If you have issues viewing or accessing this file contact us at NCJRS.gov.

U.S. DEPARTMENT OF COMMERCE
National Technical Information Service

PB-268 839

An Analysis of the Incidence of Crime with Selected Socio-Economic Variables in Durham, North Carolina

Durham Urban Observatory, N C

45709

Prepared for

Department of Housing and Urban Development, Washington, D C Assistant Secretary for Policy Development and Research

Jun 76

PB 268 839

D U R H A M U R B A N O B S E R V A T O R Y

R E P O R T

AN ANALYSIS OF THE INCIDENCE OF CRIME WITH SELECTED SOCIO-ECONOMIC VARIABLES IN DURHAM, NORTH CAROLINA

NCJRS
MAR 10 1978
ACQUISITIONS

Ronald H. Brown
Vinston Burton, Jr.
William Porter, Jr.

N O R T H C A R O L I N A C E N T R A L U N I V E R S I T Y
Durham, North Carolina

"The research and studies forming the basis for this report were conducted pursuant to a contract between the Department of Housing and Urban Development and the League of Cities - Conference of Mayors, Inc. The substance of this research is dedicated to the public. The authors and publisher are solely responsible for the accuracy of the statements or interpretations contained herein."

JUNE 1976

REPRODUCED BY
NATIONAL TECHNICAL
INFORMATION SERVICE
U.S. DEPARTMENT OF COMMERCE
SPRINGFIELD, VA. 22161

1101

BIBLIOGRAPHIC DATA SHEET	1. Report No. UO-LCCM-DUR-76-006	2. HUD/RES-1101	3. Recipient's Accession No.

4. Title and Subtitle
ANALYSIS OF CRIME INCIDENCE IN RELATIONSHIP TO SELECTIVE PUBLIC SERVICES AND DEMOGRAPHIC CHARACTERISTICS IN DURHAM, NORTH CAROLINA

5. Report Date: June, 1976

6.

7. Author(s)
Ronald Brown, Vinston Burton, Jr. and William Porter, Jr.

8. Performing Organization Rept. No.

9. Performing Organization Name and Address
Durham Urban Observatory
City of Durham
P. O. Box 2251
Durham, North Carolina 27706

10. Project/Task/Work Unit No.

11. Contract/Grant No.
H-2196R

12. Sponsoring Organization Name and Address
Office of Assistant Secretary for Policy Development and Research
Department of Housing and Urban Development
Washington, D.C. 20410

13. Type of Report & Period Covered
Final

14.

15. Supplementary Notes

16. Abstracts The purpose of this research was to assess the relationship between criminal activity and selected socio-economic variables in Durham, North Carolina. Specifically the location of the offense and the suspects' residences were analyzed in relationship to the following variables: a) density (persons/acre and persons/room, b) educational background, c) percent black, d) residential attrition, e) recreational facilities, f) miles of unpaved streets, and g) percent sub-standard housing. Two types of crimes were selected for analysis: forcible entry and larceny involving 200 dollars or more for the years 1973 and 1974. The researchers selected to test the following two hypotheses: 1) certain socio-economic variables are correlates of number and location of criminal activity. 2) certain socio-economic variables are correlates of the number and location of claims filed for forcible entry and larceny.

17. Key Words and Document Analysis. 17a. Descriptors

17b. Identifiers/Open-Ended Terms

APPROVED
P D & R REPORTS CONTROL
7-6-7

17c. COSATI Field Group

18. Availability Statement	19. Security Class (This Report)	21. No. of Pages
National Technical Information Service 5285 Port Royal Road Springfield, Virginia 22151	UNCLASSIFIED	91
	20. Security Class (This Page) UNCLASSIFIED	22. Price PC A04 / MF A01

ACKNOWLEDGEMENTS

The success of this project can be attributed to numerous persons who cooperated in assisting the research team. Several departments from both the City Administration and North Carolina Central University provided the team with valuable support during certain stages of the research. The department upon which most of our support relied was the Police Department. The project Advising Committee consisted of the following members: William Robbins, Director of Auxiliary Services and Records, Reese Trimer, Legal Advisor, and Captain Talmadge H. Lassiter, Administrative Assistant to the Chief of Police. The committee was very instrumental in making the records available to our research team. We are fortunate to have had such a cooperative committee. Consequently, the accomplishment of this task was made less difficult.

Ronald H. Brown
Vinston Burton, Jr.
William A. Porter, Jr.

ABSTRACT

The purpose of this research was to assess the relationship between criminal activity and selected socio-economic variables in Durham, North Carolina. Specifically the location of the offense and the suspects' residences were analyzed in relationship to the following variables: a) density (persons/acre and persons/room, b) educational background, c) percent black, d) residential attrition, e) recreational facilities, f) miles of unpaved streets, and g) percent sub-standard housing. Two types of crimes were selected for analysis: forcible entry and larceny involving 200 dollars or more for the years 1973 and 1974. The researchers selected to test the following two hypotheses: 1) certain socio-economic variables are correlates of number and location of criminal activity. 2) certain socio-economic variables are correlates of the number and location of claims filed for forcible entry and larceny.

Table of Contents

List of Tables

List of Figures

SUMMARY OF FINDINGS

Larceny 1973-74

A multiple stepwise regression was computed for the number of arrests and the selected socio-economic variables. In this test, variables were listed in order of their importance in explaining the number of arrests made. Thus variables which exemplified the strongest association with number of arrests explained the greatest amount of variation in number of arrests of the total multiple regression coefficient computed for all variables.

For larceny 1973-74, density per acre explained the greatest amount of variation which was 22 percent of the 50 percent explained by all variables. The correlation coefficient was .47 which suggests an increase in the number of arrests when there is an increase in density per acre. The two variables which explained the second and third highest amount of variation were recreational facilities (10%) and density per room (4%), respectively. When the test for significance was computed on each of the nine variables density per acre, recreation, percent black and density per room proved significant at the .05 level. When claims were considered, percent substandard housing (20%) median family income (8%) and percent black (9%) in this order explained the greatest amount of variation. All three variables were negatively associated which imply an increase in the number of claims for a decrease of each variable quantity. The variables that proved significant when the test for significance was computed were percent black, density per room and sub-standard housing.

Forcible Entry 1973-74

Unpaved streets explained the greatest amount of variation (17%) for the number of arrests made for forcible entry 1973-74, followed by income and density per acre which explained 19% and 8%. However, as income increased, the number of arrests decreased, contrary to the relationship for unpaved streets and density per acre. Education and accessibility were the variables that proved significant when the test of significance was computed.

When claims were considered, neighborhood attrition explained the greatest amount of variation followed by unpaved streets and income. As with the number of arrests, the number of claims decreases with an increase in income. Only one variable, residential attrition, proved significant when the test of significance was computed.

Larceny and Forcible Entry 1973-74

When both types were combined, density per acre explained the largest variation in number of arrests followed by unpaved streets and neighborhood attrition. However, density per acre and education were the only variables which proved significant when the test of significance was computed.

In the case of claims, substandard housing, median income, and percent black accounted for the largest amount of variation. In contrast to the other two variables, income exhibited a negative correlation, thus indicating a decrease in the number of claims when median family income increases. Again one variable, residential attrition, proved significant when the test of significance was computed.

CONCLUSIONS AND RECOMMENDATIONS

The research involvement and findings of this project suggest at least five recommendations to law enforcement officers within the City of Durham.

1. A data base containing essential socio-economic information about the offender's[4] residence must be developed.

2. Dispersal of Police officers throughout the City of Durham must be based on a careful analysis of crime trends during designated periods of the year. (The suggested time period for this assessment is quarterly).

3. The Police Department should provide a major source of leadership in present and future City planning efforts. Thus, representatives from the Department should be given full membership on existing Planning Boards and Commissions.

4. The Police Department must make efforts to involve the community at large in the planning and implementation of crime prevention programs.

5. In order to further substantiate the findings of this research, a similar study should be conducted for other time periods, i.e. 1970-1972.

Finally, it is concluded that appropriate officials within the City of Durham must implement rapid and necessary changes. These changes should be aimed at the improvement of socio-economic conditions and demographic factors which tend to correlate significantly with the crimes of forcible entry and larceny. It is further concluded that if these steps are undertaken a high probability exists that there will be a reduction in the incidence of the aforementioned crimes.

---

[4] It would be necessary to follow-up the conviction of suspects to determine whether they are guilty or not; thus, determining the offenders.

INTRODUCTION

For the past several decades, law enforcement officers as well as the public at large have been baffled by the alarming rise in urban crimes of all types. Serious crimes - murder, robbery, rape, burglary, aggravated assault, larceny of fifty dollars or more, automobile theft - have mounted steadily since the end of World War II. According to the FBI reports, criminal acts topped the two million mark by 1962, doubling that of 1951. By 1970, property crimes had increased 147 percent and violent crimes 126 percent. Nationally, a serious crime is committed every fifteen seconds. Equally appalling, if not more so, is the lack of a universally acceptable explanation or response to the overwhelming increase in the nation's crime. For this reason, most attempts made by police and criminal officials to reduce and prevent crime have woefully failed.

As a means of combatting crime, the federal government, through numerous criminal programs, has furnished an enormous amount of financial aid to hundreds of municipalities throughout the country. However, it appears that the monies spent have not proven effective in reducing crime. While numerous methods of reducing crime have been proposed, few socio-economic approaches have been adopted by local authorities throughout the country. Yet the problem of crime, a social ill which affects every citizen directly or indirectly, continues to be rampant and unresolved.

Numerous theories have been put forth by experts to explain the high rate of criminal activity.[1] Many researchers are of the opinion that crime is a manifestation of the socio-economic structure of society, while others contend that crime is the result of a personality disorder. Still, others have directed their attention to studying the influence of urban structural design upon criminal activity. Resultantly, there is no general consensus on the causes of crime either among criminal experts or the public at large.

According to the 1973 Report of the National Advisory Commission on Criminal Justice Standards and Goals concerning the magnitude of the crime

---

[1]Criminal activity as used in this research refers to the locational relationship of the crime site to the offender's residence. However, the data used here is based on arrests (suspects) rather than judicial convictions.

problem: "The nation's record is most impressive. This country has preferred, in large part, to ignore the frustration and rage that produce crime and instead has developed a ponderous bureaucracy to deal with the symptom, rather than the problem itself."(18) Thus is emphasized the need to implement more preventive and predictive measures to the problem of crime. With the above facts in mind, it is obvious that several questions of great urgency must be raised and seriously considered: 1) What are the primary causes of crime? 2) What measures can be taken to eradicate these causes? and 3) What resources are available which can be mobilized to achieve this end?

Research Objectives and Underlying Assumptions

The primary objective of this research is to assess the relationship between criminal activity and selected socio-economic variables for the City of Durham, North Carolina. More specifically, location of offense and suspects' residences are analyzed in relationship to population density (persons/acre and persons/room), educational background, percent black, residential attrition (percent household living in the same residence as of January 1st, 1965), recreational facilities (number and adequacy), miles of unpaved streets (accessibility index), and percent sub-standard housing.

This research will provide a base upon which law enforcement officers can make a more accurate analysis of crime trends and thus enable a more effective implementation of urban planning. The data base and findings can be used to estimate the number of arrests and claims per census tract as well as the spatial location of incidence for forcible entry and larceny for consecutive years during other time periods for the City of Durham. It is hoped that a more efficient and accurate analysis of crime incidence as well as a more effective planning model for the City based upon a broader knowledge provided by the research findings can be gained.

Two types of crimes were chosen for this research: forcible entry and larceny involving $200 or more for the years of 1973-74. These crime types were chosen because of their common occurrence and the limitation of the research project. In order that an aggregate analysis of criminal activity could be made, the census tract was chosen as the basic unit area of study.

The primary underlying assumptions and hypotheses of this research are as follows:

1. The City of Durham will be faced with a significant increase in criminal activity over the next several decades. Over the past decade, Durham's population has grown by nearly 30%. This percentage is small when compared with the projected population growth for the City over the next several decades. This projection is based primarily on the attraction of the existing employment opportunities created by the newly established Research Triangle Park within the immediate vicinity. Furthermore, Durham's central location within the rapidly expanding industrial and educational core of the State, along with its renown educational and medical facilities, gives it an added magnetism when compared with cities of comparable size and character. In view of this, and present crime statistics, Durham will presumably witness a disproportionate increase in criminal activity in the near future.

2. Certain socio-economic variables are correlates of number and location of criminal activity. Three of the most commonly used approaches in assessing criminal activity on an aggregate basis are 1) Social Disorganization, 2) Anomie, and 3) Deviant Subculture. The first approach emphasizes low socio-economic conditions as correlates of crime, while the second is predicated upon the notion that persons who come in contact with many cultures become familiar with two or more value systems and as a result feel loyal and obligated to neither. Thus, a highly diverse behavior evolves. The third approach emphasized the conflict between the accepted behavior norms of a subculture with that of the larger society. In that this research does not attempt to explain all of the variation in criminal activity for the types and years chosen, only the social disorganization approach is employed. The socio-economic variables chosen for this research are among those most commonly used in previous studies which employed the social disorganization approach. The position taken by this research is that areas of low socio-economic status give rise to crime. Thus, the overriding null hypothesis - there is no significant multiple relationship between criminal activity and the selected socio-economic variables - is tested.

3. Certain socio-economic variables are correlates of the number and location of claims filed for forcible entry and larceny. The basic assumption is that forcible entry and larceny are committed more frequently in those census tracts which have the highest socio-economic standards. Based on this, the null hypothesis-that there is no significant multiple relationship between the number of claims for forcible entry and larceny and the selected socio-economic variables-is tested.

The Data Base, Research Methodology and General Crime Analysis

The primary data source was police records from which suspect's residence, location of crime, and amount taken were extracted. Where claim amount differed from amount on the officer's report, the latter was used. Most of the base maps used in this research were provided by the City Planning Division which also provided much of the socio-economic data.

The completion of the research involved several major tasks following an extensive review of the related literature. Due to the nature of the then existing records, an excessive number of hours was required to extract and compile the data. This phase was followed by mapping the precise location of the suspect's residence and the location of each offense. Several variables were then studied to determine if they could be used to statistically predict criminal preference patterns in the City of Durham, North Carolina. These variables consisted of the demographic composition of the City within a partial reconstruction of Lander's socio-economic factors. Subsequently, data on all of the selected socio-economic variables were extracted and converted from the Durham City Profile of the Division of City Planning.

The initial total sample size for claims reported involved 1,813 cases, of which 894 were larceny and 919 were forcible entry (Table 1). Of the larceny claims, 367 cases were reported during 1973 and 527 reported during 1974, an increase of more than 43 percent. Likewise, the number of claims reported for forcible entry increased by slightly more than 90%, from 314 in 1973 to 605 in 1974. Table 1 also shows the percentage involving arrests and percentage with no arrests. For both crime types and years, the mean percentage cleared by arrest did not exceed 12.7.

Table 2 shows the number of claims reported by census tract for crime types and years. Here the total sample size is 1,668 as opposed to 1,813 in that 147 cases could not be located because of missing address data. Consequently, this sample was used in the computation of the research. The largest number of claims reported (57) was in tract 15 for forcible entry (1973.) The lowest number of claims reported (0) was in tract 17.03 for forcible entry (1973.) The average number of claims and arrests per census tract is reported in Table 3. The number of claims ranged from 9.6 per census tract to 20.1, while the number of arrests ranged from a low .7 to 3.5.

The means and standard deviations of the socio-economic variables are reported in Table 4. Several of the variables had relatively larger means than was expected. For example, the mean percent of persons over 25 years of age who did not complete high school was 56 percent, a substantially high percentage. Likewise, percent black (41%), and percent substandard housing (32%) were also relatively high. In regards to persons living in the same household as of January 1, 1965, over 45 percent were living at a different residence. Consequently, Durham has a relatively high residential attrition rate.

Table 5 contains the stepwise multiple regression results for the socio-economic variables and number of arrests for larceny. The variable which explains the greatest amount of variation is density per acre, followed by recreation index and density per room, respectively. According to previous studies, population density is a traditional indicator of criminal activity. Interestingly so, percent black, education, and substandard housing ranked fairly low, 6th, 7th, and 8th respectively among the nine variables.

In comparing the order of the variables for forcible entry with that of larceny, a change in rank is observed (Table 6). Density per acre shifts to the third rank while accessibility and income shift to the first and second ranks. Likewise, recreation and density per room shift to a significantly lower order of explained variation. This substantial shift in variables can perhaps be explained in part by the difference in the convenience to commit larceny as opposed to forcible entry. Whereas an act of larceny may not require pre-planning, forcible entry undoubtedly does. Thus, variables used to explain the variation in larceny may shift in order of rank due to the spontaneity of the crime. Interestingly, education, percent black, and substandard housing all fell below the 6th rank for both larceny and forcible entry.

The stepwise regression for both crime types is presented in Table 7. Here, density per acre was the most significant variable in explaining the variation in the number of arrests, and accessibility and income ranked number 2 and 3 respectively. One consistency observed for separate crime type and a combination of the two was the fourth ranking of neighborhood attrition.

Table 8 contains the stepwise regression of claims for larceny, 1973-74. As observed, substandard housing ranks as the best indicator of probable incidence of larceny, followed by median family income, percent black, population density per acre, and neighborhood attrition, respectively. The ranking of variables for larceny contrasts that of forcible entry and both types combined in nearly all respects.

When claims for forcible entry 1973-74 are considered, neighborhood attrition ranks as the best indicator (Table 9). The subsequent rank order included accessibility, income, quality of housing, population density per acre, and educational background.

A stepwise multiple regression was also run for number of claims for larceny and forcible entry against the socio-economic variables (Table 10). Neighborhood attrition, as in the case for forcible entry, also explained the most variation when both crime types were combined. However, accessibility and income were replaced by substandard housing and education. In both instances, percent black ranked 9th with a negative correlation. Thus, the greater the amount of claims per census tract, the smaller the percent black.

Spatial Considerations and an Analysis of Selected Socio-Economic Variables

In observing the map for arrests made for larceny in 1973, it is noted that small clusters are distributed throughout the southeast, northeast, northwest central and central portion of the City. In contrast, crime site clusters were located throughout the southwest, southeast central and central portions of the City (see overlays).[2] However, the rate of apprehension and the crime sites during 1973 do not show a definite trend. Thus, these factors demonstrate that no adequate police manpower could have been dispersed throughout the various census tracts to act as a deterrent to these crimes.

---

[2]To justify overlays with maps insert overlays over map and align top of overlay with top of map. All dots without X beside them should fall within City boundaries.

The spatial occurrence of larceny was similar for the years of 1973 and 1974. In both instances, no definite trend in the rate of apprehension and site of the crime could be determined. For the most part, the residences of those individuals apprehended were aggregated throughout the southern and northwestern sections of the City (see overlays).

For forcible entry, 1973, a significant trend was observed between the crime sites and suspects' residence. With few exceptions, suspects resided within the central and southeastern sections of the City while a majority of the crimes were committed in the northwestern and southwestern sections (see overlays). On a whole, the tracts in which the crime was committed were of higher socio-economic status than those in which arrests were made. In contrast, no such trend exists for forcible entry during 1974. Instead, crime sites relative to suspects' residences exhibited randomly distributed patterns and low socio-economic tracts were also heavily victimized (see overlays). In both instance, 1973-74, a majority of the suspect's residences were located near the center of the City.

Median Family Income

The majority of the crime sites involving larceny for which a suspect was arrested were in the central portion of the City with the largest number occurring in tract 8.01 - the heart of the CBD. Tracts 5, 7, 8.01, and 3.02 also reported a high incidence of larceny; however, they ranked higher in median income than tract 8.01. Further, an association between the low income census tracts and the location of the suspect's residence exists. The largest cluster of suspect's residences for both years occurred in the southeastern section (see overlays). Of particular note is the significant increase of claims during 1974 for larceny and forcible entry over 1973.

There is also a significant association between the income of the suspect and his chances of being arrested for forcible entry. Thus, those census tracts (tracts 5, 9, 10.01, 11, 19.01, 14) which show the lowest income levels of the residents are also the tracts in which the greatest number of individuals tend to be arrested for forcible entry. This trend is apparent for both 1973 and 1974.

Negative correlations exist for arrests and median family income. The correlations (larceny -.29, forcible entry -.31, and for both crime types combined -.33) further suggest that as the median income per census tract decreases there is a concomitant increase in the rate of arrests (see Figure 1 and overlays).

Education

The education map indicates by census tract the percentage of individuals over 25 who did not finish high school (Figure 2). As observed previously, a random pattern of criminal activity for larceny 1973-74 and forcible entry 1974, with minor exceptions, exists. For forcible entry, 1973 a slightly different pattern emerges involving the general trend of movement of suspects from the east central area of the City, where education levels are low, to peripheral areas in the west, where the level of education is significantly higher. The majority of suspects' residences are located in tract 9, 11, 12.02 and 14, which are among the lowest category of educational attainment and tracts 20.02, 20.01, 6, 15, 17.01, 4.01 and 17.02 which are located in the western section of the City. As is commonly the case, the tracts of high educational rank also rank high in median family income. Consequently, a general movement of suspects from areas of low median income and low educational attainment is the most prevalent trend exhibited for forcible entry during 1973 (see Figures 1 & 2 and overlays).

A moderate positive correlation existed between the number of arrests and education. The highest educational correlation was obtained when crime types and years were combined (.41), while forcible entry and larceny separately had correlations of .39 and .33, respectively.

Substandard Housing

Substandard housing is among the top of the list of indices used in the identification of poverty neighborhoods. The mean percent of tracts with over 50% substandard housing are located in the southeast and eastern sections of the City (Figure 3). A wedge-shaped corridor which points northwestward along the expressway exists. Other areas of sub-standard housing exists in the extreme northeast in tract 17.03, and in the extreme southeast in tract 18.02.

A slight pattern is noticed for crime trends for larceny 1974 as a large percentage of the suspects' residences were located within and around the wedge. In many instances, the route to crime site closely paralleled the orientation of the wedge. In contrast, no such pattern is discernable for 1973 larceny trends; instead, a random pattern exists.

The correlation coefficients for both years was a positive .27, the largest coefficient computed for substandard housing and numbers of arrest.

Strong trends and greater clustering exist for forcible entry, particularly noticeable for 1973. Two fairly strong trends occur where the suspect originates in the east and southeast and the crime is committed in the southwest (see overlays). Again, the northwest trend parallels very closely with the wedge of substandard housing. For 1974, a majority of the suspects' residences is clustered in the southeast and eastern sections of the City. However, there are no distinct trends and distances between crime site and the suspect's residence is considerably shorter (see overlays). Despite a clustering of suspects' residences, a considerable number of the residences were scattered throughout all sections of the City. A low positive correlation coefficient of .20 was computed for percent substandard housing and number of arrests for both years combined (Table 6). Similarly, when both crime types and both years are combined, a positive correlation of .24 was derived (Table 7).

Percent Black Population

The tracts with the greatest concentration of blacks form a continuous belt in the southeast, extending from the CBD to the outer City limits (Figure 4). Another belt loops north of the CBD, almost forming a complete circle. Two other concentrations are located slightly north of the CBD and in the extreme northeast.

Criminal activity involving larceny, 1973-74 is fairly pronounced in the predominantly black areas fringing the CBD (overlays). This area showed a high frequency of crime as well as arrests. Likewise, a similar situation is noticed for forcible entry during the year of 1974.

In contrast, a majority of the crime sites for forcible entry 1973 were located in areas of low black concentration, despite the slight clustering of suspects' residences in the predominantly black areas.

In considering the correlation of percent black and number of arrests, a positive relationship existed in all three instances. However, the coefficient (.11) computed for forcible entry was considerably lower than that for larceny (.39) and combined crime types (.21).

Population Density

It is common knowledge that population density is a fairly strong correlation of criminal activity. Overcrowding breeds discontent and anxiety which often manifests itself in criminal behavior.

By and large, Durham has a low population density, an average of 5.7 persons/acre. However, some areas near the CBD have population densities nearly three times that of the average.

For the most part, the areas of greatest population density correspond with those of high concentration of blacks (Figures 4 and 5). Thus, the analysis for both variables is very similar. As in the case of percent black population, a positive correlation exists. However, density per acre had higher correlations in all cases, a range from .35 for forcible entry to .47 for larceny (Tables 5 and 6). It should be reiterated here that density per acre was the most consistent variable in explaining the greatest amount of variations for the number of arrests in all instances.

Tracts which had high population density per acre generally were those with a large percentage of units with more than one person per room. As such, a positive correlation also exists for density per room and number of arrests (Tables 5, 6, 7). In all instances, the correlation was equal to or greater than .25.

Residential Attrition

Residences which witness a high attrition rate run the risk of losing perhaps the most vital unifying element of all - the concept and feeling of neighborhood. A constant turnover of residents negates the opportunity to become well acquainted with neighbors. Consequently, a high degree of anonymity prevails which makes it easier for neighbor to rob neighbor.

For the City of Durham an average of 45% of all families were living in new residences as of January 1, 1965. Tracts 15 and 17.01 consisted primarily of the Duke University community. The greatest number of arrests for larceny occurred in those tracts with 50 to 75 percent attrition rate (Figure 7 and overlays). However, only one arrest was made in tract 15 and none in tract 17.01 for both years. The other arrests involved persons residing outside the City and persons living in tracts with an attrition rate between 25%-50%. The correlation obtained for larceny 1973-74 was a low .14.

A similar situation exists in the case of forcible entry 1973-74 where tracts with attrition rates of 25%-50% and 50%-75% showed the highest number of arrests (see overlays). The correlation obtained here was also positive and small (.20). An obvious contrast between 1973 and 1974 is that the latter showed a larger percentage of the arrests occurring within the immediate vicinity of the crime sites. When both crimes were considered together, a positive .20 correlation was obtained for attrition rate and number of arrests.

Recreational Facilities

Areas of low socio-economic status (particularly areas that suffer over-crowding) often lack adequate recreational facilities to accomodate their youths. Recreation reduces the idleness of youths and provides a constructive outlet for their often excessive energies. Thus, common opinion is that adequate recreational facilities significantly contributed to the reduction in juvenile delinquency.

Quality points were determined for each census tract on the basis of number of parks, adequacy and number of facilities per park, availability of lighting, etc. Despite the more than thirty community and neighborhood parks in Durham, nearly one half of the tracts contain no park at all.[3] Many of these tracts border each other and as such, access to neighboring facilities is not available.

A majority of persons arrested for larceny 1973-74 were from tracts with a quality rating below 40 points (Figure 8 and overlays). Many arrests were made along a belt with a low rating which extended from the southeast to the northwest through the CBD. A positive correlation of .39 was obtained between recreational index and number of arrests.

For forcible entry 1973, a distinct association between suspects' residences and recreational index exists (Figure 8 and overlays). Again, a majority of the arrests occurred in tracts with low ratings. Despite the obvious clustering of arrests in low-rated tracts for 1974, a less distinct association is observed from the map (Figure 8 and overlays). For forcible entry 1973-74, a smaller positive correlation of .25

[3]Tot lots, special parks and facilities such as Durham's Athletic Park and Civic Center were not considered in this research.

is obtained while a .33 is obtained when both crimes are combined.

Accessibility (Unpaved Streets)

Street quality is a strong indicator of the economic status of a neighborhood. Dirt streets accelerate the deterioration of a residence and renders it unattractive to "potential" newcomers. Durham has approximately 58 miles of dirt streets or 18% of its streets are unpaved.

Figure 9 shows the total number of miles of unpaved streets per census tract. Interestingly so, many of the tracts which ranked low for the other socio-economic variables possess the least mileage of unpaved streets. In particular, larceny 1973-74 shows a weak positive correlation of .07. Thus, an overwhelming percentage of the tracts with low accessibility account for a small percentage of the arrests (Figure 9 and overlays).

In the case of forcible entry 1973-74, a stronger association is observed as a positive correlation of .39 was obtained, a considerable increase over that for larceny. Similarly, a positive correlation of .35 was obtained when both types and years were combined.

SIGNIFICANCE TESTS AND THE PREDICTIVE MODEL

Several hypotheses were tested at the .05 level of significance to determine the relationship between the socio-economic variables and number of arrests and number of claims for each crime type and both types combined (Tables 5-10). The t-test was employed to determine the significance of each variable.

Four of the nine variables proved significant for number of arrests made for larceny 1973-74. They were density per acre, recreational index, density per room and percent black. Each of these variables exhibited a positive correlation. Thus, an increase in arrest occurred for an increase in each variable quantity. For claims, three variables proved significant; percent substandard housing, percent black and density per room. The computed negative correlations suggest a decrease in the number of arrests for an increase in each variable quantity.

Two variables were significant for forcible entry 1973-74; education and accessibility. In both instances, the number of arrests increases as each variable increases. Residential attrition was the only variable which proved signigicant for claims for forcible entry. Likewise, as residential attrition increases claims also increase.

When crime types were combined, education and density per acre were the only two variables which proved significant. As was the case for forcible entry, residential attrition, which exhibited a positive relationship, was the only variable significant for claims reported.

The following prediction equation can be employed to predict the number of arrests and/or claims for any given combination of the socio-economic variables chosen for this research:

$$Y = a + b_1 X_1 + b_2 X_2 + b_3 X_3 \ldots b_n X_n$$

Where a is a constant and b is the regression coefficient.

Predictions must be made based on the census tract in that it constituted the basic unit area of the research. Given the computed values for the regression coefficients and the constant for larceny, a predicted value for number of arrests can be made for any combination of the socio-economic variables. The arbitrary values may be as follows: Income (X_1) = $6,000, Education ($X_2$) = 30 substandard housing (X_3) = 20 percent black (X_4) = 30, density per acre (X_5) = 5, Density per room (X_6) = 4, residential attrition (X_7) = 40 recreation index (X_8) = 50, accessibility index (X_9) = .4. Thus, the predicted number of arrests for a census tract with this combination is:

$$Y = -7.5056 + .0002\ (6{,}000) + .0505\ (30) + (-.0152)\ (5) + .228\ (30) + .0664\ (5) + .0041\ (4) + .1441\ (40) + .0361\ (50) + (-.0543)\ (4)$$

$$= -7.5056 + 1.2000 + 1.5150 - .0760 + .6840 + .3320 + .0164 + 5.7640 + 1.8050 - .2172$$

$$= 3.5176$$

The same procedure can be used to compute the predicted value for number of claims. This model may prove particularly valuable in estimating the number of arrests and claims per census tract for each census period, at which time data is available and projected changes in the socio-economic variables can be made based on existing urban trends.

Table 1

PERCENTAGE OF CRIMINAL ACTIVITY AND APPREHENSION RATE

BY TYPE AND YEAR

LARCENY

YEAR	% INVOLVING ARRESTS	% WITHOUT ARRESTS	TOTAL NUMBER REPORTED
1973	5.0	95.0	367
1974	3.8	96.2	527
	$\bar{X}$ = 4.4	$\bar{X}$ = 95.6	Total = 894

FORCIBLE ENTRY

YEAR	% INVOLVING ARRESTS	% WITHOUT ARRESTS	TOTAL NUMBER REPORTED
1973	10.5	89.5	314
1974	12.7	88.3	605
	$\bar{X}$ = 11.6	$\bar{X}$ = 88.9	Total = 919
Grand $\bar{X}$	8.0	92.0	Grand Total = 1813

Table 2

FREQUENCY COUNT OF CLAIMS BY CENSUS TRACTS

CENSUS TRACT	LARCENY 1973	LARCENY 1974	ALL LARCENY	FORCIBLE ENTRY 1973	FORCIBLE ENTRY 1974	ALL FORCIBLE ENTRY	TOTAL BOTH TYPES/ BOTH YEARS
1	13	36	49	10	21	31	80
2	9	9	18	5	28	33	51
3.01	9	21	30	7	15	22	52
3.02	7	20	27	12	10	22	49
4.01	26	23	49	6	13	19	68
4.02	16	17	33	14	29	43	76
5	7	12	19	5	31	36	55
6	14	14	31	15	23	38	69
7	11	30	41	4	12	16	57
8.01	26	20	46	11	27	38	84
8.02	20	22	42	10	23	33	75
9	1	5	6	6	17	23	29
10.01	9	12	21	16	26	42	63
10.02	27	23	50	17	38	55	105
11	17	30	47	18	41	59	106
12.01	6	8	14	9	6	15	29
12.02	2	2	4	10	9	19	23
13.01	1	7	8	9	14	23	31
13.02	22	17	39	16	33	49	88
14	8	10	18	13	15	28	46
15	22	50	72	5	57	62	134
17.01 Co.	3	3	6	10	4	14	20
17.02	32	21	53	9	25	34	87
17.03 Co.	2	8	10	0	13	13	23
18.01 Co.	1	4	5	6	2	8	13
18.02	6	11	17	9	12	21	38
20.01 Co.	8	18	26	13	12	25	51
20.02	4	7	11	3	10	13	24
20.03	6	9	15	11	16	27	42
	$\Sigma X = 335$	$\Sigma X = 472$	$\Sigma X = 807$	$\Sigma X = 279$	$\Sigma X = 582$	$\Sigma X = 861$	$\Sigma X = 1668$
	$\bar{X} = 11.55$	$\bar{X} = 16.27$	$X = 27.82$	$\bar{X} = 9.62$	$\bar{X} = 20.06$	$\bar{X} = 29.68$	$\bar{X} = 57.51$
	*32	*55		*31	*23		

*= Number of cases that were deleted because of incomplete address data (unable to plot location).

Table 3

AVERAGE CLAIMS & ARRESTS FOR ALL CENSUS TRACTS
(29 tracts)

NUMBER OF CLAIMS

YEAR	LARCENY	FORCIBLE ENTRY	BOTH TYPES
1973	11.6	9.6	10.6
1974	16.3	20.1	18.2
Both Years	14.0	14.9	Grand $\overline{X}$ = 14.5

NUMBER OF ARRESTS

YEAR	LARCENY	FORCIBLE ENTRY	BOTH TYPES
1973	.8	1.0	.9
1974	.7	3.5	2.1
Both Years	.75	2.3	Grand $\overline{X}$ = 1.5

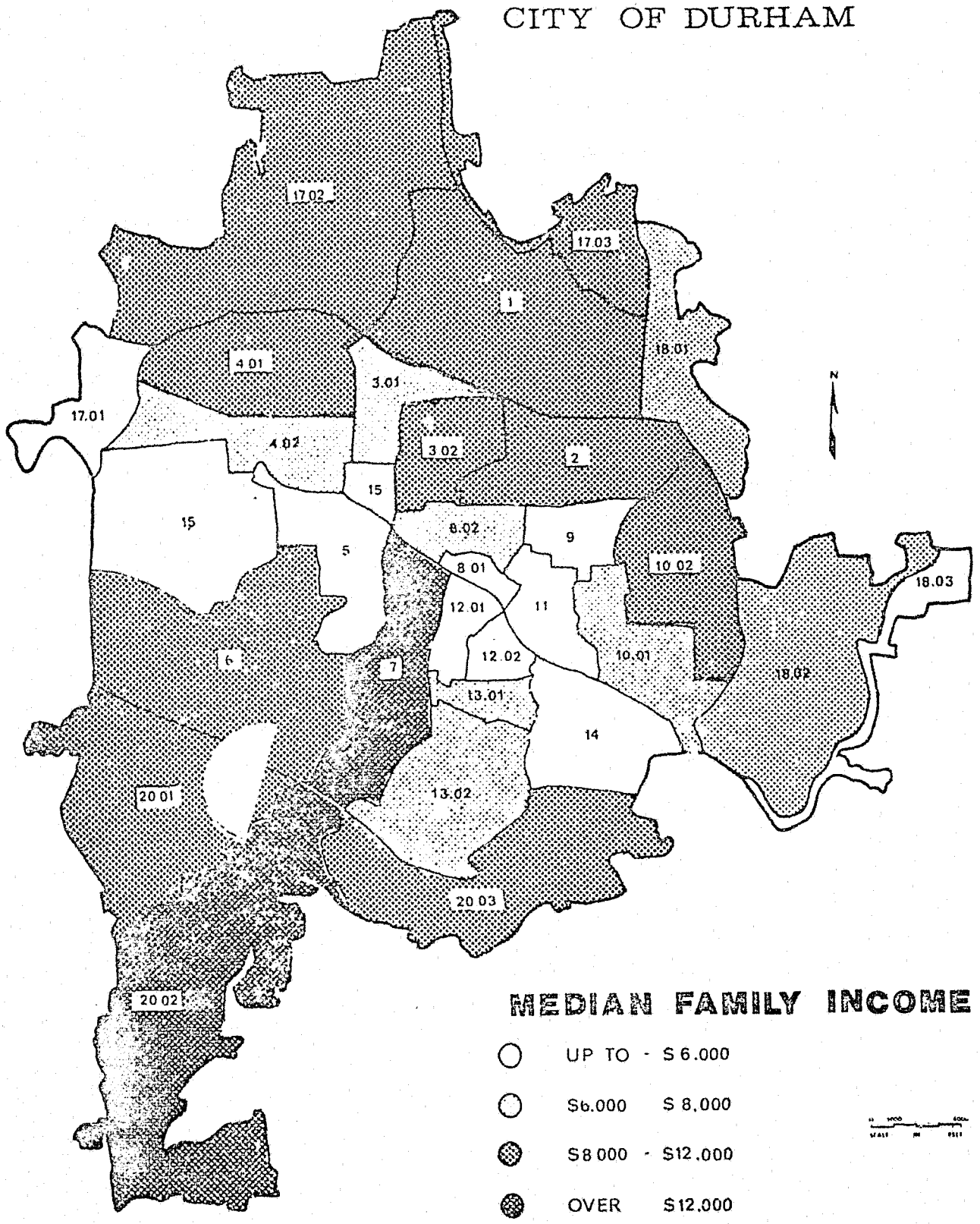
Table 4

MEAN AND STANDARD DEVIATION OF SOCIO-ECONOMIC VARIABLES USED TO PREDICT CRIME INCIDENCE

VARIABLE	MEAN	STANDARD DEVIATION
Median Family Income	$7962	$3631
Education (% over 25 yrs. of age who did not complete High School)	56	21
Percent Sub-Standard Housing (Units)	32	29
Percent Black	41	38
Population Density per Acre	5.7	3.8
Population Density per Room (% units with 1.01 or more persons)	9.0	6.2
Residential Attrition (% residents not living in some residence as of Jan. 1, 1965)	54.4	15.4
Recreational Facilities	18.6	19.7
Miles of Unpaved Streets (Accessibility Index)	2.0	1.5

N = 29

Figure 1



Preceding page blank

Figure 2

EDUCATION

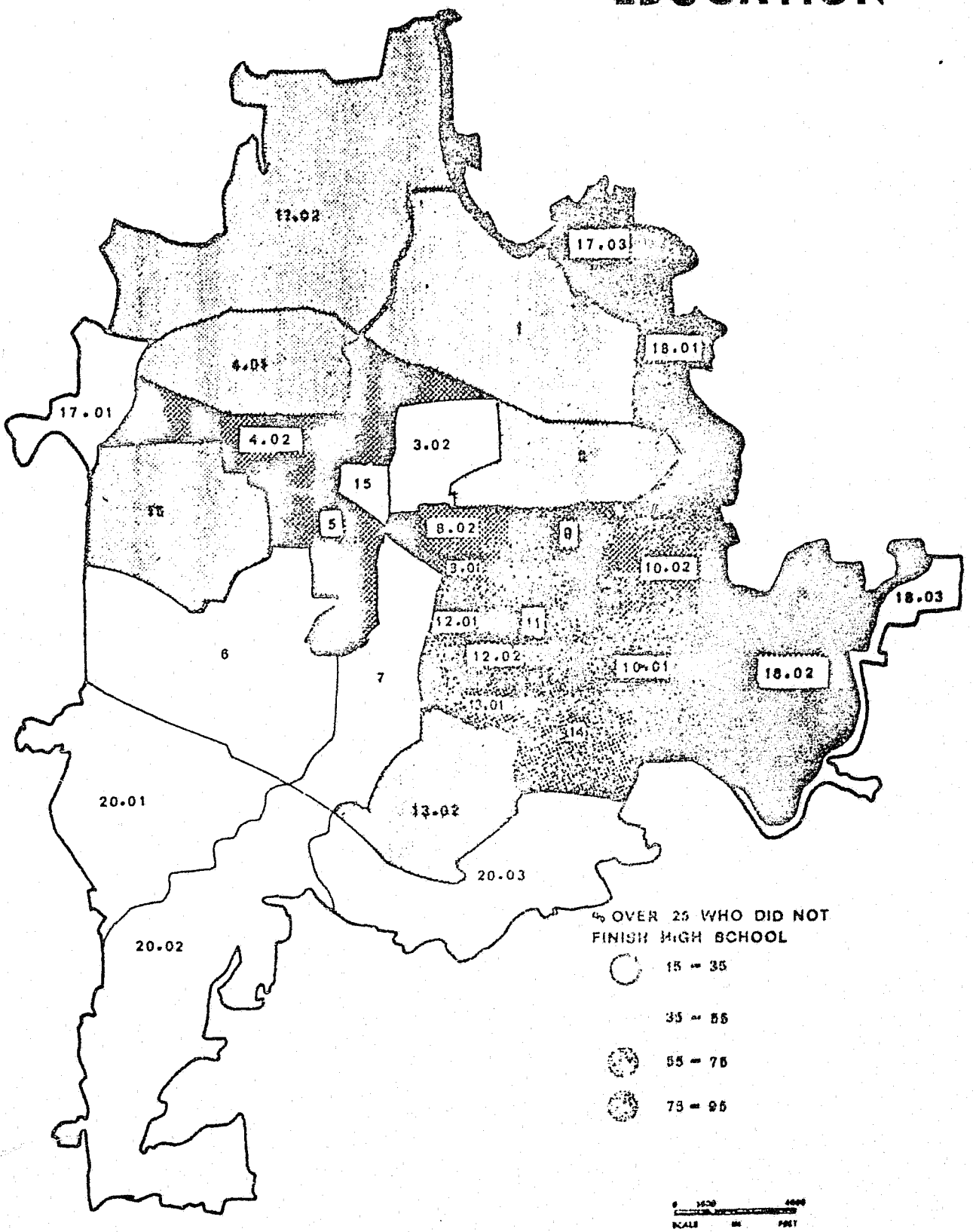


Figure 3

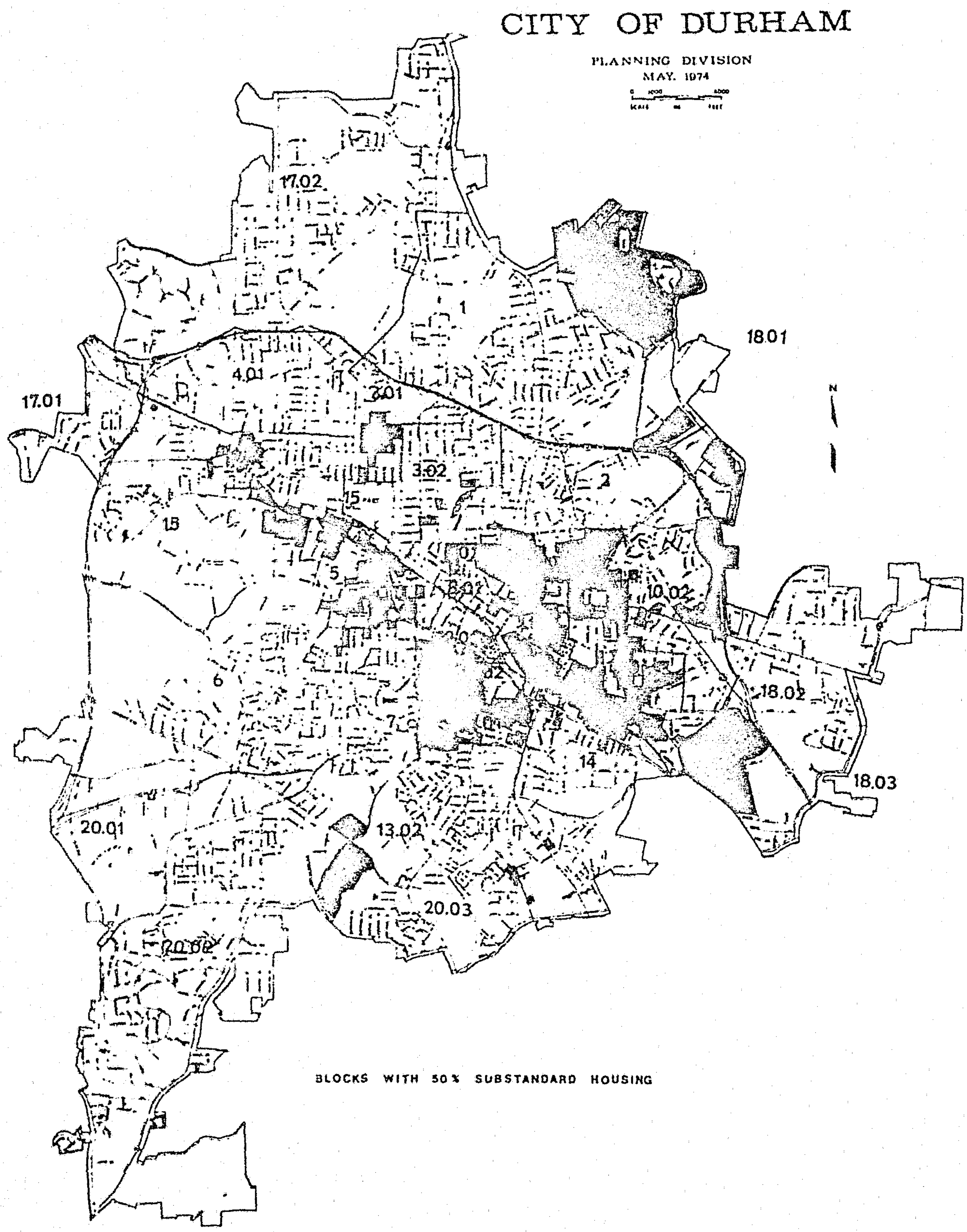

CITY OF DURHAM
PLANNING DIVISION
MAY, 1974
17.02
1
18.01
4.01
3.01
17.01
3.02
2
15
18
5
10.02
6
18.02
7
14
18.03
20.01
13.02
20.03
20.02
BLOCKS WITH 50% SUBSTANDARD HOUSING

Figure 4

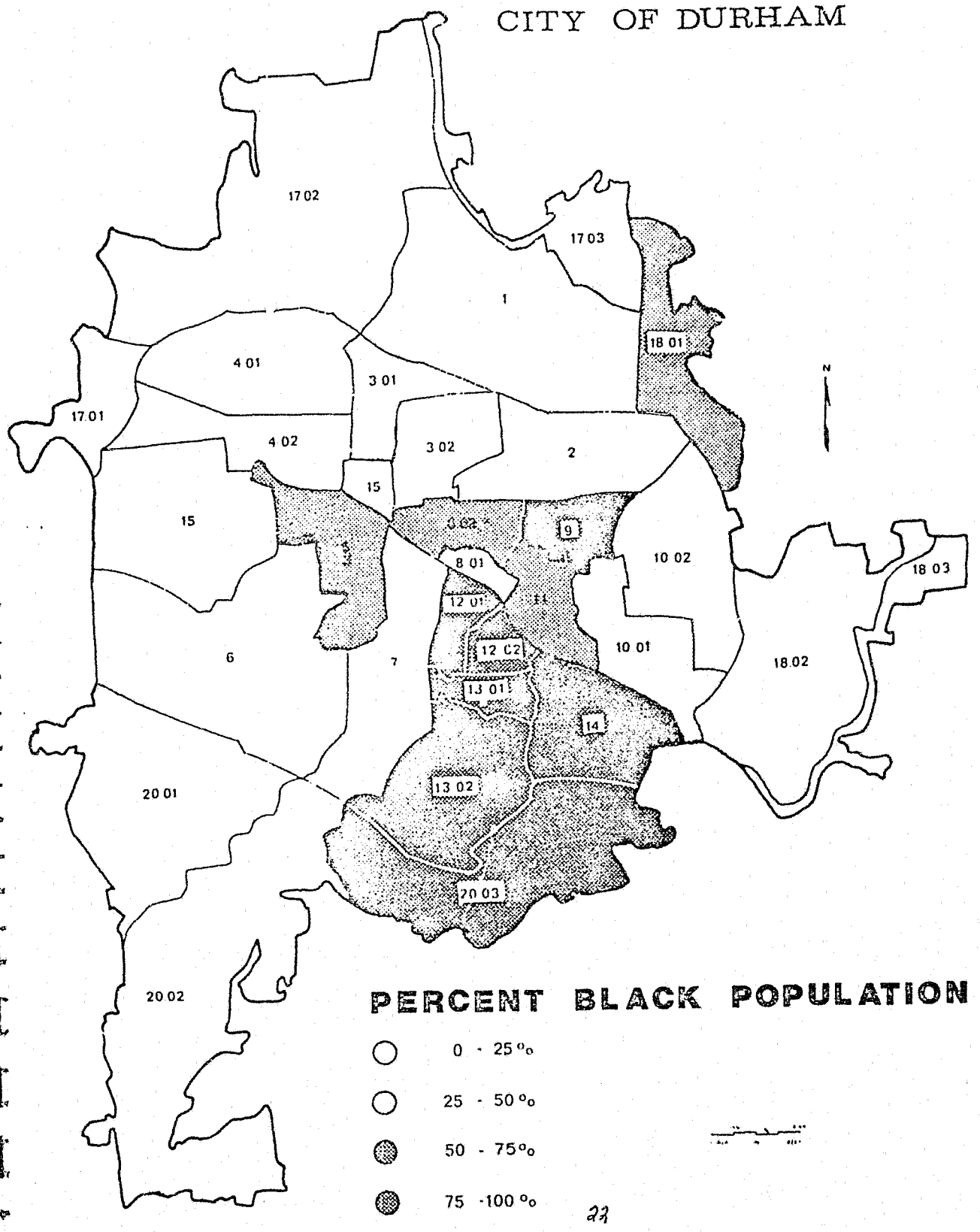

CITY OF DURHAM
17 02
17 03
1
18 01
4 01
3 01
17.01
4 02
3 02
2
15
15
9
8 01
10 02
18 03
12 01
11
6
7
12 02
10 01
18.02
13 01
14
20 01
13 02
20 03
20 02
N
PERCENT BLACK POPULATION
0 - 25 %
25 - 50 %
50 - 75%
75 -100 %

Figure 5

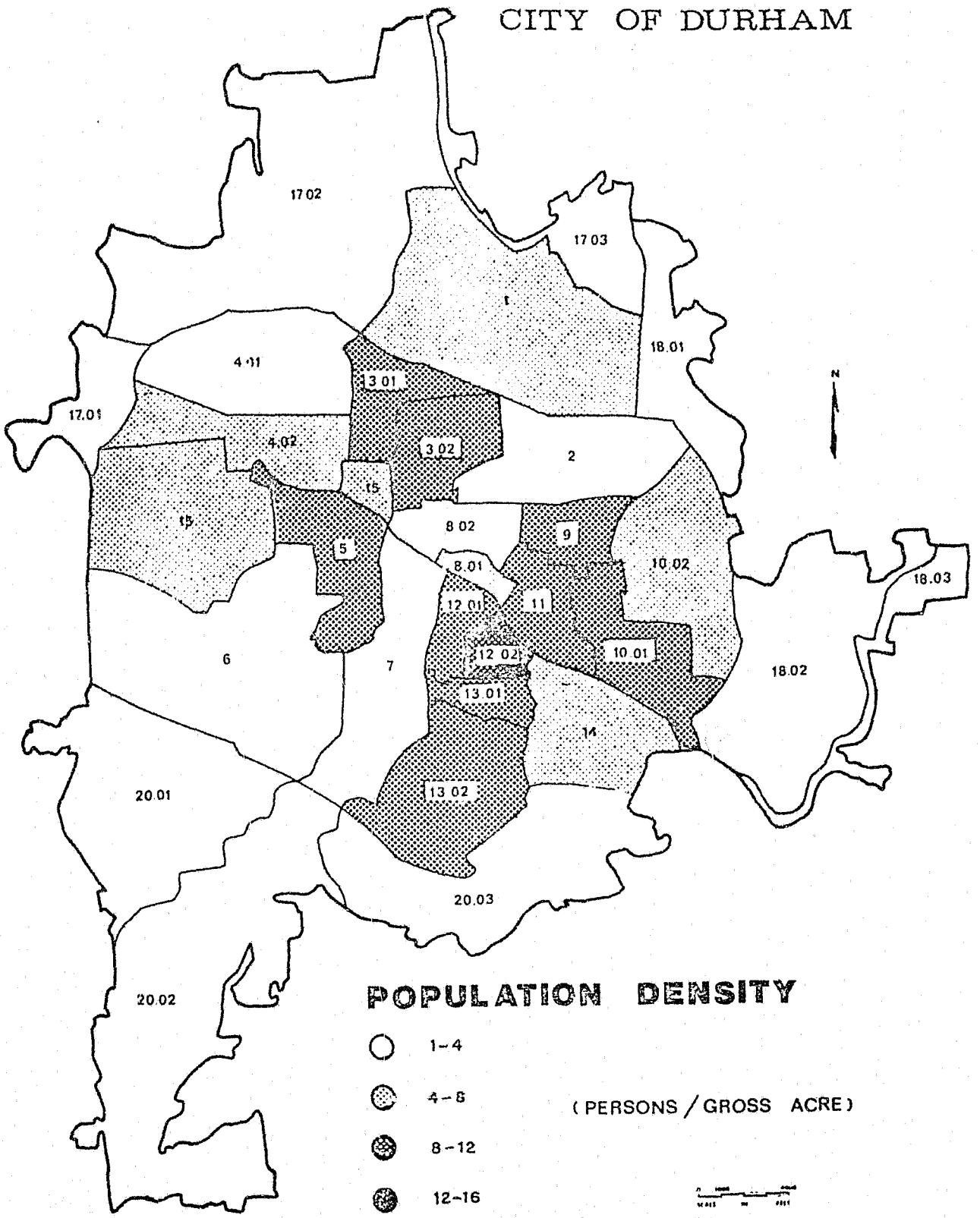

CITY OF DURHAM
17.02
17.03
1
18.01
4.01
13.01
17.01
4.02
3.02
2
15
19
8.02
9
5
8.01
10.02
18.03
12.01
11
6
7
12.02
10.01
18.02
13.01
14
20.01
13.02
20.03
20.02
POPULATION DENSITY
1-4
4-8
8-12
12-16
(PERSONS / GROSS ACRE)
N

Figure 6

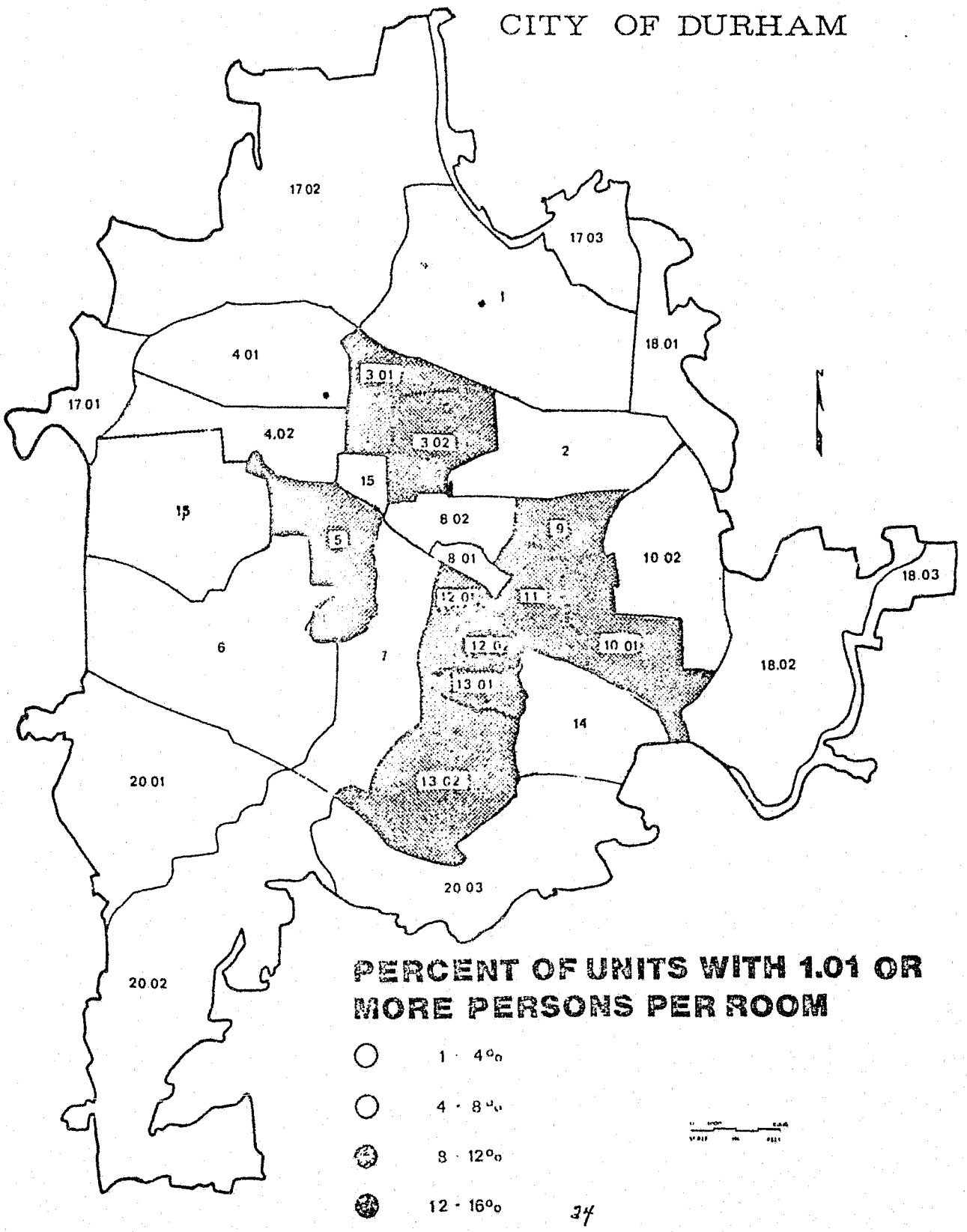

CITY OF DURHAM
17.02
17.03
18.01
4.01
3.01
17.01
4.02
3.02
2
15
15
8.02
5
9
8.01
10.02
18.03
12.01
11
6
7
12.02
10.01
18.02
13.01
14
20.01
13.02
20.03
20.02
PERCENT OF UNITS WITH 1.01 OR MORE PERSONS PER ROOM
1 - 4%
4 - 8%
8 - 12%
12 - 16%

Figure 7

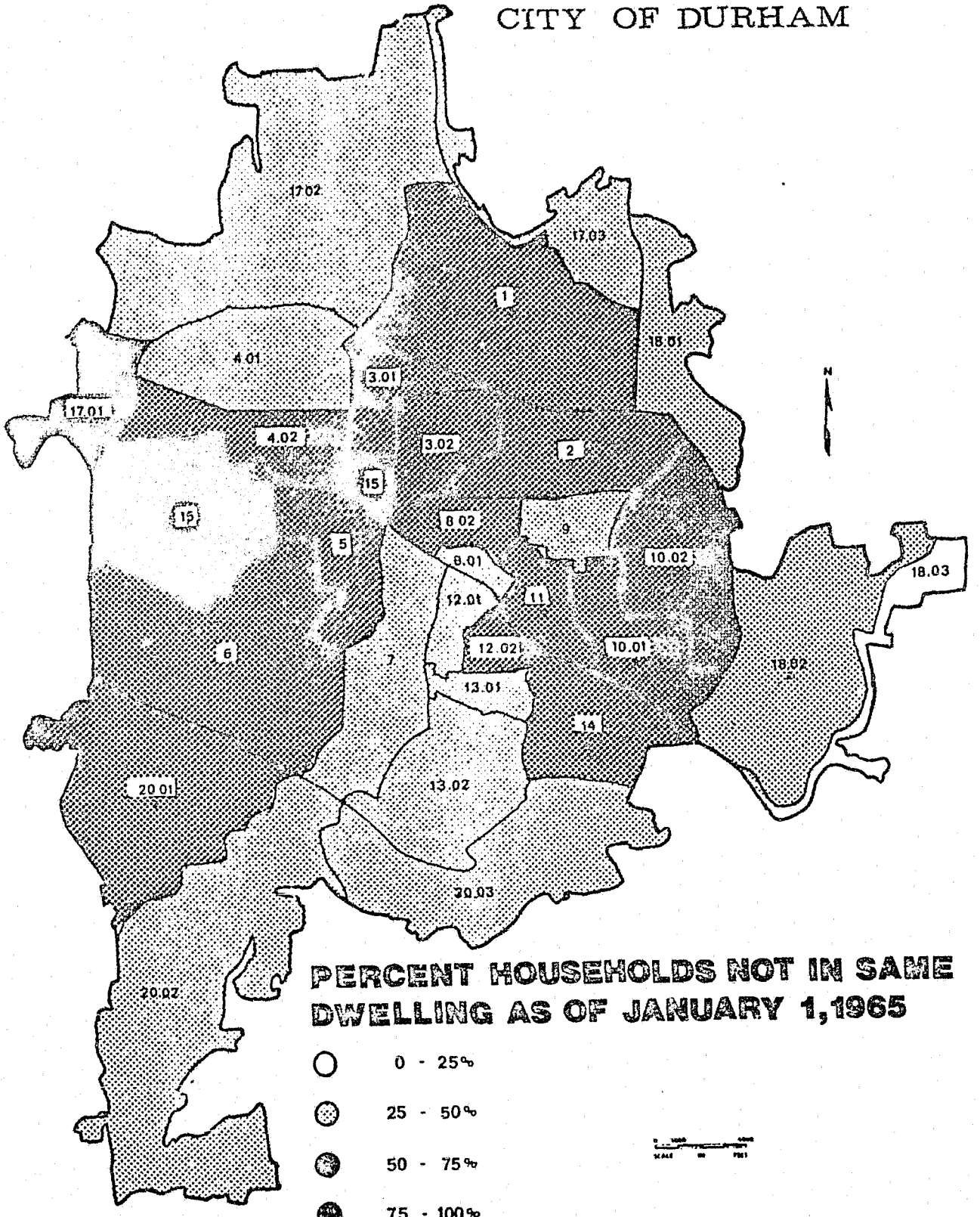
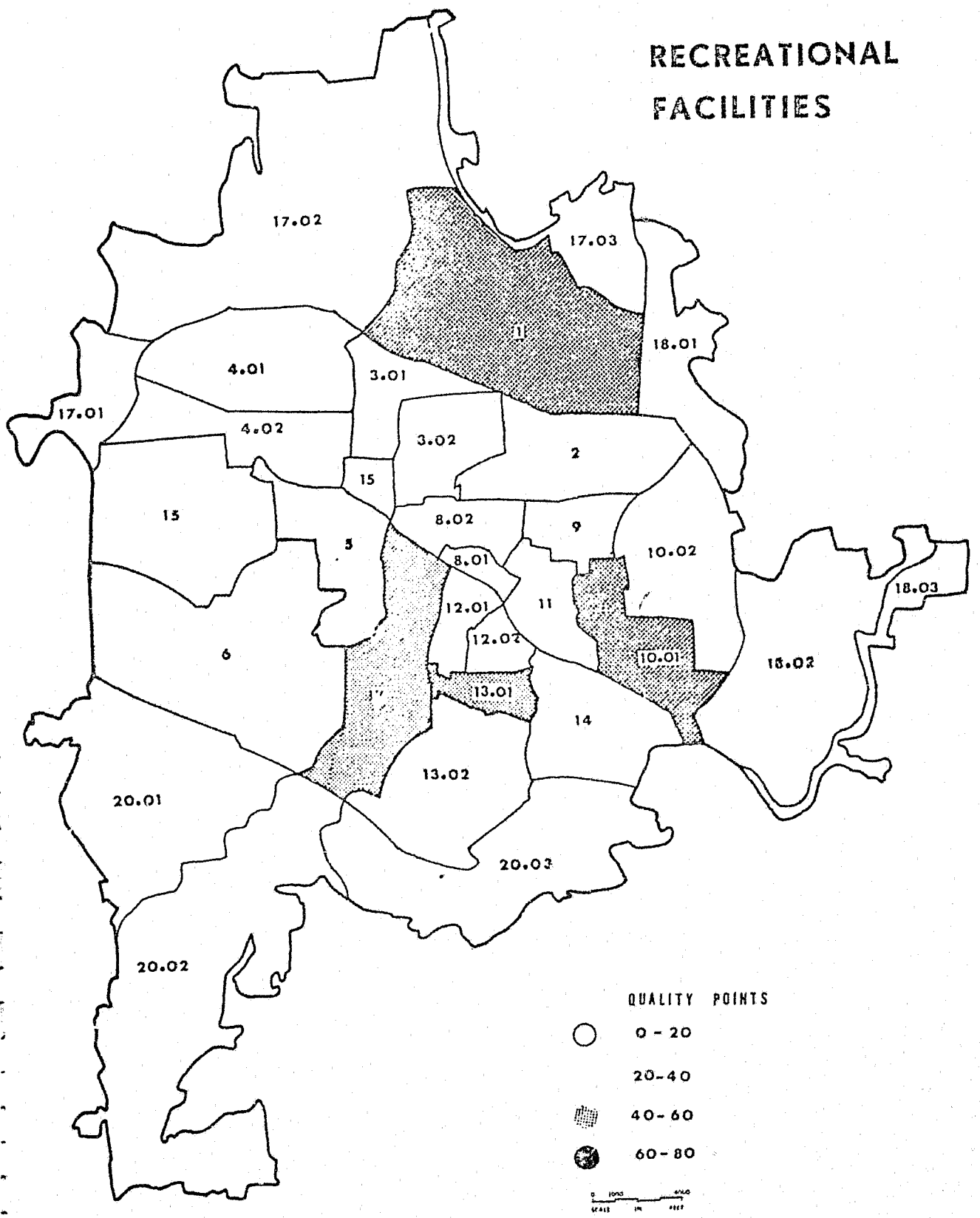

CITY OF DURHAM
17.02
17.03
1
18.01
4.01
3.01
17.01
4.02
3.02
2
15
15
8.02
9
5
8.01
10.02
18.03
12.01
11
6
7
12.02
10.01
18.02
13.01
14
20.01
13.02
20.03
20.02
N
PERCENT HOUSEHOLDS NOT IN SAME DWELLING AS OF JANUARY 1,1965
0 - 25%
25 - 50%
50 - 75%
75 - 100%

Figure 5


RECREATIONAL FACILITIES
17.02
17.03
1
18.01
4.01
3.01
17.01
4.02
3.02
2
15
15
8.02
9
5
10.02
8.01
18.03
12.01
11
12.02
10.01
6
18.02
13.01
14
13.02
20.01
20.03
20.02
QUALITY POINTS
0 - 20
20-40
40-60
60-80

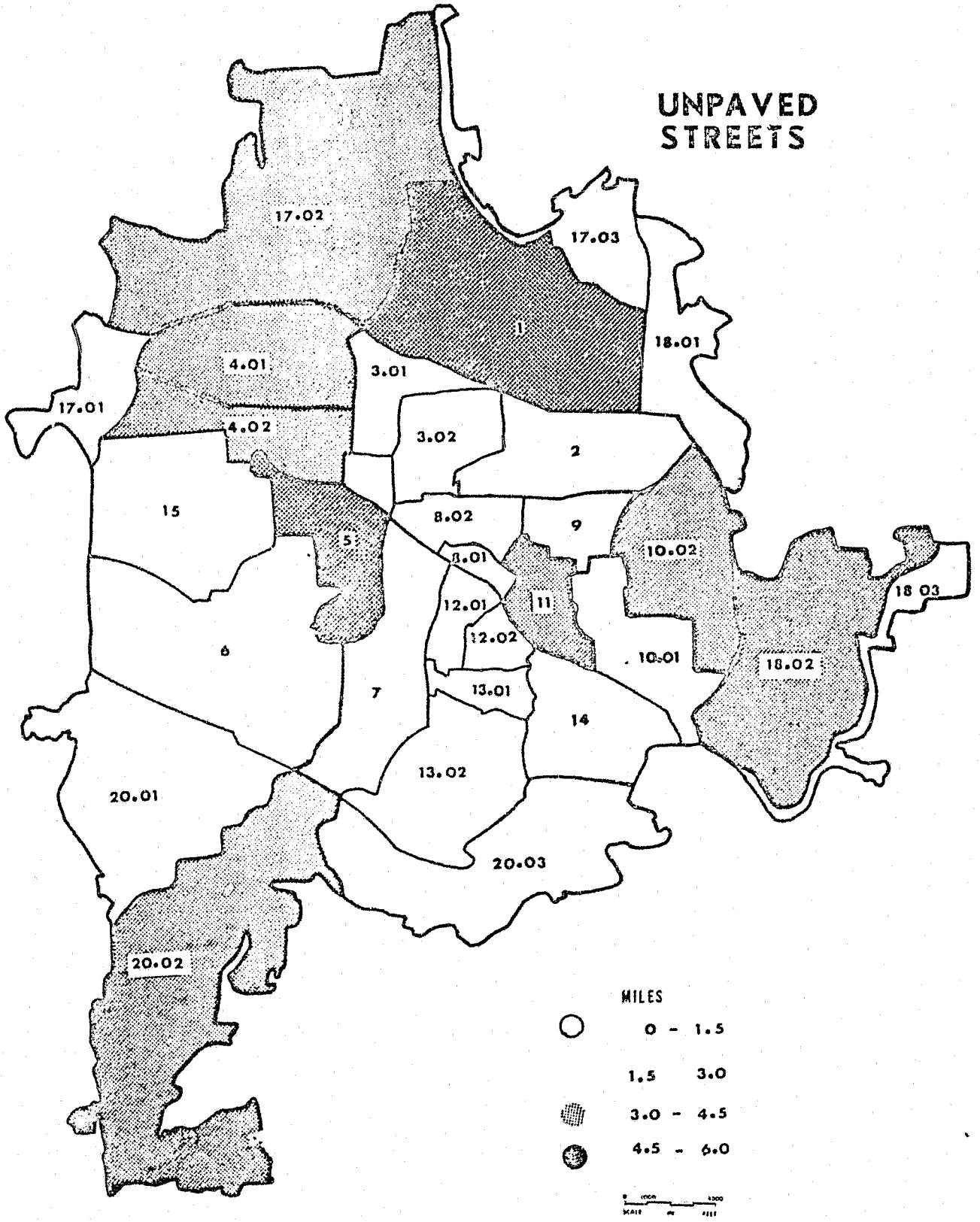

UNPAVED
STREETS
17.02
17.03
1
18.01
4.01
3.01
17.01
4.02
3.02
2
15
8.02
9
5
8.01
10.02
18.03
12.01
11
12.02
10.01
18.02
6
7
13.01
14
13.02
20.01
20.03
20.02
MILES
0 - 1.5
1.5 3.0
3.0 - 4.5
4.5 - 6.0

Figure 10

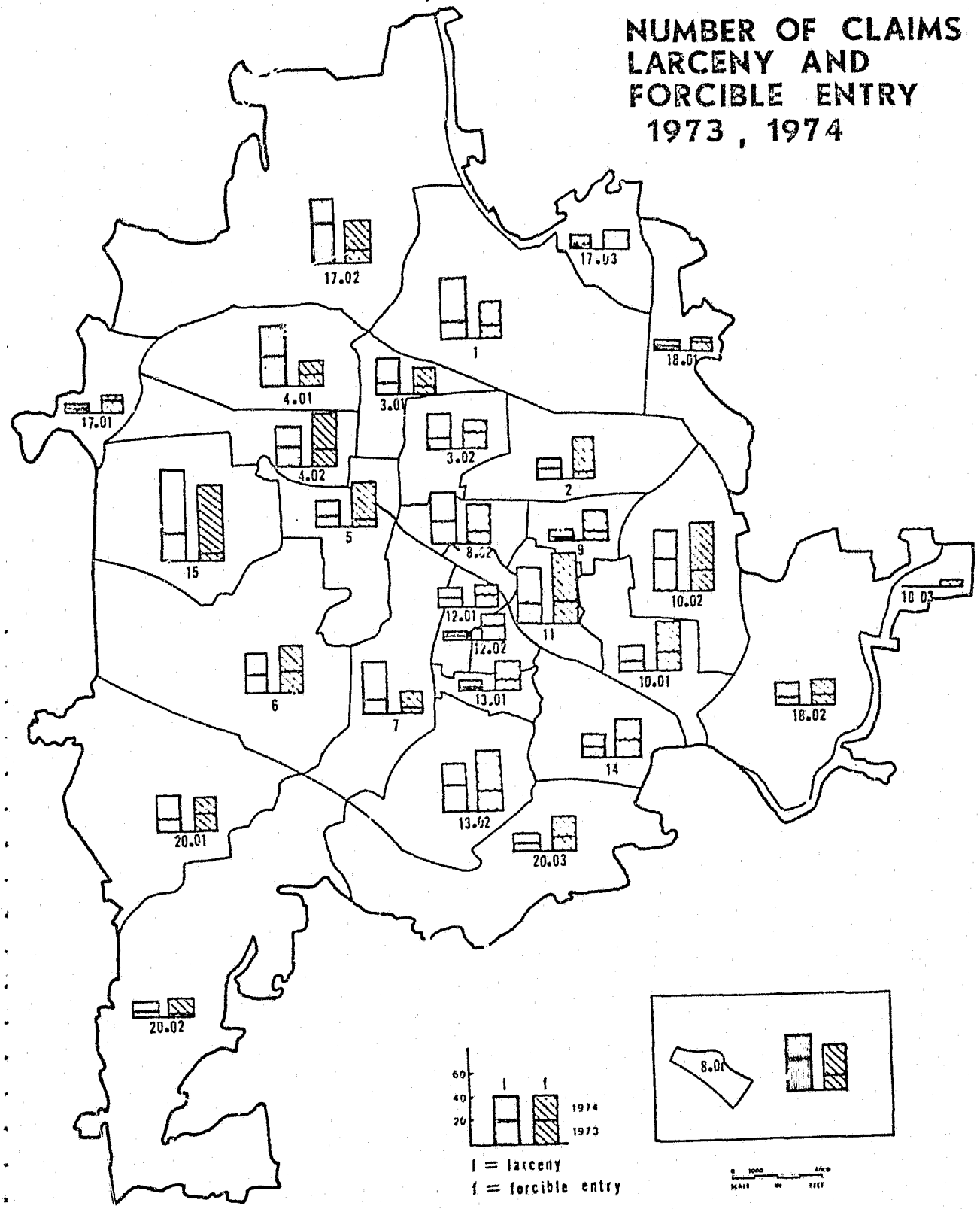

NUMBER OF CLAIMS
LARCENY AND
FORCIBLE ENTRY
1973 , 1974
17.02
17.03
1
18.01
4.01
3.01
17.01
3.02
4.02
2
5
15
8.02
9
10.02
18.03
12.01
12.02
11
10.01
6
13.01
7
18.02
14
13.02
20.01
20.03
20.02
8.01
60
40
20
1974
1973
l = larceny
f = forcible entry

Table 5

SUMMARY OF STEPWISE MULTIPLE REGRESSION ANALYSIS OF SELECTED SOCIO-ECONOMIC VARIABLES WITH NUMBER OF ARRESTS FOR LARCENY 73-74

STEP NUMBER	VARIABLE ENTERED	MULTIPLE R	R^2	SIMPLE R	DEGREES OF FREEDOM	t
1	Population Density per Acre	.47	.22	.47	1,27	2.77*
2	Recreational Facilities Index	.56	.32	.39	2,36	2.39*
3	Population Density per room(% units with 1.01 or more persons)	.60	.36	.39	3,25	2.39*
4	Residential Attrition	.66	.44	.14	4,24	0.742
5	Median Family Income	.67	.45	(-.29)	5,23	-1.59
6	Percent Black	.68	.46	.39	6,22	2.39*
7	Education (% over 25 yrs. of age who did not finish High School)	.70	.49	.33	7,21	1.79
8	Percent Sub-Standard Housing (units)	.70	.49	.27	8,20	1.46
9	Miles of Unpaved Streets (Accessibility Index)	.70	.50	.07	9,19	0.39

*Significant at . 05 level.

Table 6

SUMMARY OF STEPWISE MULTIPLE REGRESSION ANALYSIS OF SELECTED SOCIO-ECONOMIC VARIABLES WITH NUMBER OF ARRESTS FOR FORCIBLE ENTRY 73-74

STEP NUMBER	VARIABLE ENTERED	MULTIPLE R	R^2	SIMPLE R	DEGRESS OF FREEDOM	t
1	Miles of Unpaved Streets (Accessibility Index)	.42	.17	.42	1,27	2.37*
2	Median Family Income	.60	.36	(-.31)	2,26	-1.69
3	Population Density per Acre	.65	.42	.35	3,25	1.91
4	Residential Attrition	.68	.46	.20	4,24	1.09
5	Education (% over 25 yrs. of age who did not finish High School)	.68	.47	.39	5,23	2.39*
6	Percent Sub-Standard Housing (units)	.70	.49	.20	6,22	1.05
7	Recreational Facilities	.70	.49	.25	7,21	1.32
8	Population Density per Room (% units with 1.01 or more persons)	.70	.49	.25	8,20	1.32
9	Percent Black	.71	.50	.11	9,19	0.58

*Significant at .05 Level.

Table 7

SUMMARY OF STEPWISE REGRESSION ANALYSIS OF SELECTED SOCIO-ECONOMIC VARIABLES WITH NUMBER OF ARRESTS FOR LARCENY AND FORCIBLE ENTRY, 1973-74

STEP NUMBER	VARIABLE ENTERED	MULTIPLE R	R^2	SIMPLE R	DEGREES OF FREEDOM	t
1	Population Density per Acre	.42	.17	.42	1,27	2.37*
2	Miles of Unpaved Streets (Accessibility Index)	.59	.35	.35	2,26	1.94
3	Median Family Income	.64	.41	(-.33)	3,25	-1.79
4	Residential Attrition	.67	.45	.20	4,24	1.05
5	Recreational Facilities Index	.68	.47	.32	5,23	1.76
6	Education (% over 25 yrs. of age who did not finish High School)	.70	.49	.41	6,22	2.34*
7	Percent Sub-Standard Housing (units)	.71	.51	.24	7,21	1.28
8	Percent Black	.72	.52	.21	8,20	1.09
9	Population Density per Room (% units with 1.01 or more persons)	.72	.52	.31	9,19	1.69

*Significant at .05 level.

Table 8

STEPWISE MULTIPLE REGRESSION OF CLAIMS FOR LARCENY 1973-74

STEP NUMBER	VARIABLE	MULTIPLE R	R^2	SIMPLE R	DEGREES OF FREEDOM	
1	Percent Sub-Standard Housing (units)	.44	.20	-.44	1,27	-2.55*
2	Median Family Income	.53	.28	-.02	2,26	- .10
3	Percent Black	.61	.37	-.43	3,25	-2.48*
4	Population Density per Acre	.62	.39	-.16	4,24	- .85
5	Residential Attrition	.64	.41	.28	5,23	1.51
6	Miles of Unpaved Streets (Accessibility Index)	.64	.42	.15	6,22	.83
7	Education (% over 25 yrs. of age who did not finish High School)	.65	.42	-.22	7,21	-1.15
8	Recreational Facilities Index	.65	.42	.07	8,20	.39
9	Population density per room (% units. with 1.01 or more persons)	.65	.42	-.38	9,19	-2.10*

*Significant at .05 level.

Table 9

STEPWISE MULTIPLE REGRESSION OF CLAIMS FOR FORCIBLE ENTRY 73-74

STEP NUMBER	VARIABLE	MULTIPLE R^2	R	SIMPLE R	DEGREES OF FREEDOM	t
1	Residential Attrition	.44	.19	.44	1,27	2.55*
2	Miles of Unpaved Streets (Accessibility Index)	.53	.28	.21	2,26	1.09
3	Median Family Income	.61	.37	-.33	3,25	-1.79
4	Percent Sub-Standard Housing (units)	.67	.45	-.18	4,24	- .95
5	Population Density per Acre	.71	.51	.21	5,23	1.09
6	Education	.74	.55	.12	6,22	.63
7	Recreational Facilities	.75	.56	.09	7,21	.47
8	Population Density per room (% units with 1.01 or more persons)	.75	.57	-.02	8,20	-..10
9	Percent Black	.76	.58	-.07	9,19	-.39

*Significant at .05 level.

Table 10

STEPWISE MULTIPLE REGRESSION OF CLAIMS FOR LARCENY AND FORCIBLE ENTRY FOR 1973-74

STEP NUMBER	VARIABLE	MULTIPLE R	R^2	SIMPLE R	DEGREES OF FREEDOM	t
1	Residential Attrition	.39	.15	.39	1,27	2,39*
2	Percent Sub-Standard Housing (units)	.48	.23	- .36	2,26	-1.99
3	Education (% over 25 yrs. old who did not finish High School)	.62	.39	-.07	3,25	- .39
4	Population Density per Acre	.66	.43	.002	4,24	.01
5	Population Density per room (% units with 1.01 or more persons)	.68	.47	-.24	5,23	-1.28
6	Recreational Facilities Index	.69	.47	.07	6,22	.39
7	Miles of Unpaved Streets (Accessi-	.70	.48	.20	7,21	1.05
8	Median Family Income	.71	.50	-.18	8,20	- .95
9	Percent Black	.71	.50	-.30	9,19	-1.62

*Significant at .05 level.

BIBLIOGRAPHY

1. Boggs, Sarah L., "Urban Crime & Treatment," American Sociological Review, 30 (1965), 899-908.

2. Capone, Donald L. & Nichols, Woodrow W., Jr., "Urban Structure & Criminal Mobility" Presented at the American Society of Criminalogy Annual Meeting in Toronto, Canada, October 30, 1975.

3. Clawson, M., "Open (uncovered) Space as an Urban Resource" in Perloff, History (ed.), The Quality of the Urban Environment (Resources for Future, Inc., 1969), pp.139-175.

4. Clinard, Marshal B., and Quinney, Richard, Editors, Criminal Behavior Systems, Holt, Rinehart and Winston, Inc., New York, 1967.

5. Cressey, Donald R., Ward, David A., Editors, Delinquency, Crime, and Social Process, Harper and Row, New Yor, 1969.

6. Dudycha, George et. at., Psychology for Law Enforcement Officers, Charles C. Thomas, Springfield, Illinois, 1955

7. Fraenkel, Jack R., Crime and Criminals, Prentice-Hall, Inc. Englewood Cliffs, New Jersey. 1970

8. Friendly, Alfred and Goldfard, Ronald L., Crime and Publicity, Vintage Books, New York, 1968.

9. Harvey, D., "Social Processes and Spatial Form: An Analysis of the Conceptual Problems of Urban Planning," Papers of the Regional Science Association, 25 (1970), pp. 47-69.

10. Herbert, David, Urban Geography: A Social Perspective, Praeger Publishers: New York, 1972

11. Hirschi, Travis, Causes of Delinquency, University of California Press, Berkeley, California, 1969.

12. Hirschi, Travis and Selvin Hanan C., Principles of Survey Analysis, The Free Press, New York, 1973.

13. Hooton, Earnest A., Crime and the Man, Greenwood Press, New York, 1968.

14. Knudten, R. D., Editor, Crime, Criminology, and Contemporary Society, The Dorsey Press, Homewood, Illinois, 1970

15. Lander, B., Towards an Understanding of Juvenile Delinquency, Columbia University Press, 1944.

16. Lewis, Oscar, "The Culture of Poverty," Scientific American, 215 (1966) pp. 19-25.

17. Mays, J. B., "Crime and the Urban Pattern" Sociological Review, 16 (1968), pp. 241-55.

18. National Advisory Commission Criminal Justice Standards and Goals, Community Crime Prevention, 1973

19. Palmer, Stuart, The Prevention of Crime, Behavioral Publication, New York, 1973.

20. Pyle, Gerald F. "A Spatial & Temporal Comparison of Crimes Reported for Major Public Housing Estates Within Cleveland, Ohio," Presented at the American Society of Criminology Annual Meeting In Toronto, Canada, Oct. 31, 1975

21. Quinney, R., "Crime, Delinquency and Social Areas," Journal of Research in Crime Delinquency, 1(1964), 149-54.

22. Reckless, Walter C., The Crime Problem, Appleton-Century-Crofts, Inc., New York, 1961.

23. Rosser, C., "Housing for the Lowest Income Group: The Calcutta Experience," Ekistics, 183(1971), 126-31

24. Schmid, C. F., "Urban Crime Areas," American Sociological Review, 25(1960) pp. 527-42 and 655-78.

25. Shaw, C. R. and McKay, H. D., Juvenile Delinquency & Urban Areas, (University of Chicago Press, 1964), pp. 609.

26. Sykes, Gresham M., and Drabek, Thomas E., Editors, Law and the Lawless, Random House, New York, 1969.

27, The Annals of the American Academy of Political & Social Science, Vol. 423, Crime and Justice in America: 1776-1976, Jan., 1976.

28. Willie, C. V., "Relative Contributions of Family Status and Economic Status in Juvenile Delinquency," Social Problems, 4(1967), pp. 740-4

29. Wilkins, L. T., "Crime Cause & Treatment: Recent Research & Theory," Education Research, 4(1961-62), pp. 18.

END