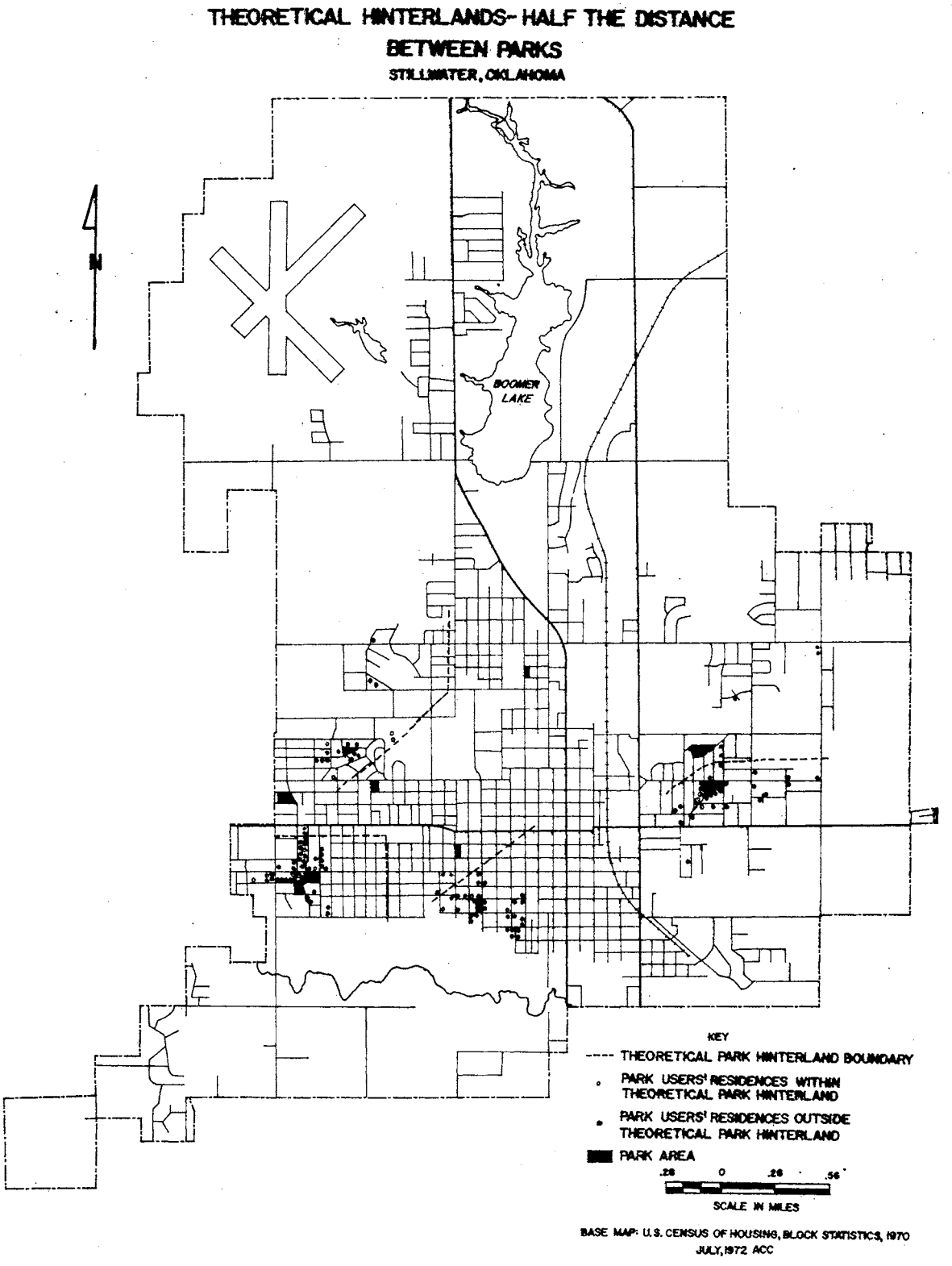

Figure 17. Theoretical Park Hinterlands (Half the Distance Between Parks)

Based on the above findings it is possible to postulate hinterlands for the additional parks in the system (Figure 18). It is expected all these parks serve relatively small areas. For example, Little Boomer Park is bounded by major streets within two blocks. A similar condition is formed by Ingham Park which has only a slightly larger hinterland, in part perhaps because of lack of park alternatives. However, in the case of Sunset and Berry Parks, their hinterlands are reduced in size because of the proximity of Washington and Berry Parks' hinterland, respectively. Finally, the lack of visibility of surrounding areas is apparent in the case of Little Boomer and Tower Parks; here, there is a drastic compaction of the hinterland. The size and shape of each of these hinterlands directly influences the level of park use, because the hinterland determines the numbers of people that are likely to use the park.

Neighborhood Park Use

Unlike community parks, neighborhood park use appears to be differentially associated with the demographic, land use, and socio-economic chafacter of its hinterland (Tables VIII, IX, X). Yet, the trends are not consistent. For example, Arrowhead Park, associated with low use and small sized hinterland, does not serve the lowest proportion of the total population, population density, percentage of area in gross open space and number of open space parcels, or population density of those persons under 15 years old. On the other hand, Arrington Park, associated with high use and a large sized hinterland serves the greatest proportion of the total population and highest percentage of the population under the age of 15 years. Furthermore,

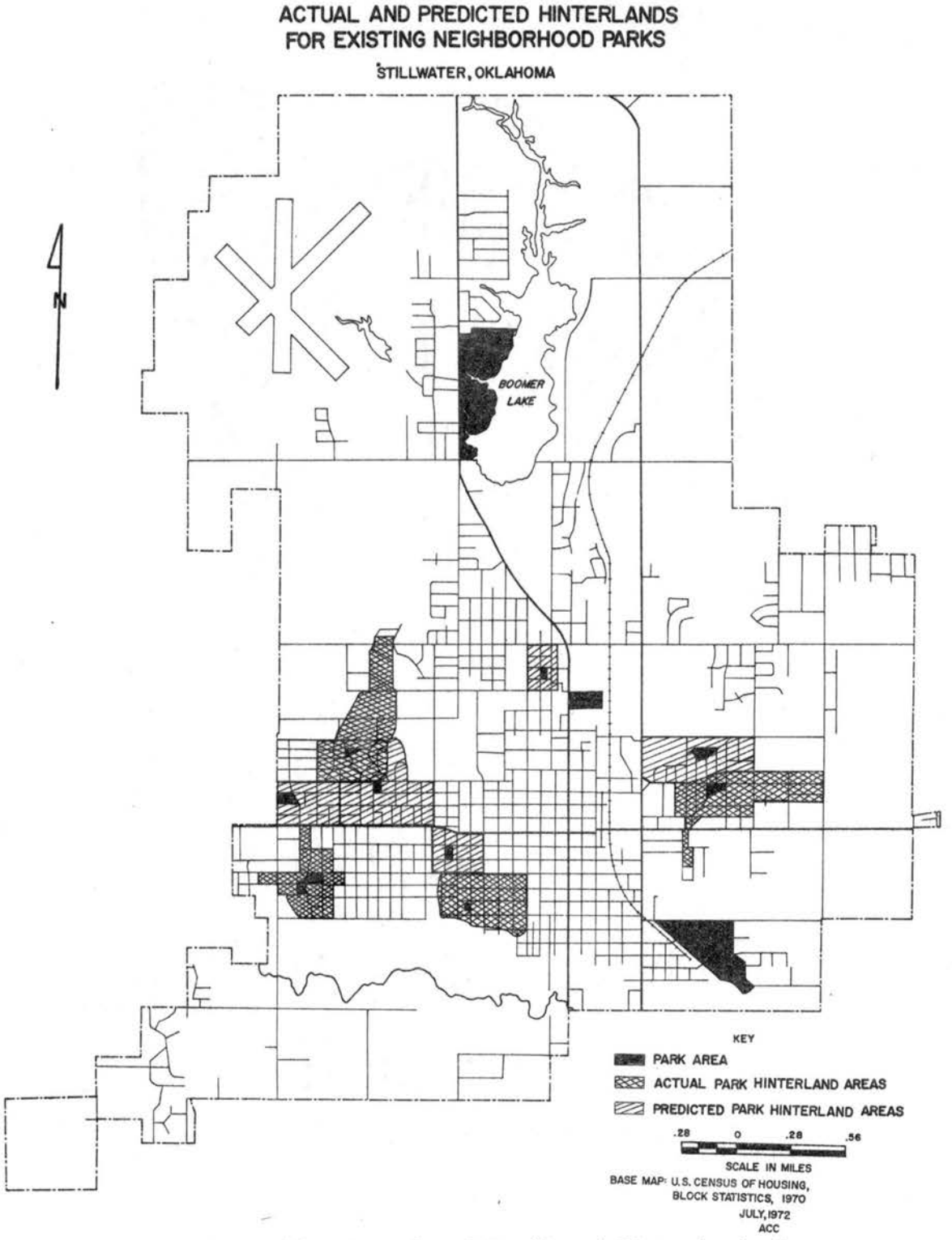

Figure 18. Actual and Predicted Hinterlands for Existing Neighborhood Parks

TABLE VIII

ONE WAY ANALYSIS OF VARIANCE ON DEMOGRAPHIC AND SOCIO-ECONOMIC CHARACTERISTICS IN ACTUAL NEIGHBORHOOD PARK HINTERLANDS

Variable	F	Df	F_{01}	F_{05}	Significance Level
Total Population	6.31	83	4.88	3.11	5%
Population Density	8.30	83	4.88	3.11	1%
Housing Value	.35	59	7.10	--	1%
Age 0-4	4.93	83	4.88	--	1%
Age 5-9	11.08	83	4.88	--	1%
Age 10-15	7.49	83	4.88	--	1%
Age 16-25	2.00	83	4.88	3.11	Not Significant
Age 26-50	16.02	83	4.88	--	1%
Age 50+	.07	83	4.88	3.11	Not Significant

TABLE IX

ONE WAY ANALYSIS OF VARIANCE ON LAND USE CHARACTERISTICS IN ACTUAL NEIGHBORHOOD PARK HINTERLANDS

Variable	F	Df	F_{01}	F_{05}	Significance Level
Percentage of Area in Gross Open Space	7.90	89	4.85	3.0	1%
Number of Open Space Parcels	3.88	89	4.85	3.10	5%
Percentage of Area in Open Space Parcels	171.32	42	5.18	--	1%

TABLE X

AVERAGE PARK USE AND AVERAGE DEMOGRAPHIC AND SOCIO-ECONOMIC VALUES OF FOUR NEIGHBORHOOD PARK HINTERLANDS

	Arrington	Washington	Meyers	Arrowhead
Park Use	5.5	3.1	1.1	.8
Housing Value	16,952	5,807	24,000	22,846
Population Density (Persons per sq. acre)	7.51	6.58	6.94	13.45
Total Population	80	34	49	45
Total Population Under 15 Years of Age	8.56	3.81	5.64	3.41
Population Density of Those Under 15 Years of Age (Persons per sq. acre)	2.26	2.83	1.51	3.43

it is interesting to note that the hinterland area of Arrington Park with the median mean of housing value was associated with high park use. In the case of total population below the age of 15 years there is a fairly consistent relationship; that is, as the percentage of the population under 15 years of age increases in the observed hinterland, so does park use.

This finding is further substantiated by analysis of observed hinterlands and predicted hinterlands at other parks (Table XI). Rank correlations showed a high degree of association between park use and (1) percentage of the population under 15 years, (2) total population and (3) housing value; a low level of association exists between park

TABLE XI

AVERAGE PARK USE AND AVERAGE DEMOGRAPHIC AND SOCIO-ECONOMIC VALUES OF ALL NEIGHBORHOOD PARKS

	Arrington	Berry	Washington	Sunset	Tower	Meyers	Ingham	Little Boomer	Arrowhead
Park Use	7.0	5.9	3.1	2.6	2.4	1.1	.9	.9	.8
Percent of Population Under 15 years of age	34.1	35.1	32.4	18.7	10.3	34.6	25.6	12.4	22.7
Housing Value	16,952	14,733	5,807	10,560	17,442	24,000	29,700	16,300	22,846
Total Population	1,762	820	618	347	1,969	773	359	226	526
Population Density (persons per sq.acre)	7.51	12.21	6.58	8.79	19.82	6.94	8.33	8.23	13.58
Population Density of those under 15 years of age (persons per sq.acre)	2.26	4.44	2.83	1.61	1.79	1.51	1.93	1.15	3.43

use and (1) population density, (2) population density of those under 15 years of age, and (3) land use characteristics.[3] These results of high association with total population figures yet low association with density characteristics indicates that areas of high population are not necessarily characteristic of dense structural development.

The anomalies within the rank correlation in terms of attendance can be explained. For example, Tower Park achieves higher use because of tennis court and basketball facilities and proximity to the university; that is, there is high use of these facilities by university students. In the case of Sunset Park, greater use is a result of extremely high visibility and accessibility; this is a result of the park's close proximity to a major thoroughfare. Finally, in the case of Meyers Park the use is reduced because of a low total population which is caused by major street boundaries creating a small sized hinterland.

Summary

The results of this analysis on existing neighborhood parks provides sufficient information for the formulation of a planning strategy to locate and evaluate use of new parks in unserved parks areas of Stillwater. It is recommended that the locational characteristics of accessibility, line of sight, major streets, and relationships to other parks be used as primary tools for determining hinterland shape and size. Furthermore, it is recommended that total population and the percent of the total population under 15 years of age of these predicted hinterlands be employed to assess the use of the new parks. These variables must be treated separately, because there is not a significant association among them.[4]

FOOTNOTES

[1]Even though statistical differences appeared in some cases, the actual means did not correspond with use of the park. The area in gross open space is defined as all area not covered by streets or structures.

[2]Hypothetical hinterland boundaries were drawn half the distance between neighborhood parks. Arrington and Washington Parks were the only parks to have locations in different park hinterlands, 5 and 3 locations respectively.

[3]Results of rank correlation between park use and the following variables was:

(1) Percentage of Total Population under 15 years;
r_s = .57, Table r_s at 5% level=.475; significance level is 5%;

(2) Total population:
r_s = .66, Table r_s at 5% level=.475, significance level is 5%;

(3) Housing Value:
r_s=-.55, Table r_s at 5% level=-4.75; significance level is 5%;

(4) Population Density (per square acre):
r_s=-.25, Table r_s at 5% level=.475, not significant;

(5) Population Density of those persons under 15 years old:
r_s=.32, Table r_s at 5% level=.475, not significant.

Even though housing value showed a significant association with park use, it is felt by the author that people of all ranges of housing value should have equal accessibility to park areas.

[4]The results of rank correlation were the following: (1) between the percent of the total population under 15 years old and total population r_s=.46 where table r_s at 5% level=.475, therefore there is no significance; (2) between housing value and the total population r_s=-.17 where table r_s at 5% level=-.475, therefore there is no significance; (3) between housing value and the percent of the total population under 15 years old r_s=-.04 where table r_s at 5% level=-.475, therefore there is no significance.

CHAPTER IV

STILLWATER PARK NEEDS: A CONCLUDING STATEMENT

There are many areas in Stillwater that go unserved by neighborhood parks (Figure 18). Therefore, by using findings and proposed planning criteria identified in Chapter III it is possible to estimate increments to the system and give some indication as to their use. In practice careful consideration is given to the realities of the availability of open space suitable for park development, for it seems unlikely that land already developed would be altered in order to accommodate recreation activities. Therefore, final park development proposals will be made on the basis of the availability of open space parcels (Figure 16). The following parks in order of priority are needed to cover unserved park areas (Figures 19 and 20).

University Park

This park is proposed to primarily serve those in university married student housing. Its hinterland is bounded by major streets except in the case of open space north of the housing development. The park is only accessible by two streets but has excellent visibility to those in the immediate area. Furthermore, since this area is a homogeneous housing complex, it is felt most people would be aware of an existing park. The hinterland would contain a very large number of people with a very high proportion of children under the age of 15

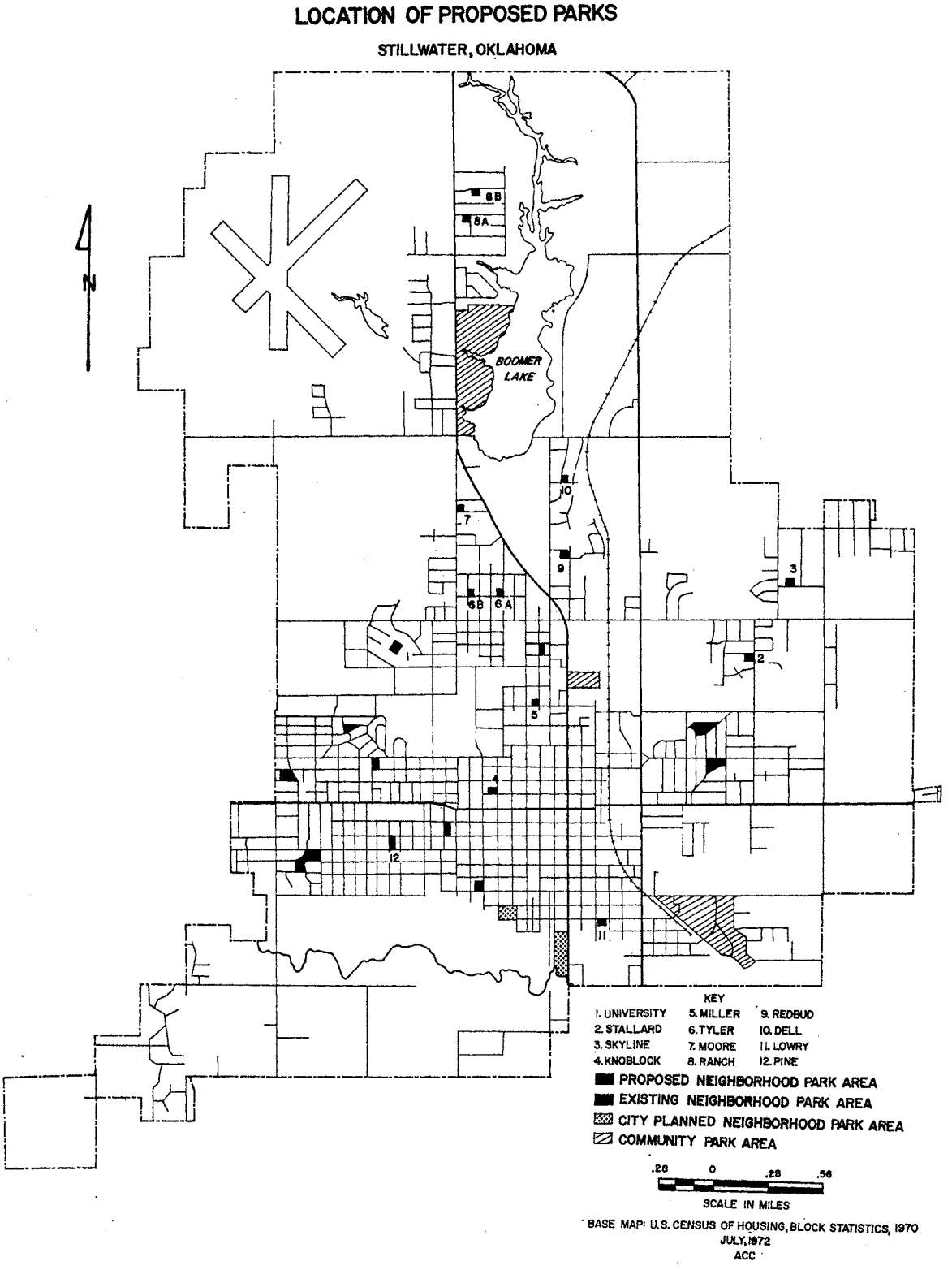

Figure 19. Location of Proposed Parks

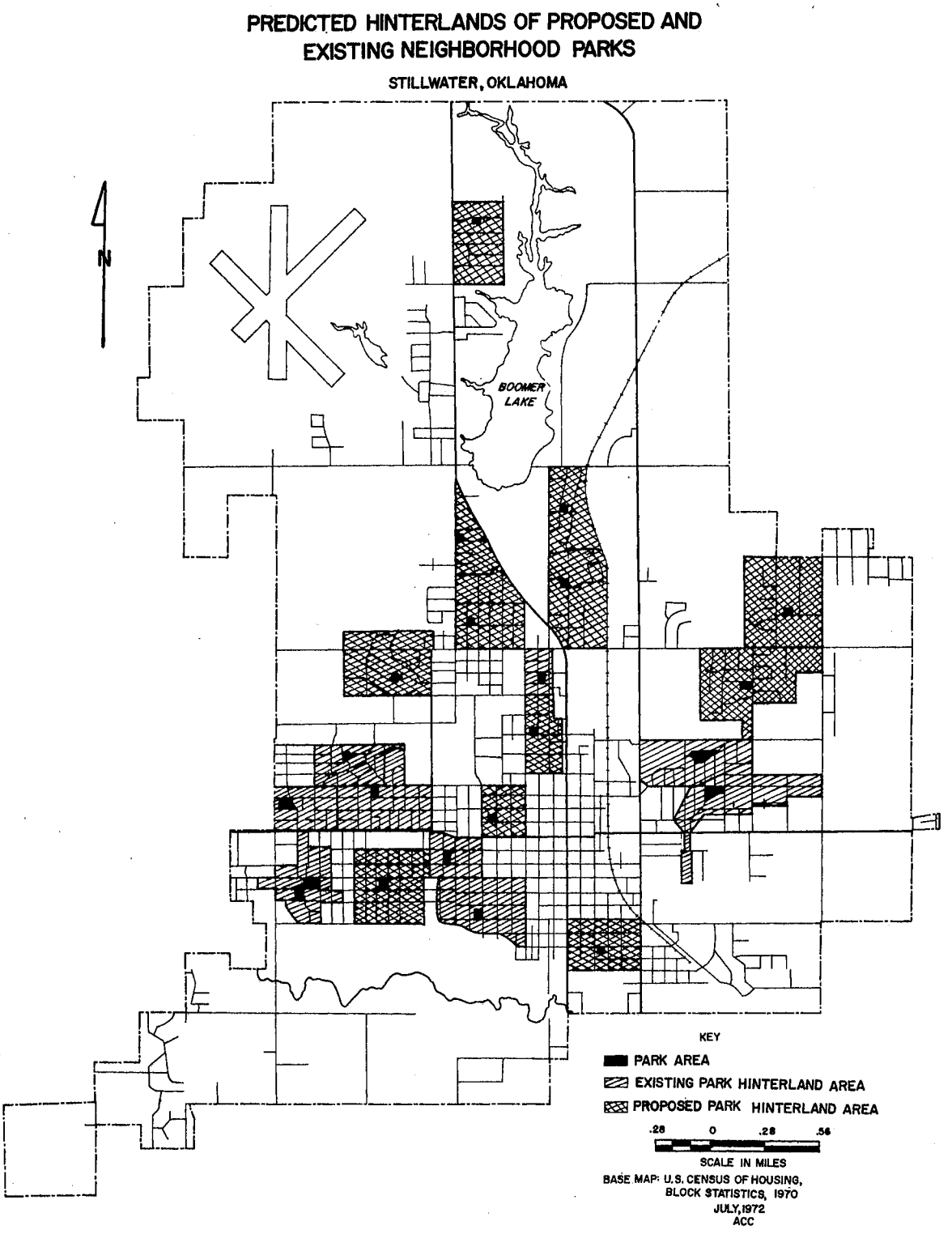

Figure 20. Predicted Hinterlands of Proposed and Existing Neighborhood Parks

years (Table XII). It seems likely that such a park would receive very high usage.

Stallard Park and Skyline Park

Both of these parks have relatively large hinterlands in area, however much of these areas are open space; therefore, these hinterlands are characterized by a low total population. This is to a large degree a result of the areas being relatively new residential development areas with more development likely to take place. The age structure within both these hinterlands is characterized by a high proportion of children under the age of 15 years (Table XII). It is felt that there is presently a need for park development in both these areas because of the age structure within the present population, the likelihood of increased population density, and the fact that Arrington Park's hinterland extends into Stallard Park's hinterland. It is predicted that medium use would take place presently in both parks; however, this would increase, as development progressed in the area. Therefore, acquisition should take place quickly to insure park land availability.

Knoblock Park and Miller Park

Both of these parks are very much alike in locational characteristics and age structure. Both parks are accessible by three streets and have low visibility because of the densely structured area. There is a very high proportion of the population from 16 to 25 and a very low proportion of the population under the age of 15 years (Table XII). This stems from the fact both areas are located in close

TABLE XII

DEMOGRAPHIC CHARACTERISTICS OF PREDICTED HINTERLANDS IN PROPOSED NEIGHBORHOOD PARKS

Park	Total Population by Age in Years						Total Population
	0-4	5-9	10-15	16-25	26-50	50+	
University	210	90	26	785	368	3	1462
Stallard	55	82	112	108	276	33	565
Skyline	48	62	58	35	203	42	448
Knoblock	17	20	25	335	100	85	582
Miller	55	26	30	598	185	111	1005
Tyler	73	64	66	277	250	77	807
Moore	54	37	30	57	124	37	339
Ranch	30	110	46	29	123	16	284
Redbud	35	26	30	133	146	56	426
Dell	23	24	17	33	89	55	241
Lawry	50	57	60	85	148	234	634
Pine	51	60	63	100	267	280	821
Central Business District Areas	115	107	100	571	485	473	1851

proximity to the university. The use of these parks would be similar to that of Tower Park, judging from the fact these parks are similar to the locational and demographic characteristics of Tower Park's hinterland. However, because of the difference in total population between the two parks, park use will vary. Miller Park serves a high total population, in contrast to Knoblock Park serving a low total population. Therefore, it is predicted that Knoblock Park will receive medium to low use and Miller Park will be characterized as having medium park use. For optimal use of these two parks it is suggested that facilities be oriented towards the 16 to 25 year age group.

Tyler Park

The hinterland of Tyler Park has two available open spaces for park location. Even though location A is more centrally located, it is felt that location B would be better than A because of greater street accessibility and higher visibility. The hinterland has a medium total population with a medium proportion of the population under the age of 15 years (Table XII); therefore, it is predicted that medium park use would be expected if the park was established.

Moore Park

The location of Moore Park on the edge of its hinterland is relatively poor, but this was the only available open space in this area. The park has adequate accessibility and good visibility because of its location near a major street. The hinterland has low total population; however, there is a medium proportion of children under 15 years of age (Table XII). This demographic situation is analogous to

that of Meyers Park. Since the total population is low and the location of the park is not central, it is predicted that the park will be characterized by medium use.

Ranch Park and Redbud Park

There are two possible locations for Ranch Park because of the open space available. The choice of location of the park relies on the status of future plans for residential development of the area. Location A has greater accessibility; however, the location B is more centrally located and would be a better location if development continues in a northerly direction. Since the hinterlands of Ranch and Redbud Parks incorporate new residential development areas, they are characterized by low total population. The age structure within these populations has a medium proportion of children below the age of 15 years (Table XII). It is predicted that the park initially would be characterized by low use because of the low total population. However, it is recommended that at least there is acquisition of land for these neighborhood parks with park facility development planned in the near future. These areas only require more population to provide high visitation for a neighborhood park.

Dell Park

The hinterland of Dell Park is relatively small because of major street boundaries and the existence of the railroad to the east; thus, the park serves a low total population (Table XII). Even though accessibility to the park is adequate and the proportion of the population under the age of 15 years is medium, it is felt that park use

will be low because of the extremely low total population in the hinterland. Therefore, actual development of this park would rely on the prospects for further population increase in the area.

Lowry Park

Even though the hinterland of Lowry Park is near Couch Park, the population within this hinterland does not use Couch Park as a neighborhood recreational area. This is because of the major street immediately adjacent to both hinterlands. The hinterland of Lowry Park is relatively small because of these major street boundaries; this characteristic contributes to the low total population in the hinterland. The age structure of this population has a low to medium proportion under the age of 15 years and a high proportion over 50 years old (Table XII). The demographic structure of the hinterland area indicates that there would be slightly above low park use.

Pine Park

Pine Park is not only bounded by major streets but also by the hinterlands of Washington, Sunset, and Meyers Parks; therefore, the proximity of all these parks might cause some conflict in use. The park would serve a medium total amount of the population in the proposed hinterland. However, the age structure within this population might inhibit park use, because there is a low proportion under the age of 15 years and a high proportion over the age of 50 years (Table XII). Therefore, it is predicted that this park would receive low use if established.

Community Parks

It is felt that community parks do not serve their immediate neighborhoods because of accessibility problems. However, by means of simple inexpensive construction these parks could acquire a neighborhood function. For example, where major streets impede nearby use, tunnels could be built under the streets. Similarly, in the case of fragmented access problems small roads and/or pathways could be constructed at sites such as south and east of Boomer Lake Park and south of Recreation and Couch Parks.

Unserved Areas

This proposal of new park areas still leaves some areas of Stillwater unserved by parks. In the case of southwest Stillwater, a new residential area, location of new facilities was not proposed because of a lack of census information. However, it is recommended that acquisition of park land take place at this time. This is based on expected continued development for the area.

In the case of northwest Stillwater, park development was not considered because development of a community park is in progress; this should fulfill the recreational needs of the area's population. The same is true for southern Stillwater where there are plans for development of two parks (Figure 19).

The central business district and its immediate surrounding residential area has no available open space for development. The demographic characteristics and high structural density of this area demonstrates that there is a need for park development (Table XII).

Moreover, a park would not only serve recreational needs, but also would serve as an aesthetically pleasing break in the structural landscape. Therefore, it is recommended that park development be considered and at the very least vest pocket parks be incorporated into the present landscape.

Summary

This planning strategy appears useful and significant; however, caution must be practiced in its use. The present deficiency in park areas may condition people's recreational behavioral patterns to the extent that the introduction of park facilities would not change their behavior. It is predicted that at best there would be a definite time lag between the completion of park development and attainment of actual optimal use of the park. A change of people's behavior in neighborhood park recreation might also evolve, if the structure of facilities is changed. For example, people of median housing value showed a high participation rate because of availability of the park facilities. In addition, it was found that children under the age of 15 years were the greatest type of users. This is probably due to park facilities being oriented towards this group. However, if parks included a wider range of facilities, they could not only attract different user types, but also serve a greater proportion of the total population. Therefore, this change is reducing the discrimination factor of planning parks around one type of group. Also, in the light of socio-economic and demographic characteristics of the population continually changing, it is recommended that any planning strategy which employs the use of these variables be periodically re-evaluated.

Several findings of this case study deserve reiteration. There was no indication that open space surrounding residences or vacant parcels of land is related to the use of nearby parks. It follows that recreation taking place in open space areas is not a substitute for recreation in parks; thus the facilities and the quality of the parks rather than the general neighborhood landscape characteristics are influential factors in attracting users. Stillwater has a large amount and homogeneous structure of open space; therefore, one should be cautious about generalizing these findings to other areas. Cities in which there is a greater structural density might show a high association between park areas and the percentage of area in gross open space and/or the number and areal extent of open space parcels.

Finally, the most significant finding of this study concerned the inadequacy of park planning standards. Population density is a very important determinant in present park standards, but in no way was it found to be significant here. Furthermore, it must be emphasized that results of analysis and formulation of this park planning strategy is only applicable in cities the same size and type of Stillwater. At worst this case study is only relevant to this city. Therefore, it is recommended that further testing of the variables responsible for determining park use should be continued, so that the validity of this plan can be achieved.

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APPENDIX

TABLES OF STATISTICAL DATA FOR PARK VISITATION CHARACTERISTICS

TABLE XIII

THE VARIATION OF VISITATION AMONG NEIGHBORHOOD PARKS ACCORDING TO TIME AND WEATHER CONDITIONS

Variables	F	Df	F_{01}	F_{05}	Significance Level	Sum of Deviations
Weekend vs. Weekday	11.2	1,332	6.74	--	1%	
Weekday: 10AM-3PM vs. 3PM-6PM	1.3	1,82	--	3.90	N.S.*	10AM-3PM = 14.4 3PM-6PM = 22.3
Temp $\leq 60^{\circ}$ vs. 61°-70°	1.82	1,249	--	3.88	N.S.	Temp 60° = -4.6 Temp 61°-70°=+.5
Temp $\leq 60^{\circ}$ vs. 71°-80°	1.64	1,195	--	3.99	N.S.	Temp $< 60^{\circ}$ = -4.6 Temp 71°-80°=6.3
Temp. 61°-70° vs. 71°-80°	3.11	1,190	--	3.99	N.S.	
Winds $<$ 20mph vs. $\geq$20 mph	1.6	1,325	--	3.88	N.S.	
Cloudy vs. Clear	2.4	1,325	--	3.87	N.S.	

*Not Significant

TABLE XIV

THE VARIATION OF VISITATION AMONG COMMUNITY PARKS ACCORDING TO TIME AND WEATHER CONDITIONS

Variables	F	Df	F_{01}	F_{05}	Significance Level
Weekday vs. Weekend	17.1	1,106	6.90	--	1%
Weekday: 10AM-3PM vs. 3PM-6PM	1.3	1,82	--	3.90	N.S.*
Temp. $\leq 60^{\circ}$ vs. 61°-70°	2.45	1,85	--	3.96	N.S.
Temp. $\leq 60^{\circ}$ vs. 71°-80°	1.70	1,67	--	3.99	N.S.
Temp. 61°-70° vs. 71°-80°	4.17	1,58	7.10	--	N.S.
Winds $<$ 20 mph vs. $\geq$ 20 mph	1.1	1,106	--	3.94	5%
Cloudy vs. Clear	13.1	1,106	6.90	--	1%

*Not Significant

TABLE XV

THE VARIATION BETWEEN VISITATION AT NEIGHBORHOOD PARKS AND COMMUNITY PARKS AMONG THE TYPE AND AGE OF PARK USERS

Variable	X^2	Df	X^2_{01}	Significance Level
Type of User	80.69	1	6.635	1%
Age of Friends	939.22	5	15.086	1%
Age of Families w/children	22.13	5	15.086	1%

TABLE XVI

THE VARIATION OF AGE AND TYPE OF USERS AMONG COMMUNITY PARKS

Variable	X^2	Df	X^2_{01}	Significance Level
Type of User	222.84	1	6.635	1%
Age of Friends	2437.54	5	15.086	1%
Age of Family w/Children	308.55	5	15.086	1%

TABLE XVII

THE VARIATION OF AGE AND TYPE OF USERS AMONG NEIGHBORHOOD PARKS

Variable	X^2	Df	X^2_{01}	Significance Level
Type of User	438.76	1	6.635	1%
Age of Friends	552.27	5	15.086	1%
Age of Family w/Children	64.85	5	15.086	1%

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