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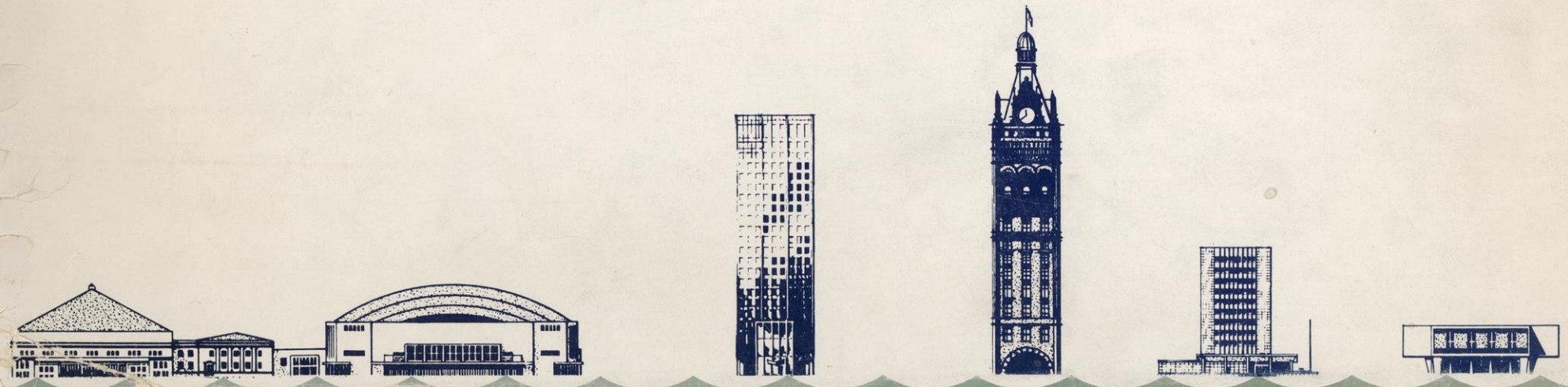
DEPARTMENT OF CITY DEVELOPMENT



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RESIDENTIAL BLIGHT AND TRENDS

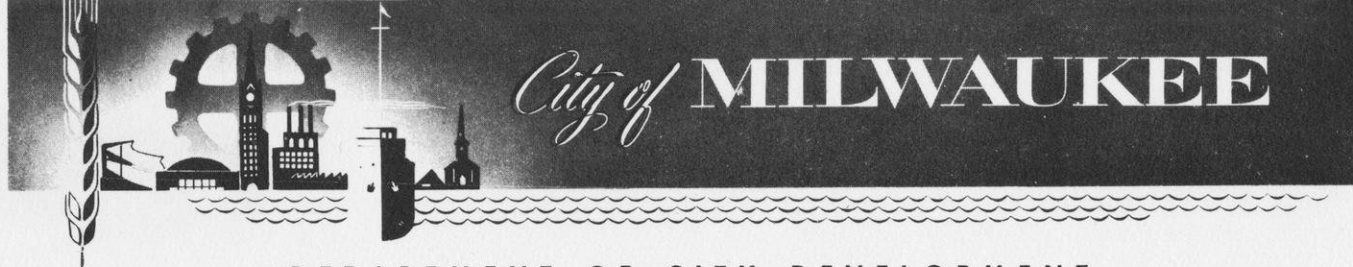
Appendix - Methods and Tables



M I L W A U K E E ' S
C O M M U N I T Y R E N E W A L P R O G R A M

RESIDENTIAL BLIGHT ANALYSIS
APPENDIX ON METHODS AND FINDINGS

DEPARTMENT OF CITY DEVELOPMENT
MAY, 1964



DEPARTMENT OF CITY DEVELOPMENT

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May 22, 1964

The Honorable Henry W. Maier
Mayor, City of Milwaukee

The Honorable Common Council
City of Milwaukee

As part of the preparation of a Community Renewal Program for the City of Milwaukee, the Department of City Development takes pleasure in submitting this report entitled Residential Blight Analysis.

An understanding of the trends and present condition of housing and of the interrelationships among housing characteristics is basic to a successful program for the improvement of the quality of housing and residential neighborhoods. This report makes available in charts, tables, and maps summary information about Milwaukee's housing. It also describes the methods used in determining the relative degree of residential blight in the 6,300 blocks of the city, and it reports some of the relationships documented in the course of extensive electronic computer analysis of data for each block of the city.

A technical appendix, published separately, contains further explanation of the procedures followed in the study as well as the detailed findings. Much additional information, too extensive for publication, is available for review in maps and tabulations on file in the library of the Department of City Development.

While this report presents summary information and the methods of analysis which provided the initial evaluation of need for renewal, the actual areas recommended for renewal action during the first six-year program are shown in the report Milwaukee's Community Renewal Program: Projects and Objectives.

Respectfully submitted,

RICHARD W. E. PERRIN, Director
Department of City Development

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SUMMARY

Two basic resources were utilized in the delineation of blighted areas in Milwaukee: block statistics of the U. S. Census of Housing for 1960, and exterior inspection and evaluation of all structures in the city, both residential and non-residential, by the Department of City Development.

The two evaluations were similar in their overall classification of units. The census classified 87.7 per cent of housing units as "sound". The DCD classified 85.8 per cent of housing units as "good". According to the census, more than 29,000 units were in "deteriorating" or "dilapidated" structures. The local survey identified 33,000 units in "fair" or "poor" structures.

The methods described in this report are designed to be useful for an accurate first screening of problem blocks. In addition, they serve adequately for the detailed analysis which accompanies Community Renewal Program definition and the selection of suggested treatment areas. Since the CRP covers a period of several years in its most immediate aspects, and many years in its general effect, these methods are not designed to take the place of the necessary interior inspection and evaluation of each structure which takes place during the survey-and-planning phase of project planning.

As a city-wide program, this initial evaluation did not concentrate upon the supposed poorest areas of the city. Instead, it included all the blocks of the city with no predetermination of problem areas. Each block was evaluated individually rather than as part of a larger aggregate such as census tract or quarter-section in order to arrive at preliminary delineations which would be as realistic as possible.

Although this particular report limits itself to a discussion of the evaluation of "need", or relative housing quality, many other considerations in addition to the basic element of "need" necessarily enter into the definition of projects and their scheduling as part of a comprehensive program of renewal. These considerations include planning goals for the community, market factors, the effect of expressway scheduling and other capital improvements, the strategic effect of a given project in encouraging private renewal, and others.

This appendix outlines briefly the various analytic methods which were part of the overall examination of housing quality in Milwaukee. Also included are summary tables, the complete tables of correlation coefficients, the regression equations which were developed in seeking methods for estimating housing quality and exploring the relationships among housing characteristics, and sample pages of the reports which pertain to individual blocks, the total of which would be too bulky to publish.

The various mathematical approaches utilized in the several steps of the analysis can be briefly explained as to purpose and usefulness:

Index I - The "best measure" of housing quality. A concise overall expression of the quality of housing in each city block, combining several pertinent items from the 1960 census in a suitable relative form.

Indices A, B, C, II, III - Alternate methods of expressing housing quality in summary form.

"T"-Score - A device for expressing a fact about any given block in terms which offer direct comparison to other facts about the same block or to the facts about any or all of the rest of the blocks of the city -- a common scale.

Correlation Coefficients - simple linear - Values which range between zero and one to express relationships which vary from chance to complete dependability between two different situations, e.g., between "high percentage of dilapidation" and "low rent".

Correlation Coefficients - simple rank order - Similar to the above but based upon two sets of ranks rather than upon sets of measurements.

Correlation Coefficients - multiple linear - Similar to the above but usually approaching closer to 1.00 (and further from .00) and, therefore, expressing a greater degree of association and more dependability since combinations of more than one kind of information can be used to estimate or predict the unknown item.

Regression equation - A formula for combining kinds of information which have been shown by their correlation coefficients to be efficient aids in estimating some unknown items, e.g., "housing quality". The regression equation tells how to estimate; the correlation coefficient tells the percentage of "success" to expect in the resulting estimates.

The goals of the blight analysis in residential areas included the following:

1. A block-by-block evaluation of housing quality.
2. A block-by-block description of housing characteristics.
3. Block profiles relating to housing characteristics.
4. A single-term index of blight.
5. A ranking of all blocks in terms of this index.
6. Alternate indices.
7. Totals of blocks, population, housing units at each quality or "blight" level.
8. Totals of owner-occupied and renter-occupied units at each level.
9. Totals of rented units in low-rent categories at each level.
10. Totals of dilapidated, deteriorating and deficient units at each level.
11. Study of the association of housing characteristics as expressed by simple and multiple correlation coefficients.
12. Estimating equations for measurement of blight with and without current census data.

DATA NEEDS AND RESOURCES

Data Needs

The data requirements of the CRP differ markedly from the data requirements of a redevelopment project or a conservation project, even though these may be the most typical form of activity envisioned in the Program.

The CRP encompasses the whole gamut of corrective and protective measures which the city may take to defend and improve its livability. It is concerned with all levels of housing quality as well as with the good health of both residential and non-residential areas. For CRP planning, it is important to recognize potential assets as well as liabilities in residential, commercial and industrial areas.

The CRP is time-phased. Its proposals will be carried out over a period of several to many years. A precise measure of current eligibility for federal aid is, therefore, not the primary goal of its studies. It is equally important to develop data systems which can add to the technical and popular understanding of the dynamics of housing, which can reflect changing conditions, can explore relationships among housing characteristics, population characteristics, land use patterns and socio-economic trends in the community, and which may even permit the testing of alternative public policies designed to preserve and enhance the livability and vitality of the community.

The CRP data needs are similar to the overall data needs of city planning. They include access to a broad range of information, including housing, land use, population, construction, assessment and other data.

They also include flexible and effective methods of collecting, summarizing, analyzing and presenting this information. Data inputs to the CRP should be comprehensive, city-wide in coverage, including as wide a range of pertinent data as possible, updatable, flexible so that data can be considered in relation to the individual block or to a variety of larger areas of which the block may be a part. These needs imply that it is necessary to take full advantage of electronic data processing and of newly developing analytic tools such as computer graphics and operations research techniques.

Data Resources

The chief resources which were considered for use in initial CRP development included 1960 Census of Housing, Department of City Development survey, and data from other city departments on assessed valuation and building construction.

U. S. Census of Housing, 1960 Block Statistics. This data provided the most important information. A description of the method of analysis of block statistics data is contained in the next section.

U. S. Census of Population and Housing, 1960 Tract Statistics. This data was put on punched cards for use in describing the various renewal areas as they were defined. This data did not enter into the original delineation of areas on the basis of housing condition, however. Tract data was not utilized to define problem areas, but rather to describe them and to analyze and evaluate their needs after these areas had been defined on the basis of the block statistics data, together with DCD field studies of structural condition, land use and master plan consideration.

DCD Field Survey of Structural Condition. An exterior inspection of each structure in the city was made by the DCD. Both residential and non-residential structures were graded on a four-point scale from good to poor. This survey yielded the following information:

1. Number and proportion of structures in each block, tract, and quarter-section, and for the city as a whole, by condition. (Census data is in terms of dwelling units, not structures.)
2. Amount and proportion of land area in each block, tract, etc., which is occupied by structures of each condition.
3. Direct comparison between census and DCD estimates of the condition of dwelling units - for testing correctness of each.
4. Evaluation of the non-residential structures of the city.
5. Relation between structural condition and land use, zoning and location.

DCD Field Survey of Land Uses. Detailed punched card records of land use and zoning have also been prepared, summarized and analyzed. They will be discussed in detail in a separate report.

Assessed Valuation Data. Assessment data provided by the Office of the Tax Commissioner was used to estimate acquisition costs in proposed redevelopment areas. Study of the possibilities of also using assessment data as a means of estimating the current condition of areas of the city and up-dating the CRP suggests that a primary problem in incorporating such data may be the establishment of common codes for blocks in order to link valuation data with census and land use information. In addition, it will be necessary to examine on a sample basis the correlation of valuation and index 1 to confirm this data's apparent usefulness.

Housing Division Inspection Records. Housing inspection records maintained by the Health Department constitute an important resource in the analysis of the selected areas where these inspections have been carried out. They were not used in the present study of comparative housing quality, however, because they do not provide comprehensive coverage of the entire city.

Construction Records. The Building Inspector maintains a record, in punch card form, of new construction, conversions, remodelings, and demolitions authorized by building permits. When it becomes possible to include a census tract as an area identification code, this data will add significantly to the city's ability to keep the CRP up-to-date.

ANALYSIS OF THE 1960 BLOCK STATISTICS

Goals for Analysis

The DCD's analysis of block statistics and related data was designed to achieve the following goals:

1. Information for each block in the city on the percentage of housing units affected by each reported characteristic - dilapidation, overcrowding, owner-occupancy, etc.
2. A method of describing the relative strong points and deficiencies of each block. An at-a-glance profile for each block showing how it compared with all of the other blocks of the city with respect to each reported characteristic.
3. One single measure, if possible, that would tell enough about the quality of housing in each block to permit a ranking on the basis of need for renewal action.
4. A ranking of all the blocks in the city from the worst to best housing condition. A report grouping the blocks of the city according to this ranking.
5. A series of alternative indices of housing quality to provide a comparison to the one index initially judged most dependable in advance of a test of this judgment.
6. Summary tables showing the number of blocks in each housing condition class. (City-wide summaries of housing units by condition are available in the census, but no such summary of blocks by level of need for renewal existed.)
7. A summary of the number of housing units in low-rated blocks, and in each quality level.
8. A summary, at each quality level, of the number of owner-occupied and renter-occupied units, and also (on the basis of present rents) an estimate of the number of households which might be eligible for public housing.

9. A summary of the number of dilapidated, deteriorating and deficient housing units included at each quality level.
10. Increased information on the way in which various housing characteristics are associated with one another.
11. Investigation, through the calculation of regression equations and multiple correlations, of the possibility of developing predictive formulae sufficiently valid and reliable to screen areas for eligibility for various types of renewal action. Such formulae should offer significant improvements over the preliminary indices devised at the outset of the study.
12. A series of maps depicting the geographic distribution of housing characteristics and quality levels detailed to show individual blocks.
13. A second series of maps depicting the geographic distribution of housing characteristics and quality levels summarized to approximately 400 quarter-section areas for simplified display and analysis.
14. Flexible records to facilitate recombining of block data into specifically delineated renewal areas, or into alternative special-purpose planning areas for summary and analysis.
15. Supporting data from the census tract statistics in suitable form for mapping or tabular summarization in relation to delineated renewal areas.
16. Comparison of census information and local agency data to provide a check on each source, a test of the DCD windshield survey, and improved estimates of quality based on the combined sources.

The achievement of the foregoing goals rested largely upon extensive use of electronic data processing.

The 1960 Census of Housing Block Statistics - Description

Several major improvements made the 1960 census of housing a much more useful tool for renewal studies than the 1950 census.

(1) An intermediate category, "deteriorating" units, was identified where formerly only dilapidated units and standard units were. As a result, the classification of blocks according to the condition of housing became much more discriminating. (2) Dilapidated units were separated from units which lacked plumbing facilities, thus permitting these two conditions to be distinguished from one another, something which was not possible in 1950. (3) A more complete reporting of living units, especially in close-in areas, was achieved by the inclusion of many single-room living quarters not considered dwelling units in 1950, with a consequent truer appraisal of some poor living conditions formerly undetected. (4) Population in housing units and population not in housing units were reported for each block.

Table 1 indicates the data which was available for each block from the "Block Statistics Edited Output Record" (a magnetic tape record). This tape record was purchased by the City of Milwaukee from the Bureau of the Census and used as the source for analyses of housing conditions.

In place of the very useful added data on structure and environment that the American Public Health Association or similar survey techniques would provide, considerable use was made of contract rent and the average value of owner-occupied single-family homes. Rent and value were assumed to represent the intangible "package" of characteristics associated with the dwelling unit, such significant, but unreported, items as the esthetic values of the structure and environment, lot width, room size, light and air, location with respect to schools, churches, transportation, shopping, utilities, employment, nuisances and hazards, etc.

The task of surveying for these and other important factors of housing quality and then of weighing them properly in an overall evaluation was judged too costly, time consuming, and difficult. Any analysis of such items would therefore be restricted to areas already selected, on the basis of census and other criteria, as treatment areas. Therefore, to compensate for the limited range of variables available in the census block statistics

that would have to represent the whole of the concept "quality of housing", it was believed that rent and value as "dollar symbols" would be useful in distinguishing levels of housing satisfaction.

These "dollar symbols" would, of course, be limited in their ability to represent housing satisfaction if the purchaser did not have an opportunity to exercise choice among competing housing accommodations.

The fact that the housing supply in Milwaukee was relatively adequate by 1960, as indicated by vacancy rates which rose from less than one per cent in 1950 to 3.3 per cent in 1960 (1.1 per cent in vacancy rate in sales housing and 5.6 per cent vacancy rate in rental housing), and also by a drop in the percentage of married couples without their own household (from 7.7 per cent in 1950 to 1.7 per cent in 1960), made it reasonable to assume a fair amount of choice of housing accommodations for most families. This competitive situation was expected to assure reasonable correspondence between levels of rent or value and the quality of the housing associated with them.

TABLE I

BLOCK STATISTICS EDITED OUTPUT RECORD (20 WORD)

Attachment
 DCD Technical Memorandum No. 34
 (Supplement No. 1)
 October 20, 1961

	<u>Word</u>	<u>Bit</u>	<u>Language</u>	<u>Item</u>
A	0	35-0	XS3	ED No.
B	1	35-18	XS3	Prefix area
C		17-0	XS3	City block no.
D	2	35-0	XS3	Serial No.
E	3	35-18	Binary	Household population
F		17-0	"	Group quarters population
G	4	35-0	"	Sound units with all facilities
H	5	35-0	"	Sound units lacking facilities
I	6	35-0	"	Deteriorating units with all facilities
J	7	35-0	"	Deteriorating units lacking facilities, with flush toilet
K	8	35-0	"	Deteriorating units lacking facilities, with no flush toilet
L	9	35-0	"	Total dilapidated units
M	10	35-0	"	Total owner occupied units
N	11	35-0	"	Total owner occupied reporting value
O	12	35-0	"	Total value reported (dollars - $\frac{1}{250}$ of actual value)
P	13	35-0	"	Owner occupied total rooms
Q	14	35-0	"	Total renter occupied units
R	15	35-0	"	Renter occupied total rooms
S	16	35-0	"	Total rent reported (dollars)
T	17	35-24	"	Renter occupied units reporting rent
U		23-12	"	Total nonwhite units
V		11-0	"	Units with 1.01 or more persons per room

METHOD OF ANALYSIS OF CENSUS BLOCK STATISTICS

Summary

The following list describes very briefly the various elements of the analysis of the block statistics which were devised to accomplish the goals for analysis listed on pages 7 and 8. The numbers following each item indicate the goals for which that particular item is pertinent.

1. A 5,500 line report (one line for each block with five or more housing units) converting the housing data for each city block into a series of derived percentages, averages, indices, etc., for easier interpretation. Report One is in order by tract and block. (1) (5) (See Table 14)

2. A 5,500 line report converting the computed percentages, averages and indices to standard scores having a mean of 50 and a standard deviation of 10, and also presenting additional indices. Report Two is in order by housing quality from poorest in city to best as judged by Index 1.(2) (3) (4) (5) (See Table 15)

3. Report Three contains the same information as Report Two but it is in order by tract and block. (2) (5)

4. A 5,500 card deck of IBM 80-column punch cards carrying the original data from the magnetic tape - essentially the data contained in the published block statistics but with some additions including mapping coordinates. (12) (13) (14) (See Table 12)

5. A 5,500 card deck of IBM 80-column punch cards carrying the standard scores and indices, including mapping coordinates. (12) (14) (See Table 13)

6. Ten reports summarizing city-wide totals for the blocks in each of about 50 quality levels as measured by the six indices of housing quality and four additional significant variables - vacancy, overcrowding, percentage of units which are sound with all facilities, and average value of single-family, owner-occupied units. These reports

present the totals for dwelling units, population, number of rented units, low-rent units, dilapidated units, deteriorating units and units lacking facilities. (6) (7) (8) (9)
(See Table 17)

7. A report on the correlation coefficients observed between 100 pairs of variables including original census characteristics and the composite indices. (10) (11) (See Table 18)

8. Computer-printed maps of the city at 2640' scale (one-half mile to the inch) identifying the poorest ranking blocks of the city. (12)

9. Computer-printed maps of the city at 2640' scale summarizing various housing characteristics in each of approximately 400 quarter-sections of the city. (13) (See Maps Section for drafted versions of some of these.)

10. Correlation coefficients between the DCD structural condition rating and the census information. (16) (See Table 19)

11. Maps comparing housing unit counts by block based on DCD and census enumerations. (16)

Items 1 and 2, and 4 through 7 were completed by Remington-Rand Corporation to the specifications outlined by the planning staff. Item 8 utilized the computer graphic techniques developed at the University of Washington and published by the H.M.F.A. as CRP Guide 1: Using Computer Graphics In Community Renewal. Approximately 50 maps were prepared which provided part of the determination of renewal treatment areas. Item 9 utilized a different mapping program developed by the City of Milwaukee before the University of Washington techniques became known.

Multiple regression analysis of the punch card records named in item 5, to which information gained from the DCD field surveys had been added, yielded additional correlation matrices and some potentially useful regression equations. (See Table 21)

Development of Indices of Housing Quality

Because each of the individual census variables is subject to limitations as well as inaccuracies if used alone as a measure of blight, attempts were made to construct indices from the census data that would reflect the pertinent available variables in one concise rating. A primary difficulty in developing a good measure of blight is that there is no independent criteria against which these experimental measures can be readily validated. Even the most authoritative and detailed of available measures, such as the American Public Housing Association scale, are favorite targets for critical articles pointing out their inability to measure what they set out to measure.* In spite of the difficulties, however, it is necessary to make an attempt at as good an index as possible in order to identify the degree of need for renewal action in each block. (It is no real help to suggest that no composite index be devised at all and that the separate census items be used. At some point, whether it is done consciously or unconsciously, the separate items are brought together with some system of weighting, usually not defined, and specific combinations of factors are relied upon even though they may never be specified.)

Since detailed, in-the-building surveys will be required in the process of carrying out any given project, and since not all projects could be accomplished within even a period of several to many years, it was not believed appropriate or necessary that the CRP itself should attempt any detailed interior surveys. However, the CRP would require better indices than the simple count of dilapidated or deficient housing units.

Several indices were suggested, of varying difficulty to compute and of initially unknown efficacy. One of the purposes of the study would be to test these measures so that they could be interpreted with greater confidence, and these or better indices refined for further use. An additional purpose, after defining a "best measure" from the census data, would be to identify types of information which would either be continuously available locally, such as assessed valuation, housing inspection and construction and remodeling data, or could be obtained with reasonable effort, such as DCD surveys of

*A. I. P. Journal, May, 1963, "Use and Mis-Use of Measurement Scales in City Planning",
Gerald Hodge

the condition of structures as judged by exterior inspection, which would correlate well enough with this "best measure" to provide continuing dependable information between the decennial censuses.

Accordingly, several logical-seeming indices were suggested which combined and weighted the available factors from the census. These are described in turn.

Index A. Index A is a weighted sum of the percentages of housing units in each block which are dilapidated, deteriorating or deficient in facilities, modified by the average rent per room as indicated in the following formula:

$$A = \frac{10 (20 + 3 (\% \text{ dilapidated}) + \% \text{ deteriorating} + \% \text{ deficient})}{10 + \text{average rent per room}}$$

The weights which were assigned to each of the three condition items resulted in the following total contributions to Index A considering all of the blocks of the city:

Factor	Weight	Number of Units	Total Weight	Percent of Total Weight
Dilapidation	3	4,170	12,510	22%
Deterioration	1	25,354	25,354	43%
Deficiency in facilities	1	<u>20,493</u>	<u>20,493</u>	<u>35%</u>
Total		50,017	58,357	100%

The largest contribution to Index A is made by deteriorating units because of their large numbers. The next most significant effect is exerted by units deficient in facilities. Even though dilapidation was weighted three times more heavily than the others, it contributes only 22 per cent to the total score. The weights were assigned arbitrarily on the basis that the distinction between deteriorating and dilapidated housing units was not a sharp one, it being suspected that some units classed as dilapidated in 1950 were now classed as deteriorating. Nevertheless, it seemed important to weight dilapidation considerably heavier than any other item. Equal weights were assigned to deterioration and deficiency for the practical reason that it was difficult to make a judgment as to which condition should receive the heaviest penalty.

As a further means of distinguishing the relative quality of blocks, rent per room was introduced into the denominator of the term so that quality varies inversely with rent. A constant was introduced into the denominator in order that this effect not override the condition items, and a compensating constant was introduced into the numerator to create a whole-number index which would vary between 1 and 150. The combined effect of changes in rent and condition is shown for hypothetical blocks in Table A. (See Table 17-D)

Index B. Index B is the unweighted sum of the percentages of housing units which are overcrowded, lacking in exclusive use of plumbing facilities, or vacant.

This very simple Index attempts to consider only occupancy factors in order to contrast these to factors pertaining to the structures themselves. For this Index, lack of facilities is interpreted to mean over-use of facilities rather than the absolute lack of them. It is assumed that most structures which contain units that are classed as lacking facilities could serve a smaller number of households adequately, but have been subdivided to accommodate too many households. Simple reduction in the number of households occupying the structure might be sufficient to remove such deficiencies.

Since overcrowding and shared facilities are not mutually exclusive conditions, the total percentage of affected units might conceivably exceed 100 per cent. In order to conserve card capacity and because it was not believed necessary to distinguish scores so extreme, the maximum score recorded was 99.9 per cent. In spite of the shortcomings involved in combining the few available measures of over and under-occupancy, it was believed desirable to observe the behavior of an Index based solely on occupancy characteristics.

No use was made of data on non-white occupancy, nor on renter-occupancy since, even though associations among owner-occupancy, renter-occupancy, race, value and condition of housing might be observable, these items appear inappropriate at this stage as part of a definition of a housing problem. At another stage, as part of a predictive formula, this difficulty would largely disappear. (See Table 17-E)

Index C. Index C is a weighted sum of the percentages of housing units which are dilapidated, deteriorating or deficient in facilities, modified by the average value per room of single-family, owner-occupied housing units, as indicated in the following formula:

$$C = \frac{2000(20 + 3(\% \text{ dilapidated}) + \% \text{ deteriorating} + \% \text{ deficient})}{500 + \text{average value per room}}$$

Index C is in all respects identical with Index A except that value per room is used in the denominator instead of rent per room so that it is indicative of the quality of blocks with five or more owner-occupied units, whereas Index A covers blocks with five or more renter-occupied units, thereby giving coverage of a largely overlapping, but somewhat different group of blocks. Of Milwaukee blocks, 3,157 are rated by both Index A and Index C. An additional 1,393 blocks are rated by Index C only, there being too few rented units (under five) to evaluate in these blocks. Conversely, 826 blocks have only Index A computed. Tables 1 and 2 indicate that, because of the constants used, Index C is more responsive to variations in owner-value than is Index A to variations in rental value. Index C would have been made more directly comparable to Index A had a constant of 1000 been used in both numerator and denominator. (See Table 17-F)

Table 2

Sample Values of Index A

$$A = \frac{10(20 + 3(\% \text{ dilap.}) + \% \text{ deter.} + \% \text{ deflc.})}{10 + \text{rent per room}}$$

Per Cent of Units Which Are:			Rent Per Room				
Dilapidated	Deteriorating	Deficient	\$10	\$17	\$20	\$23	\$30
0	0	0	10	7	7	6	5
5	0	0	18	13	12	10	9
5	5	5	22	17	15	14	11
10	10	10	35	26	23	21	18
20	20	20	60	44	40	36	30
20	50	50	90	67	60	54	45
50	30	30	115	85	76	69	58

Index A

The value of Index A for the entire city is 16.

Table 3

Sample Values of Index C

$$C = \frac{2000(20 + 3(\% \text{ dilap.}) + \% \text{ deter.} + \% \text{ deflc.})}{500 + \text{value per room}}$$

Per Cent of Units Which Are:			Value Per Room						
Dilapidated	Deteriorating	Deficient	\$500	\$1000	\$1500	\$2000	\$2500	\$3000	\$3500
0	0	0	40	27	20	16	13	11	10
5	0	0	70	47	35	28	23	20	18
5	5	5	90	60	45	36	30	26	22
10	10	10	140	93	70	56	47	40	35
20	20	20	240	160	120	96	80	69	60
20	50	50	360	240	180	144	120	103	90
50	30	30	460	306	230	184	153	131	115

Index C

The value of Index C for the entire city is 27

Index I. Index I is a weighted average of the relative standings (T-scores) of each block as compared to the other blocks of the city according to the following formula:

$$I = \frac{3T_{dil} + 2T_{det} + 2T_{def} + T_o + T_r + T_v}{10}$$

where I = Index I
T_{dil} = dilapidation T-score
T_{det} = deterioration T-score
T_{def} = deficiency T-score
T_o = overcrowding T-score
T_r = rent per room T-score
T_v = value per room T-score

In those blocks for which rented units or owner-occupied units are missing the divisor becomes 9 rather than 10.

Index I, by combining different types of data in the form of standard scores, avoids the problem which occurs with the attempted combination of non-standardized data - the problem of unintentional misweighting. All attempts to combine different kinds of data into a single Index suffer from the major problem of non-comparability and the difficulty of equating different kinds of information. Just how should differences of \$5 in rent, \$1,000 in value, five per cent in overcrowding, one-half room in the average size of a housing unit, 10 per cent vacancy, and so forth, be related most meaningfully to each other? And do these absolute differences in rent, value, unit size, etc., have the same meaning at all levels of value or do they differ as they occur higher or lower on a scale?

The simplest method of removing this difficulty of combining different kinds of data is to standardize each scale so that all observations are in common terms. The computation of these standard scores is explained under "T-scores" on page 18. Once scores have been standardized they may be compared with one another, added, or otherwise manipulated with

confidence that differences mean approximately what they appear to mean. The problem of weighting is thereby simplified through the elimination of unrecognized sources of confusion and misweighting.

The true weighting problem, the decision as to the relative importance of variables, remains, of course, and this may be resolved only by expert judgment or, where possible, through regression analysis and the development of predictive equations.

In Index I, weights have been assigned so that 50 per cent of the final score is contributed by items formally accepted as defining substandardness (dilapidation and deficient facilities). An additional 20 per cent is contributed by another measure of poor condition (deterioration). The remaining 30 per cent is based upon rent, value of single-family homes, and overcrowding.

As indicated in Table 17-A, the five per cent of blocks which rank highest on Index I contain 60 per cent of the dilapidated units of the city, 29 per cent of the deteriorating units and 18 per cent of the deficient units. The 20 per cent of blocks which rank highest on Index I contain 90 per cent of the dilapidated units, 76 per cent of the deteriorating units and 68 per cent of the deficient units of the city.

Index II. Index II is an estimate of the relative value of housing in each block computed from the block's relative standing (T-score) with respect to rent per unit, weighted according to the percentage of units which are renter-occupied, plus its relative standing with respect to value per unit, weighted according to the percentage of units which are owner-occupied, according to the following formula:

$$II = T_r \times P_r + T_v \times P_v$$

where: II = Index II

T_r = rent per unit T-score for block

P_r = percentage of occupied units which are renter-occupied

T_v = value per unit T-score for block

P_v = percentage of occupied units which are owner-occupied

This index is concerned with predicting the quality of housing from value and rent alone. If these "dollar symbols" can be found to identify the same blocks as are identified by the condition variables and by eventual selection of problem areas, they suggest that such locally available measures as assessed valuation also could be used to predict the need for renewal. A logical error inherent in this index is the equating of rent and owner value on the assumption that blocks with the lowest rents are similar in quality to the blocks with the lowest owner values, and blocks with the highest rents are similar in quality to the blocks with the highest owner values. In general, of course, the housing which is renter-occupied is of somewhat lower quality than housing which is owner-occupied. It was not known, however, just how great this difference might be and whether it has a significant effect upon the usefulness of this index. (See Table 17-B)

As shown there, the highest ranking blocks, containing 7 per cent of the city's housing units, include 28 per cent of the dilapidated units, 19 per cent of the deteriorating units and 26 per cent of the deficient units.

Index III. Index III is an estimate of per capita housing expenditures within each block, computed by adding total estimated monthly contract rent paid in the block and one per cent of total estimated value of owned homes within the block and dividing the sum by the total population in housing units in that block according to the following formula:

$$III = \frac{R + \frac{V}{100}}{P}$$

where: III = Index III

R = total rent paid in block

V = total valuation of owner-occupied housing units in block

P = total population in households in block

R was estimated by multiplying the total rent reported by the ratio of total renter-occupied units to renter-occupied units reporting rent.

V was estimated by multiplying the total value reported by the ratio of total owner-occupied units to owner-occupied units reporting value.

Index III uses rent and owner value, but assumes a different relationship between them than does Index II. Whereas in Index II the two distributions, rented units and owner-occupied units, are assumed to cover the same range of quality so that equal T-scores or relative positions within the two distributions are assumed to be equal, no such assumption is used in Index III. Instead, it is assumed that there is a constant ratio between the dollar amounts irrespective of their position in the total range of rents or values. The basic assumption in Index III is that monthly contract rent varies around one per cent of the capitalized value of a housing unit. Thus an \$80 rent would be equated with a value of \$8,000 and a \$160 rent with a value of \$16,000.

Indexes II and III will both erroneously identify public housing areas as problem areas because of their low rents. This type of mistake is easily spotted, however, since public housing areas are known.

A more serious disadvantage is their inability to adjust for possible changes in the relationship between rent or value and condition of housing between white and non-white households. This problem can be handled better after the correlation analyses and regression equation development are completed. (See Table 17-C) As shown there, the five per cent of blocks which have the lowest per capita housing expenditures as computed in Index III include 6 per cent of all housing units and 30 per cent of the dilapidated units, 16 per cent of the deteriorating units, and 8 per cent of the deficient units in the city.

Table 4

Comparison Of Index Scores Describing Blocks
Ranked In Groups From Worst To Best

Blocks In Order	Index I	Index II	Index III	Index A	Index B	Index C
4001-5452	40.0-46.3	20.0-44.0	\$99.90-\$46.00	0-4	0.0-6.4	4-9
3001-4000	46.4-47.7	44.1-49.0	45.90- 38.70	5-7	6.5-10.9	10-12
2001-3000	47.8-49.5	49.1-53.2	38.60- 30.50	8-11	11.0-19.0	13-17
1001-2000	49.6-53.4	53.3-57.4	30.40- 24.30	12-20	19.1-29.6	18-31
501-1000	53.5-58.6	57.5-59.6	24.20- 20.40	21-33	29.7-41.9	32-53
401-500	58.7-59.6	59.7-60.4	20.30- 19.60	34-38	42.0-46.6	54-61
301-400	59.7-61.4	60.5-61.0	19.50- 18.40	39-44	46.7-53.3	62-73
201-300	61.5-63.9	61.1-61.7	18.30- 16.50	45-51	53.4-63.0	74-89
101-200	64.0-69.5	61.8-63.0	16.40- 15.10	52-66	63.1-80.4	90-111
Worst 100	69.6-83.0	63.1-75.0	15.00- 6.00	67-150	80.5-99.9	112-234

Table 5

Comparison Of Percentage Scores Describing Blocks
Ranked In Groups From Worse To Best

Blocks In Order	Per Cent Vacant	Per Cent Crowded	Per Cent Sound-All	Value Per Unit
4001-5452	.0- .9%	0.0- 2.9%	100.0%	\$19,500 up
3001-4000	1.0- 1.8%	3.0- 5.9%	100.0-98.1%	16,500-19,499
2001-3000	1.9- 3.7%	6.0- 9.5%	98.0-91.1%	14,000-16,499
1001-2000	3.8- 6.9%	9.6-15.0%	91.0-71.0%	11,500-13,999
501-1000	7.0- 10.4%	15.1-20.0%	70.9-46.5%	10,000-11,499
401-500	10.5- 11.5%	20.1-21.3%	46.4-40.1%	9,500- 9,999
301-400	11.6- 13.8%	21.4-22.9%	40.0-32.0%	9,000- 9,499
201-300	13.9- 17.0%	23.0-25.5%	31.9-21.2%	8,500- 8,999
101-200	17.1- 22.2%	25.6-31.0%	21.1- 8.0%	8,000- 8,499
Worst 100	22.3- 90.0%	31.1-63.9%	7.9- 0.0%	0000- 7,999

City-Wide Summarization

Therefore, summary statements of the number of blocks, number of persons, households, renter-occupied or owner-occupied, average rent, number of low-rent units, etc. within each level of blight as measured by the Index scores should be useful in establishing the criteria, in terms of index scores, which will be used to suggest the need for various types of renewal action.

(See Table 17)

Table 4 compares the Index values which describe the poorest 100 blocks in the city, the successively better 100-block groups and the best blocks as measured in turn by each index. High scores indicate poor blocks and low scores indicate good blocks in all indices except Index III which can be read as dollars per month housing expenditure per capita.

Table 5 compares percentage scores which describe the poorest 100 blocks in the city, the successively better 100-block groups and the best blocks as measured by selected census variables.

"T"-Scores (Profile Scores)

All of the census data for blocks were converted to "T"-scores. The "T"-scores used in Report Two, Map Series D, and Indexes I and II were developed for each census-reported variable such as dilapidation, owner-occupancy, etc., in the following manner:

1. The mean (average) for each variable was calculated by summing the observed values in all the blocks and dividing by the number of blocks for which the variable was pertinent.

$$M = \frac{SX}{N} \quad \text{where: } M = \text{mean}$$

X = an observed value in a block for a given variable

SX = the sum of the observed values in all the blocks for that variable

N = the number of blocks

2. The standard deviation from the mean was calculated by computing the square root of the sum of all the squared deviations from the mean divided by the number of blocks.

$$SD = \sqrt{\frac{S(X-M)^2}{N}}$$

where: SD = standard deviation
 X-M = deviation from the mean in a given block
 $(X-M)^2$ = the square of each deviation from the mean
 $S(X-M)^2$ = the sum of the squares
 N = the number of blocks

3. A standard score was computed for each block by dividing the deviation of that block from the mean by the standard deviation.

$$z_x = \frac{X-M}{SD}$$

where: z_x = the standard score of a given block
 X-M = deviation from the mean in a given block
 SD = standard deviation

4. A "T"-score was computed for each block by multiplying the standard score by 10 and adding 50. This modification is solely for convenience and does not change the relationships among the standard scores. (The range of unmodified standard scores would theoretically be from about -3.00 through .00 to 3.00. The range of "T"-scores would therefore be from about 30 to about 80. Thus the conversion eliminates negative amounts and decimal fractions.)

$$T_x = 50 + 10(z_x)$$

where: T_x = the T-score for a given block
 z_x = the standard score for the same block

An advantage of the conversion of data to "T"-score form is that one can then see at a glance the precise standing of each block in relation to each other block, or to all the blocks in the city, with respect to each variable. Also, the "T"-scores can be read as a series of block profiles showing the particular strengths and weaknesses of a given block or group of blocks. Table 16 summarizes the individual "T"-scores and shows the number of blocks scoring at each level for each of these separate factors. All of the "T"-scores are constructed so that the larger scores signify the poorer conditions and the smaller scores represent the better conditions.

"Blight" is defined in both absolute and relative terms in this analysis. Indexes A, B, C and III are composite scores based on absolute values. Their value in any given block is independent of their value in other blocks. Indexes I and II are composite scores based on the relative standing of an individual block with respect to all of the other blocks of the city.

It is possible to translate any of the relative terms back into more readily understandable equivalents, however. Any "T"-score for any block can also be read as the actual percentage or value by referring to the same tract and block in Report One. The specific conditions which caused a block to rank high or low on Index I or II can also be interpreted by reference to Report One.

In general, the absolute scores (Indexes A, B, C and III and percentages and averages) and the relative scores (Indexes I and II and the "T"-scores) have contrasting attributes. The absolute scores provide comparison between cities or between periods of time. They are also probably more easily understood or explained. The relative scores allow more meaningful combinations of various kinds of information into composite indices for a given city at a given time. They are also unaffected by such complicating factors as inflation or the contrast between high-rent and low-rent cities. For example, if a given block were scored at two different census dates, the absolute score might indicate an increase in rent while the relative score indicated a decline in rent in comparison with an even more rapid increase in the rest of the city.

Computer Mapping

In the course of the development of the Milwaukee CRP over 100 computer maps have been produced. These have contributed to the delineation of renewal treatment areas and to the general understanding of the structure of the city. They represent the beginning of what will probably be an extensive use of mapping to interpret and display information now in suitable punch card form for such analysis, including land use, zoning, population and housing data. With some additional work much of the data which other city departments now prepare in punch card form such as new construction, remodelings, demolitions, assessed valuation of land and structures, housing inspections, vital statistics, and many other items can also be mapped and analyzed.

Two basic mapping approaches were used. The first, with which Map Series A, B and C were produced (examples in residential blight report, list of titles available from Department of City Development), was devised specifically for use with IBM Card One which carried the original census block statistics data from the magnetic tape. It is used to position data at regular one-inch intervals which, at the 2640' scale adopted for city-wide maps, represent half-mile intervals or quarter-section areas. At the same time that data is printed, an outline map (resolution 80 points to the square inch) of the city and boundaries of the quarter-sections may optionally be printed also.

This mapping program was developed to complement the translation of the census magnetic tapes for display and analysis of census block statistics data. The program is not completely generalized; therefore, variations in field size from the Card One format would require modifications in the program. The only fixed limitation on the output is that it must be to regularly spaced intervals. The particular map outline may be varied to suit the user. The program is written for an 8K IBM 1401 computer with tape drive.

The second mapping approach, with which Map Series D was prepared, is described in the Urban Renewal Administration's CRP Guide No. 1 together with other mapping and graphic display programs. The programs presented in the manual are far more powerful and more general than the mapping program first described. However, for certain purposes the Milwaukee program has advantages over the others. It can both compute (add, subtract, multiply and divide) and print the results of these computations. The other mapping programs can either print numeric data or compute but do not do both. Use of the programs presented in the Guide has the further disadvantage of requiring access to the IBM 7090 computer which is often not available. For a planning agency which can design its data gathering with the ultimate use of these mapping and graphic display programs in mind and can arrange access to the IBM 709, 7090, or the new 360, these programs provide extremely powerful, flexible and potentially effective methods of data handling.

A FIELD STUDY OF CONDITION OF STRUCTURES

Survey Method

As a supplement to census findings, the Department of City Development conducted a survey of structural condition which included an evaluation of every structure in the city. This evaluation was based upon external inspection only. The inspection was carried out by two-man crews working from an automobile in residential areas and on foot in commercial areas. Condition was interpreted almost entirely in terms of maintenance. Intrinsic value, as such, was not considered.

A rating, on a four-point scale, was assigned to each structure after it had been viewed both from the street and from the alley, if there was an alley. If no alley existed and there was reason to suspect the structure was not in good condition, or the possible presence of rear dwellings, the survey crew would examine the rear of the properties on foot.

All structures, both residential and non-residential, were rated with the exception of accessory buildings such as residential garages. The rating scale which was used in classifying structures is shown in Table 6. (See Table 11-A and 23-B for a summary of survey findings) An average condition was determined for each block utilizing the following arithmetic weights: good = 1, fair + = 2, fair - = 3, poor = 4.

Table 6

Structure Condition Classification
Instructions to Enumerators

(Only the structure proper will be considered; landscaping, littered yards, conditions of auxiliary buildings, etc. will be disregarded)

1. Good (G) (Conservation)

Structure is sound and requires only normal maintenance, e.g.,

- 1) siding - either wood or artificial - is in very good condition, although wood siding may require painting.
- 2) very limited porch repairs - spindle or stair tread replacement, gutter or down-spout replacement, etc. may be necessary.

Generally, structure gives impression of good, timely maintenance.

2. Fair plus (F+) (Rehabilitation)

Structure is basically sound, but shows signs of minor neglect

- 1) siding - spot replacement of siding may be required
- 2) replacement of a sash and/or casing may be necessary; porch may require considerable repairs (but condition is short of complete replacement)
- 3) foundation - must be free of cracks (bricks must not show signs of deterioration)

3. Fair minus (F-) (Rehabilitation possible, but very expensive)

Structure gives impression of neglect over a protracted period of time

- 1) siding - is in poor condition or shows signs of extreme weathering
- 2) porches - virtual replacement is necessary
- 3) foundation - may have minor cracks
- 4) chimney and roof - need major repairs

4. Poor (P) (Redevelopment)

Structurally unsound and probably should be demolished

- 1) structure out of plumb
- 2) wood foundation
- 3) substantial foundation cracks

Comparison of Field Survey and Census Data - Number of Units

The DCD field survey in 1962 identified only 95 per cent as many housing units as did the census in 1960. The census enumerated 240,934 housing units; the field survey enumerated 229,093. The following table summarizes changes which are estimated to have taken place between the census date and the planning survey dates.

Table 7

Changes to Housing Unit Count, 1960-1962

April 1, 1960 U. S. Census	240,934*
New Construction 1960-1961**	7,601
Conversions, 1960-1961**	185
Demolitions, 1960-1961**	-2,041
Annexation	500
"Deconversion"	?
Estimated total, April, 1962	247,000

* 1962 city limits

** Building Permit data, Annual Reports of the Superintendent of Buildings.

Nearly 18,000 fewer units, a seven per cent difference, were identified in the field survey than would have been expected from 1960 census counts plus new construction since 1960. A major source of discrepancy appears to be in the treatment of rooming houses and hotels. While the census included some single rooms, including permanent occupancies in hotels, in the count of dwelling units, the Milwaukee DCD survey identified each rooming house or hotel as one establishment. The total number of rooming houses thus identified was 2,189. In addition, 70 motels and hotels were counted. An average of 8 or 9 rooms in each rooming house or hotel would be required to provide a full accounting for the observed difference. (A check of blocks near the downtown area indicates that the under-enumeration was concentrated in these areas, with many permanent residences classified as hotels and rooming houses.)

It is probable, also, that a considerable number of units ceased to exist through unreported "deconversions" in which second-class dwellings (lacking individual plumbing facilities) and others were withdrawn from the market as the housing supply became more adequate and vacancy rates increased.

Comparison of Field Survey and Census Data - Condition of Structures

A direct comparison of the ratings for structural condition assigned by the census in 1960 and by the DCD in 1962 can be made. The table below summarizes the number of housing units in structures classified as sound, deteriorating or dilapidated by the census and good, fair or poor on a four-point scale by the DCD.

Table 8

Condition of Structures, U. S. Census
of 1960 and DCD Survey, 1962

Source	Condition of Structures	Number of Housing Units	Percentage of Housing Units
1960 Census	Total	240,934	100.0%
	Sound	211,410	87.7
	Deteriorating	25,354	10.5
	Dilapidated	4,170	1.7
1962 DCD Survey	Total	229,093	100.0%
	Good	196,504	85.8
	Fair +	13,229	5.8
	Fair -	9,340	4.1
	Poor	10,020	4.4

The two surveys classified very similar proportions of housing units as good or sound, 88 per cent of units according to the census, 86 per cent of units according to the DCD survey. The category "poor" is more than twice as large as the category "dilapidated" indicating that a good many structures classified as deteriorating by the census were judged as poor by the DCD.

The correlation between the DCD field survey and census blocks ranked according to the per cent of units dilapidated is .50, with blocks ranked according to the per cent of units deteriorating is .49, and with both dilapidated and deteriorating is .59. These correlations are not higher because the coefficients are based on a comparison between average structure condition (DCD survey) and average housing unit by condition of structure (census). For technical reasons, it was not possible at this time to test the more logical association between DCD housing units and census housing units even though the data is available for this type of comparison.

ASSOCIATIONS OBSERVED AMONG HOUSING CHARACTERISTICS

An analysis of the associations among census variables and between census data and locally available data such as the DCD field survey of structural condition was carried out in two phases. Initially, a set of rank difference correlations was developed as part of the first Remington-Rand processing of the census magnetic tapes. Subsequently, product moment correlations were obtained for purposes of comparison.

Rank Difference Correlations

Twenty variables were selected from the available census data and indices for correlation analysis. One hundred paired-comparisons were selected for completion as shown in Table 18.

Each of the 100 correlation coefficients was computed by means of the Spearman Rank-Difference method as follows:

$$R = 1 - \frac{6SD^2}{N(N^2-1)}$$

where: R = rank difference correlation coefficient
D = the difference between a given block's rank with respect to variable 1 and its rank with respect to variable 2
D² = the square of the difference
SD² = the sum of the squares
N = the number of blocks for which both variable 1 and variable 2 are available.

Correlation coefficients can vary from 1.00 (perfect correlation: A is always accompanied by B and as A increases, B increases also) through .00 (no apparent relationship other than chance, A may or may not be accompanied by B) to -1.00 (perfect negative correlation: A is never accompanied by B, or as A increases, B decreases). If a high correlation is observed (one which approaches either 1.00 or -1.00), it is possible to predict B if A is known, or A if B is known. If little or no correlation is observed (approaching .00) knowledge of either A or B does nothing to improve the ability to predict the other.

The correlations yielded by the rank-difference method appear to indicate a high degree of predictability of certain variables on the basis of knowledge of other variables,

particularly if multiple correlations are derived so that the knowledge of more than one independent variable can be utilized in attempting to predict a third variable. (See Table 19 for the reported values) However, the distribution of housing characteristics throughout the city does not follow the normal distribution assumed by statisticians as the basis for most statements of reliability. A large proportion of the blocks have zero per cent of units dilapidated, deteriorated or lacking facilities, resulting in a very large number of blocks with tied scores.

Rank difference correlations should be adjusted for tied scores. Two formulae* are available for use in making this adjustment. Rho_a assumes that one set of ranks is a factual, objective representation of a true situation and that a second set of ranks is a judge's estimate, or an approximation of a true situation. Rho_b assumes that both sets of ranks are approximations or judgments and that correlation between them measures only agreement and not validity. The two formulae are given below:

$$Rho_a = 1 - \frac{6(S(D^2)+T'+U')}{n^3 - n} \qquad Rho_b = 1 - \frac{S(D^2)}{1/6(n^3 - n) - (T'+U')}$$

where: $S(D^2)$ = the sum of the squared deviations between ranks

$$T' = S(t^3 - t)/12$$

$$U' = S(u^3 - u)/12$$

t = number of cases involved in a tie in one set of ranks

u = number of cases involved in a tie in the other set of ranks

The result of making either of these corrections is shown in Table 9 for a limited number of the 100 rank-difference correlations. The degree to which those correlations are reduced is dependent both upon the proportion of ties in the distribution of a given variable and upon the strength of the association as originally computed.

Table 9 compares the original and corrected rank-difference correlations with the product-moment correlation coefficients obtained from a sample population generally similar to the first. (The sample population lacked blocks in which either renter-occupied units or owner-occupied units did not equal at least five.) In general, these product-moment correlations seem most consistent with Rho_a .

*Rank Correlation Methods, Maurice G. Kendall, M.A., London, Charles Griffin & Company Limited, 42 Drury Lane, 1948

Table 9

Comparison of Corrected and Uncorrected Rank-Difference Correlations
With Product-Moment Correlations from a
Similar* Group of Blocks

Items Correlated		Observed Rho	Rho _b	Rho _a	Product-Moment R
Per cent Sound	Value per Unit	.66	.60	.55	.51
Renter Occupied	Nonwhite Occupied	.54	.38	.28	.30
Sound	Index I	-.77	-.66	-.73	-.92
Deteriorating	Index I	.76	.73	.66	.80
Sound	Index II	-.57	-.47	-.52	-.54
Sound	Renter Occupied	-.50	-.44	-.46	-.42
Deficient	Index I	.72	.68	.61	.57
Dilapidated	Deteriorating	.65	.20	.08	.39
Overcrowded	Dilapidated	.45	.20	.14	.34
Nonwhite	Dilapidated	.70	.30	.13	.29
Value per Room	Sound	.69	.66	.61	.51
Rent per Unit	Sound	.64	.59	.52	.47
Deteriorating	Deficient	.61	.47	.42	.38

Rho_a and Rho_b have been corrected for the presence of large numbers of tied scores. No such correction is required for the product-moment R.

*Similar - a random 10 per cent sample of the universe from which Rho was computed, except that nearly 40 per cent of the sample was deleted (blocks having fewer than 5 owner-occupied units and blocks having fewer than 5 renter-occupied units) for technical reasons associated with the limitations of the computer program which was utilized.

Product-Moment Correlations

When it became possible to carry out a product-moment correlation coefficient analysis as a recheck on the rank-difference correlations originally utilized, this was done. A matrix of the coefficients is included in Table 20. The coefficients are defined by the following formula.

$$r_{12} = \frac{SXY - \frac{(SX)(SY)}{N}}{\sqrt{\left(SX^2 - \frac{(SX)^2}{N}\right) \left(SY^2 - \frac{(SY)^2}{N}\right)}}$$

where: r_{12} = product-moment correlation coefficient for variable₁ and variable₂
 X = the value of variable₁ in each block
 Y = the value of variable₂ in each block
 SX = the total value of variable₁ in all blocks
 SY = the total value of variable₂ in all blocks
 N = the number of blocks

The significance of the correlation coefficients obtained by either the rank-difference (corrected for ties) or the product-moment method can be evaluated generally as indicated below:

Correlation Coefficient r	Variance Explained r ²	Qualitative Evaluation
.90-1.00	.81-1.00	very high
.78- .89	.61- .80	high
.64- .77	.41- .60	moderate
.46- .63	.21- .40	low
.00- .45	.00- .20	very low

(Even low correlations indicate useful relationships for practical use in this imprecise social-science application. For example, although the correlation between Index 1 and the proportion of dilapidated units is only .76 in 900 renter-occupied blocks, .67 in 3100 blocks with both owners and renters, and .46 in 1460 owner-occupied blocks, the poorest 20 per cent of blocks according to Index 1 contain housing units which are 28 times more likely, proportionally, to be dilapidated as units in the other 80 per cent of the city's blocks.)

Multiple Regression Analysis

The ability to predict or estimate an unknown factor is often increased if more than one type of information can be applied to the problem. Simple correlations, such as were carried out both by the rank difference method and the product-moment method, describe the association between a dependent variable (the one being estimated) and an independent variable (the known factor). Multiple correlations describe the association between a dependent variable and two or more independent variables.

Multiple correlation coefficients were computed according to the following formulae:

$$R_{1.234} = \sqrt{1 - ((1-r^2_{12})(1-r^2_{13.2})(1-r^2_{14.23}))} \quad \text{or}$$
$$= \sqrt{1 - ((1-R^2_{1.23})(1-r^2_{14.23}))}$$

where:

$$r^2_{14.23} = \left(\frac{r_{14.2} - r_{13.2} r_{34.2}}{\sqrt{1 - r^2_{13.2}} \sqrt{1 - r^2_{34.2}}} \right)^2 \quad \text{and} \quad r^2_{12.3} = \left(\frac{r_{12} - r_{13} r_{23}}{\sqrt{1 - r^2_{13}} \sqrt{1 - r^2_{23}}} \right)^2$$

$R_{1.234}$ = the multiple correlation coefficient of the estimated (dependent) variable 1 and the known (independent) variables 2, 3 and 4

$r^2_{14.23}$ = the partial coefficient of determination of the estimated (dependent) variable 1 and the known (independent) variables 2 and 3 when the additional known variable 4 is held constant

$r^2_{12.3}$ = the partial coefficient of determination (square of the correlation coefficient) of the estimated (dependent) variable 1 and the known (independent) variable 3 when the additional known variable 2 is held constant

r_{12} = the simple linear correlation between variable 1 and variable 2

Regression equations (predictive formulae) were computed based upon a ten per cent random sample of blocks divided into three groups:

- 1) blocks for which both owner-value and rent are reported
- 2) blocks in which only owner values were available
- 3) blocks in which only rental data were available

These are shown in Table 21.

FEASIBILITY OF USING NON-CENSUS DATA IN INTER-CENSAL PERIODS

Table 11 reports the multiple correlations between Index 1 and six selected independent variables. The variables used were selected as being those items which would be most available on a continuing basis and therefore most suitable for use in an up-dating program. They did not include items that would require interior inspection of dwellings. The variables included: the DCD condition-of-structures survey data, the percentage of vacancy, the percentage of renter occupancy, the percentage of nonwhite occupancy, the average rent per unit, and the average value per unit.

Between census dates, average rent and average value can be approximated from city records such as assessed valuation or the records of real estate sales. Vacancy data can be obtained from secondary sources such as the city directory. Renter occupancy data can be similarly obtained. The percentage of nonwhite occupancy can be estimated from school enrollment data or from field surveys. The condition-of-structures survey can be repeated from time to time with reasonable expenditure of staff time and budget.

An examination of the product-moment correlations in a ten per cent sample of the 3157 blocks of the city which contained five or more of both owner-occupied and renter-occupied structures indicates that the field survey of structural condition carried out by the DCD correlated equally well with Index 1 (considered the best measure of housing quality) as any of the data reported in the census with the exception of sound units and deteriorating units.

Table 10
Correlation of Selected
Variables with Index I

Item	Correlation Coefficient
DCD field survey	.68
Sound with all facilities	.92
Deteriorating	.82
Lacking facilities	.57
Dilapidated	.67
Rent per unit	.63
Value per unit	.67
Rent per room	.56
Value per room	.68
Renter occupancy	.44
Vacancy	.35
Overcrowding	.60
Nonwhite occupancy	.43
Rooms per unit	.07
Persons per room	.36

Table II

Predictive Value of Data Available for Updating

Possible Available Predictors			Coefficient of	Coefficient of
Variable 1	Variable 2		Multiple Determination	Multiple Correlation
			R^2	R
DCD Condition Survey	Vacancy		.47	.69
"	"	"	Renter Occupancy	.69
"	"	"	Nonwhite Occupancy	.68
"	"	"	Rent per Unit	.77
"	"	"	Value per Unit	.78
Vacancy			Renter Occupancy	.49
"			Nonwhite Occupancy	.49
"			Value per Unit	.70
"			Rent per Unit	.67
Renter Occupancy			Nonwhite Occupancy	.54
"	"		Value per Unit	.70
"	"		Rent per Unit	.67
Nonwhite Occupancy			Value per Unit	.70
"	"		Rent per Unit	.70
Value per Unit			Rent per Unit	.56

The coefficients of multiple correlation and multiple determination in Table II were computed according to the following simplified formula:

$$R_{1.23} = \sqrt{\frac{r_{12}^2 + r_{13}^2 - 2r_{12}r_{13}r_{23}}{1 - r_{23}^2}}$$

where:

$R_{1.23}$ = the coefficient of multiple correlation of the dependent (estimated) variable₁ and the independent (known) variables₂ and₃.

r_{12} = the simple correlation between variable₁ and variable₂.

RELATED STUDIES

Based upon DCD field studies, detailed reports on the relation of land uses, condition of structures and zoning have been prepared. While these have been important in the analysis of residential treatment areas, they are discussed in other publications. Some of the study topics include: residential density for residential structures and mixed use structures as well as for total residential units, the condition of structures in each of ten major land use classes for the non-residential areas analyses, the use of residentially-zoned land, the land use zoning of the city and the relationship of existing uses to zoning, the condition of structures according to their classification as residential, non-residential or mixed. These studies are generally detailed to the block level as well as summarized to census tracts, quarter-sections and the city as a whole.

Census of population tract data has been related to treatment areas for description of the population characteristics of the areas.

THE ROLE OF OTHER DEPARTMENTS IN THE BLIGHT ANALYSIS

A great deal of the analysis involved in the development of the Community Renewal Program would not have been possible without the use of electronic data processing methods. Both of the city departments with general service computer centers were very helpful in their explanation of computer capabilities and the provision of some programming assistance, as well as the actual production of computer analyses and reports.

Mr. Albert Bethke, Director of the Tabulating Section of the Comptroller's Office, originated the basic concepts of the Milwaukee mapping program subsequently developed and utilized for the Department of City Development. In addition, he was most generous with his counsel in the original design of input records for the DCD land use and condition survey. His department, under the supervision of Mr. Gilbert Behling, performed many of the actual computer runs and related card processing. He also advised in the development of the DCD contract with Remington-Rand, Univac Service Center, for analysis of the block statistics data.

Mr. Peter Waal, Director of the Tabulating Section of the Office of the Tax Commissioner, devised the program for analysis of the DCD field survey of structural condition and assisted in designing other applications. His department also performed many of the actual computer runs and related card processing. In addition, he provided summaries and analyses of tax assessment data for selected potential treatment areas within the city.

DATA BANK

The data needs and resources available for a continuing Community Renewal Program will probably be re-evaluated as technological progress and increased awareness of the value of shared-data systems make more and better information available. The Department of City Development is currently making studies to determine the advantages of and the feasibility of a Data Bank for the City of Milwaukee into which all pertinent information could come for joint use regardless of the originating department. The resulting economies through avoidance of duplicate data gathering and analysis, together with the increased range of information available to each department, recommend this area as one for careful joint study and action within the very near future.

Table 12
Content of IBM Card One:
Original Census Data and Indices

<u>Card Columns</u>	<u>Data</u>
1-4	census tract
5-7	census block
8-11	household population
12-15	population in group quarters
16-22	hash cross foot check total
23-25	sound units with all facilities
26-28	sound units lacking facilities
29-31	deteriorating units with all facilities
32-34	deteriorating units lacking facilities
35-37	dilapidated units
38-40	owner occupied units
41-43	owner-occupied units reporting value
44-50	total value reported
51-54	owner-occupied rooms
55-57	renter-occupied units
58-60	renter-occupied units reporting rent
61-64	renter-occupied rooms
65-67	non-white units
68-70	units more than one person per room
71-75	total rent reported
76-79	quarter section grids
80	card identification

Table 13
Content of IBM Card Two: "T" Scores and Indices

<u>Card Columns</u>	<u>Data</u>
1-4	census tract
5-7	census block
8-11	household population
12-15	hash total
16-18	Index A
19-20	Index B
21-23	Index C
24-25	Index I
26-27	Index II
28-30	Index III
31-32	sound, all facilities
33-34	sound, lacking facilities
35-36	deteriorating, all facilities
37-38	deteriorating, lacking facilities
39-40	total deteriorating
41-42	total lacking facilities
43-44	dilapidated
45-46	rent per unit
47-48	rent per room
49-50	value per unit
51-52	value per room
53-54	per cent renter occupancy
55-56	per cent vacant
57-58	overcrowding
59-60	per cent non-white occupancy
61-62	rooms per unit
63-64	persons per room
65-67	renter occupied units
68-70	total deteriorating, dilapidated, and lacking units
71-73	total housing units
74-75	population per household
76-79	quarter section grid
80	card identification

TABLE 15
 REPORT TWO: COMPARATIVE "T" SCORES AND INDICES FOR CITY BLOCKS
 (SAMPLE PAGE)
 CITY OF MILWAUKEE 1960 U. S. CENSUS OF HOUSING

CENSUS TRACT	BLOCK	BLIGHT INDICES			ALL DILAP	ALL DET	DETER DEFIC	SND &DEF	DETER DEF	NONDF	RNT/ UNIT	RNT/ ROOM	VAL/ UNIT	VAL/ ROOM	RENT OCC.	VAC- ANCY	CROW DING	NON- WHITE	SOUND NONDEF	TOTAL POPULATION	ABSOLUTE UNITS
		I	II	III																	
7	13	69.0	60.1	14.12	47.6	99.9	72.6	97.9	46.1	90.4	60.1	57.4		62.1	67.6	75.6	46.9	86.7	65	20	
22	3	69.1	60.6	16.44	99.9	53.6	45.5	47.3	46.1	55.7	60.6	56.9		58.6	92.7	66.9	89.4	86.7	29	13	
22	14	69.6	58.4	15.94	82.4	68.1	63.3	73.2	51.1	61.1	58.4	56.6		61.5	56.0	60.0	72.7	73.4	131	39	
30	3	69.8	56.3	21.31	98.9	62.9	47.3	50.6	46.1	65.6	55.8	55.9	57.3	60.1	59.1	43.7	64.8	96.6	72.0	178	44
30	4	69.9	60.8	15.92	89.3	70.2	51.5	51.8	50.7	74.0	61.0	60.8	60.0	62.5	62.1	46.1	64.5	99.9	76.7	259	65
36	12	69.8	60.1	14.26	60.8	93.4	67.2	85.6	47.6	86.1	60.1	56.5		65.8	60.1	67.9	99.9	84.8	242	68	
37	24	69.5	55.4	21.14	99.9	58.9	47.5	49.1	47.4	61.3	52.8	53.0	65.3	64.9	63.2	52.0	64.8	89.6	70.5	253	77
48	29	69.3	58.6	21.76	85.2	85.1	48.7	53.3	46.1	91.6	55.4	55.8	61.2	57.8	50.9	56.9	56.2	51.9	84.8	85	24
52	22	69.3	60.1	15.68	87.3	74.1	45.5	47.3	46.1	80.9	55.0	57.5	68.0	68.4	56.4	45.9	65.5	94.6	77.1	306	72
114	11	69.1	67.0	20.09	53.3	83.5	99.9	99.9	67.5	52.1	67.0	44.7		66.6	70.3	50.7	47.7	83.9	123	78	
114	19	69.8	61.4	18.66	85.2	66.2	64.9	83.5	46.1	53.7	61.4	54.6		63.3	53.7	55.8	46.9	70.5	41	16	
124	30	69.7	59.4	22.00	79.5	89.7	57.4	69.6	46.1	89.3	60.1	59.0	57.8	58.9	59.5	43.7	46.5	46.9	86.7	185	52
130	2	69.2	61.2	22.52	76.2	80.1	65.2	77.1	50.8	73.8	60.6	59.5	62.1	61.3	55.4	58.8	52.3	46.9	80.5	180	63
2	2	68.9	65.7	24.97	47.6	90.1	99.9	99.9	51.5	46.7	65.7	44.9		69.9	62.8	52.0	48.2	80.2	289	200	
2	23	68.7	71.3	28.00	47.6	99.2	99.9	99.9	46.1	44.9	71.3	37.6		70.5	50.9	39.3	46.9	84.7	21	22	

Table 16
City Summary of Block Distributions According to "T" Scores
(Number of Blocks)

T-Score	Sound, All Facilities	Sound, Lacking Facilities	Deteriorating, All Facilities	Deteriorating, Lacking Facilities	Deteriorating, Total	Facilities Total	Dilapidated	Rent Per Unit	Rent Per Room	Value Per Unit	Value Per Room	Renter Occupied	Vacant	Over-Crowded	Non-White Occupied	Rooms Per Unit	Persons Per Room
01-31								112	125	159	105					109	124
32								16	19	29	45					16	
33								22	15	26	42						
34								23	29	29	58						23
35								29	19	42	63	461					22
36								42	31	50	76	193					45
37								42	38	50	139						49
38								42	35	83	117	160					738
39								72	49	79	118	136		1009			56
40								60	61	102	146	147		8			103
41								56	62	96	153	142		69			122
42								76	82	116	182	129		200			170
43								152	99	162		124		304			198
44	2417							93	108	122	191	143	2266	255			
45	447		3072		2995			96	102	144	192	143	15	272			2571
46	324	3549	200		326	3238		165	126	124	204	129	181	257			369
47	253	68	322	4353	270	266		118	124	202	183	169	302	238	4415		421
48	187	246	221	9	224	262	4652	143	152	212	177	174	346	246	265		491
49	147	212	156	110	172	232	28	218	156	172		156	329	221	133		
50	147	195	154	93	149	171	72	133	160	207	167	177	231	228	46		516
51	114	171	142	106	107	128	75	160	161	197	133	192	237	213	39		443
52	97	111	85	94	88	143	68	254	191	182	171	158	181	186	35		421
53	95	98	85	79	72	102	51	192	242	219	208	254	177	168	19		332
54	92	91	72	54	78	96	53	196	273	162	195	213	144	142	15		291
55	65	74	59	59	63	62	35	313	296	146	193	203	115	157	16		
56	81	66	53	48	67	67	31	208	311	192		192	124	123	4		183
57	76	61	62	24	51	61	27	187	294	147	186	186	97	122	6		153
58	62	37	48	35	48	57	23	252	273	197	192	168	91	98	6		125
59	57	43	50	42	55	41	20	128	167	134	179	166	66	76	11		70
60	38	26	37	23	36	38	19	88	101	126	188	132	72	109	11		908
61	46	28	53	24	47	36	26	115	54	155	182	113	51	76	11		62
62	41	16	53	22	43	36	21	52	19	109		104	26	84	2		48
63	47	25	25	28	36	37	18	48	5	92	164	98	38	67	4		47
64	36	18	31	12	33	23	11	27	4	110	121	69	47	79	12		25
65	38	24	39	19	25	24	15	7	2	59	91	78	17	50	10		20
66	39	21	25	10	37	19	19	9	48	60		69	10	48	13		
67	27	25	21	11	26	20	4	12	30	40		52	33	39	8		15
68	41	18	35	17	31	15	9	5	18	13		57	13	37	8		296
69	32	12	21	5	29	17	12	2	9			70	19	25	13		13
70	34	6	18	20	19	13	4	2	5	14		62	29	50	11		15
71	31	9	21	10	26	19	8	7	1	4		94	12	11	6		
72	31	11	16	5	13	10	6	2		1			8	5	8		19
73	22	10	21	5	18	8	7	2		1	1		17	27	7		15
74	19	6	20	9	13	14	3	1		1			11	7	13		10
75	23	12	16	6	20	9	9						2	24	6		9
76	24	6	17	6	15	15	6						15	9	9		15
77	15	9	15	6	25	9	5						13	9	10		80
78	23	7	10	3	9	6	4						13	6	12		13
79	22	8	10	2	18	10	4						9	12	6		10
80	16	5	19	6	19	8	3						4	2	10		10
81	19	7	13	6	11	8	2						8	23	13		10
82	15	7	9	4	9	5	5						4	3	13		
83	17	4	10	1	10	5	2							4	16		12
84	18	5	9	5	10	10	2						6	2	4		10
85	22	11	8	1	10	3	8						2	7	13		6
86	14	5	9	4	4	6	1						3	4	7		9
87	41	4	8	2	8	5	3						4		20		4
88		1	2	3	9	4	2						2	3	8		
89		4	10	5	10	3	3						8	10	20		4
90		2	5		9	1	3						2	5	7		
91		4	4	3	8	2	6						3	1	11		5
92		4	7	1	2	5	1						1	2	8		5
93		1	2	3	5	4	3						5	3	10		
94			4	3	9	3	2						2	1	11		2
95		3	3		1	5	2						1		9		6
96		3	3	4	8	3	1						1	3	13		3
97		1	4			5	1						7		6		7
98		5	5	4	2	2	5							1	11		11
99		57	33	48	27	60	52						32	12	42		3
Total 99	5452	5452	5452	5452	5452	5452	5452	3983	3986	4550	4554	5452	5452	5452	5452	5439	5450
No report								1469	1466	902	898					13	2
Count	5452	5452	5452	5452	5452	5452	5452	5452	5452	5452	5452	5452	5452	5452	5452	5452	5452

TABLE 17-A
CITY SUMMARY ACCORDING TO INDEX I
CITY OF MILWAUKEE 1960 U.S. CENSUS OF HOUSING

VALUE OF INDEX I	TOTAL BLOCKS	HOUSING UNITS	POPULATION TOTAL	HOUSING HOUSING	RENTED UNITS	AVERAGE RENT	LOW RENT UNITS	DILAP- IDATED	DETER- IORATED	DEFICIENT
00.0-39.9						NO DATA				
40.0-40.9	7	1058	1745	1546	983	109.81	55		3	51
41.0-41.9	13	381	813	813	217	151.68				3
42.0-42.9	27	1133	2613	2581	610	141.73			19	12
43.0-43.9	124	5321	13122	13069	2846	109.38	36		8	72
44.0-44.9	343	11520	33070	32066	4433	94.73	209	1	25	40
45.0-45.9	609	20500	61630	60551	7114	89.24	569	11	90	188
46.0-46.9	770	28227	87702	86780	10104	82.24	691	13	299	278
47.0-47.9	797	30836	98760	97553	11361	78.28	940	26	425	351
48.0-48.9	574	24023	78901	78504	10063	73.35	746	28	633	600
49.0-49.9	370	18652	58060	57562	9231	70.39	1126	34	860	979
50.0-50.9	291	13947	43567	43140	7177	68.22	979	45	1003	941
51.0-51.9	239	13520	42103	40896	8067	65.34	2041	78	1207	1375
52.0-52.9	208	11503	35151	34286	6928	66.80	1437	122	1412	1511
53.0-53.9	165	9430	28799	28277	5742	63.37	1915	107	1531	1390
54.0-54.9	134	8447	24494	24201	5387	63.91	2212	123	1661	1673
55.0-55.9	97	5882	16488	16121	3934	62.73	1595	114	1152	1348
56.0-56.9	91	5416	17879	15196	3641	62.00	1365	185	1183	1370
57.0-57.9	73	4424	12562	12253	2980	60.39	1602	138	1124	1288
58.0-58.9	80	4011	12097	11710	2592	60.11	1152	121	1643	857
59.0-59.9	56	2983	8503	8128	1990	60.02	1149	142	1007	897
60.0-60.9	63	3433	10613	10504	2191	60.33	1273	157	1590	760
61.0-61.9	48	2626	7908	7696	1670	59.45	1016	187	1072	669
62.0-62.9	46	2567	7372	7287	1718	59.40	836	187	1293	659
63.0-63.9	27	1354	3951	3858	935	54.63	671	116	794	303
64.0-64.9	18	681	2099	2062	442	58.99	222	73	390	156
65.0-65.9	22	1446	4003	3967	1042	55.19	761	150	800	444
66.0-66.9	15	767	2406	2406	505	60.99	309	138	471	114
67.0-67.9	13	799	2231	2204	591	54.35	488	154	360	587
68.0-68.9	29	1447	3564	3533	1003	49.78	867	212	922	564
69.0-69.9	14	666	2144	2109	457	55.66	316	142	381	153
70.0-70.9	20	933	2106	2095	698	50.53	669	311	335	335
71.0-71.9	11	493	1688	1598	354	56.06	229	174	251	79
72.0-72.9	20	1012	2788	2730	698	53.29	517	298	583	267
73.0-73.9	13	745	2639	2639	535	55.12	406	277	356	66
74.0-74.9	9	310	925	897	236	55.26	228	103	155	84
75.0-75.9	4	104	199	199	71	39.84	63	20	66	61
76.0-76.9	2	61	84	84	28	41.56	28	28	31	26
77.0-77.9	2	58	211	211	49	47.85	49	33	20	12
78.0-78.9	1	29	90	90	22	53.00	22	6	20	15
79.0-79.9	2	26	98	98	21	37.71	21	9	12	9
80.0-80.9	4	158	518	494	114	48.52	114	58	95	52
81.0-81.9						NO DATA				
82.0-82.9	1	5	11	11	3	.00	3	2	3	1
83.0 & UP						NO DATA				

TABLE 17-B
CITY SUMMARY ACCORDING TO INDEX II
CITY OF MILWAUKEE 1960 U. S. CENSUS OF HOUSING

VALUE OF INDEX II	TOTAL BLOCKS	HOUSING UNITS	POPULATION TOTAL	HOUSING	RENTED UNITS	AVERAGE RENT	LOW RENT UNITS	UNLAP-ROATED	DETER-ORATED	DEFICIENT
00.0-21.9	194	2711	8477	7353	1153	111.06	425	28	179	107
22.0-22.9	5	114	405	405	11	.00	11			
23.0-23.9	5	91	275	275	8	119.29			1	1
24.0-24.9	8	524	1160	1150	348	137.47	8		1	12
25.0-25.9	5	166	469	469	63	123.37	4	14		1
26.0-26.9	8	148	511	511	19	133.89				
27.0-27.9	14	484	1305	1305	258	128.13	10		4	1
28.0-28.9	10	326	1045	1040	131	128.71	3	2	3	1
29.0-29.9	9	343	1117	1117	113	132.92	9	1	13	4
30.0-30.9	15	417	1304	1304	176	114.69	9		6	3
31.0-31.9	32	1083	3304	3225	405	126.53	20	10	79	12
32.0-32.9	36	1037	3421	3386	363	112.38	23	7	26	3
33.0-33.9	44	2006	5411	5282	1084	113.97	14		24	16
34.0-34.9	38	1336	4112	4088	469	108.25	14		24	5
35.0-35.9	57	1775	5440	5297	757	107.91	31	1	22	14
36.0-36.9	73	2734	7825	7730	1121	107.39	41	2	15	43
37.0-37.9	74	2567	7946	7946	965	104.91	27	2	25	13
38.0-38.9	85	2590	8079	8072	731	97.44	80	2	24	14
39.0-39.9	107	3499	11407	11397	1223	99.92	50	5	77	28
40.0-40.9	117	4356	13657	13629	1573	98.01	75	14	68	35
41.0-41.9	134	4815	15239	15198	1759	95.50	69	10	88	49
42.0-42.9	188	7304	24507	23905	2503	92.30	113	13	120	51
43.0-43.9	157	6128	19843	19220	2387	89.43	101	16	105	44
44.0-44.9	153	5362	17122	17068	1766	90.32	95	12	116	58
45.0-45.9	181	7077	22178	22046	2717	86.56	83	16	184	126
46.0-46.9	204	7578	24903	24585	2504	85.30	124	18	265	123
47.0-47.9	239	9926	31013	30580	3718	81.44	158	21	276	325
48.0-48.9	240	10220	31911	31594	3954	81.76	121	45	482	254
49.0-49.9	214	8943	29621	26663	3904	78.88	113	110	466	405
50.0-50.9	246	10203	31738	31354	4017	76.99	142	66	558	368
51.0-51.9	247	11374	33548	33252	5399	74.01	136	84	742	768
52.0-52.9	224	11011	29680	29135	6213	71.88	114	176	1010	974
53.0-53.9	223	10152	31436	31177	5147	70.30	105	134	1072	591
54.0-54.9	244	12515	37370	36774	6929	68.70	109	106	1411	1166
55.0-55.9	262	14008	40563	39949	8275	65.74	614	213	1531	1565
56.0-56.9	247	13305	41072	40398	7528	65.03	346	227	2108	1358
57.0-57.9	222	12209	38337	37759	6996	63.16	904	254	2074	1259
58.0-58.9	250	13973	42543	42003	8387	59.93	4228	416	2617	2081
59.0-59.9	186	10717	32682	32389	6626	57.99	4569	510	2610	1722
60.0-60.9	141	8260	25572	25209	5089	56.21	4056	430	2090	1520
61.0-61.9	133	8356	24716	23906	5651	52.56	5487	601	1947	1820
62.0-62.9	73	4265	12366	12234	2886	49.75	2835	306	1173	1138
63.0-63.9	40	1921	5448	5208	1254	46.38	1254	81	511	529
64.0-64.9	20	986	2299	2192	682	44.60	682	131	378	414
65.0-65.9	11	791	1523	1439	607	41.42	607	20	279	504
66.0-66.9	5	356	452	452	246	39.79	246	8	197	273
67.0-67.9	15	553	926	926	417	36.85	417	18	180	386
68.0-68.9	2	56	98	89	41	34.15	41		2	36
69.0-69.9						NO DATA				
70.0 & UP	15	263	331	320	210	27.77	210	13	102	220

TABLE 17-C
CITY SUMMARY ACCORDING TO INDEX III
CITY OF MILWAUKEE 1960 U. S. CENSUS OF HOUSING

VALUE OF INDEX III	TOTAL BLOCKS	HOUSING UNITS	POPULATION TOTAL	HOUSING	RENTED UNITS	AVERAGE RENT	LOW RENT UNITS	DILAP- IDATED	DETER- IORATED	DEFICIENT
00.0-01.9	129	933	3697	2797	368	.00	368	28	129	55
02.0-03.9						NO DATA				
04.0-05.9						NO DATA				
06.0-07.9	1	7	20	20	6	25.17	6		2	5
08.0-09.9	1	48	224	224	35	53.66	35	22	26	7
10.0-11.9	11	982	3627	3627	779	47.87	771	98	144	51
12.0-13.9	44	1862	7457	7367	1469	53.01	1289	247	517	167
14.0-15.9	91	4995	18148	18037	3759	56.64	2714	465	1549	546
16.0-17.9	128	6100	23613	21257	4159	59.89	2076	402	1939	771
18.0-19.9	171	8620	29295	28497	5567	60.18	2535	600	2451	1229
20.0-21.9	245	13300	43142	42383	8197	60.96	3836	397	2792	1892
22.0-23.9	275	14710	46612	46044	8659	63.07	3147	406	3071	2030
24.0-25.9	297	15622	48043	47450	9007	64.86	2340	287	2950	1908
26.0-27.9	273	14105	43120	42693	8010	68.57	1593	226	1862	1378
28.0-29.9	280	13895	42225	41634	7519	70.17	1164	131	1446	1130
30.0-31.9	236	11445	34661	34345	6020	71.59	878	121	1354	1056
32.0-33.9	266	11746	36788	36334	5517	75.76	368	134	1015	803
34.0-35.9	293	13648	40496	39946	6335	72.42	1580	197	1089	1634
36.0-37.9	285	12791	41636	40548	5113	77.84	536	106	531	793
38.0-39.9	276	11970	36389	36050	4956	80.29	240	50	437	540
40.0-41.9	293	12739	37304	36882	5378	76.91	858	33	452	951
42.0-43.9	280	10981	33419	32942	4063	79.00	670	27	374	624
44.0-45.9	234	9957	28743	28250	3936	83.06	225	40	274	460
46.0-47.9	209	8705	25603	25157	3119	80.95	155	17	177	382
48.0-49.9	190	7752	21768	21428	3134	85.84	412	26	173	515
50.0-51.9	167	6532	17501	17438	2685	81.47	333	32	212	377
52.0-53.9	129	4095	11945	11754	1287	85.19	171	3	44	206
54.0-55.9	116	4449	12201	11940	1712	83.28	109	3	39	110
56.0-57.9	80	2803	7281	7219	1091	83.81	127	2	51	107
58.0-59.9	71	2952	7347	7320	1360	89.83	53	35	87	251
60.0-61.9	70	2983	6926	6858	1500	87.03	59	3	11	283
62.0-63.9	54	1668	4761	4707	395	92.21	47	2	14	5
64.0-65.9	41	1160	3349	3275	341	94.17	26	1	8	3
66.0-67.9	34	1164	2929	2910	453	92.34	26	1	6	24
68.0-69.9	24	878	2548	2204	325	89.16	29	1	13	35
70.0-71.9	26	657	1819	1819	173	97.38	20		5	2
72.0-73.9	17	480	1217	1217	166	96.93	22		4	4
74.0-75.9	18	448	1413	1266	97	101.70	23		6	1
76.0-77.9	13	602	1364	1302	360	101.97	21		3	37
78.0-79.9	11	918	1876	1704	665	112.04	9		4	15
80.0-81.9	9	522	1097	1087	367	138.66	7			12
82.0-83.9	5	72	205	205	14	76.79	3		1	
84.0-85.9	9	185	597	597	17	105.88	8		5	
86.0-87.9	5	104	319	319	10	.00	10		1	1
88.0-89.9	5	153	502	502	15	48.67	9			
90.0-91.9	4	86	249	249	14	40.00	9			2
92.0-93.9	2	46	112	112	7	84.00				
94.0-95.9	2	35	107	107		NO DATA				
96.0-97.9	4	66	172	172	9	104.38	1			
98.0-99.9	28	961	1840	1790	615	163.20	15		21	38

TABLE 17-D
CITY SUMMARY ACCORDING TO INDEX A
CITY OF MILWAUKEE 1960 U. S. CENSUS OF HOUSING

VALUE OF INDEX A	TOTAL BLOCKS	HOUSING UNITS	POPULATION TOTAL	POPULATION HOUSING	RENTED UNITS	AVERAGE RENT	LOW RENT UNITS	DILAP- IDATED	DETER- IORATED	DEFICIENT
000-004	1495	33756	119129	117752	3496	39.62	2552	109	594	213
005-009	1741	81592	242862	239870	39513	89.45	1002	42	629	806
010-014	744	40311	123930	122199	21267	70.06	2533	97	1792	2327
015-019	412	25094	71667	69663	15407	67.47	3163	175	2619	3655
020-024	278	16727	48363	47580	10475	64.37	3441	252	2685	3312
025-029	183	11680	33154	32502	7649	61.25	3712	259	2412	2899
030-034	120	6608	19570	18699	4309	61.83	1939	190	1833	1715
035-039	99	5336	16071	15966	3445	62.18	1352	251	2101	991
040-044	86	4909	15802	13327	3307	56.21	2260	299	2109	1344
045-049	75	4164	12974	12740	2662	59.45	1455	317	2172	773
050-054	49	2308	7016	6855	1447	57.52	829	121	1487	554
055-059	39	2499	6891	6802	1733	51.76	1476	242	1545	766
060-064	23	1043	2942	2842	751	53.62	566	193	529	255
065-069	20	879	2815	2745	583	56.40	468	136	624	195
070-074	18	1016	3315	3315	655	56.19	500	236	615	146
075-079	16	803	2424	2424	551	55.20	424	231	412	173
080-084	10	489	1506	1486	356	55.17	276	166	248	60
085-089	13	608	1777	1745	397	55.24	309	224	270	108
090-094	8	359	1194	1188	248	54.09	168	145	172	60
095-099	3	61	156	156	47	49.44	47	30	24	11
100-104	3	103	380	380	75	53.92	51	49	45	18
105-109	1	48	224	224	35	53.66	35	22	26	7
110-114	3	96	290	290	81	49.41	81	64	28	2
115-119	4	114	310	310	79	49.04	79	61	48	18
120-124	4	222	684	684	157	51.60	157	153	63	13
125-129	1	22	86	86	19	47.79	19	15	7	5
130-134	1	18	62	62	15	47.33	15	13	4	2
135-139	2	61	86	86	19	44.32	19	38	21	12
140-144						NO DATA				
145-149						NO DATA				
150 & UP	1	8	27	27	5	46.00	5	7	1	

TABLE 17-E
CITY SUMMARY ACCORDING TO INDEX B
CITY OF MILWAUKEE 1960 U. S. CENSUS OF HOUSING

VALUE OF INDEX B	TOTAL BLOCKS	HOUSING UNITS	POPULATION TOTAL	HOUSING HOUSING	RENTED UNITS	AVERAGE RENT	LOW RENT UNITS	DILAPIDATED	DETERIORATED	DEFICIENT
00.0-01.9	541	14609	41890	41627	5484	84.90	498	17	229	3
02.0-03.9	364	14923	45864	43382	5744	85.55	216	34	317	23
04.0-05.9	441	17580	51594	51062	7229	82.66	269	39	575	79
06.0-07.9	405	15649	48137	47170	6388	84.01	415	34	431	120
08.0-09.9	409	17575	53642	53248	7445	81.11	738	68	706	226
10.0-11.9	369	14239	45053	44919	5606	77.08	433	72	634	224
12.0-13.9	327	14553	46040	45648	6353	79.01	408	80	810	363
14.0-15.9	296	12438	40732	40598	5174	75.53	559	96	855	342
16.0-17.9	254	11487	36653	36012	5187	72.83	756	137	1007	437
18.0-19.9	230	12089	40055	39929	5436	71.77	997	146	1155	414
20.0-21.9	226	9110	31071	30323	4374	69.24	922	239	1288	461
22.0-23.9	179	8852	28053	27729	4756	75.26	566	166	1202	552
24.0-25.9	165	7297	24580	24374	3575	69.22	825	171	895	465
26.0-27.9	144	7656	24254	24106	4124	73.83	972	218	1238	604
28.0-29.9	123	6459	20050	19545	3709	66.43	1014	230	1052	620
30.0-31.9	110	5972	19710	19284	3316	63.90	1192	166	1265	604
32.0-33.9	104	4430	14300	14232	2441	62.63	1142	202	981	515
34.0-35.9	70	4083	13321	12886	2706	62.39	882	186	958	517
36.0-37.9	72	3693	10955	10871	2309	62.67	857	178	589	580
38.0-39.9	56	3286	9518	9124	2160	65.61	649	91	630	633
40.0-41.9	64	3259	10549	10081	2175	59.97	1205	131	632	517
42.0-43.9	53	3509	9910	9799	2347	63.59	1054	104	638	737
44.0-45.9	37	1865	5800	5608	1306	66.38	456	97	508	361
46.0-47.9	38	2220	6340	6182	1541	59.91	705	125	907	532
48.0-49.9	22	1293	3407	3318	863	62.62	348	59	286	273
50.0-51.9	35	2059	5995	5687	1341	58.31	825	51	542	536
52.0-53.9	24	1580	4924	4480	1134	65.69	341	123	257	428
54.0-55.9	27	1675	5142	4350	1129	59.16	595	179	364	486
56.0-57.9	26	1929	4776	4731	1420	60.34	677	64	306	663
58.0-59.9	19	1253	3401	3380	1014	65.34	376	39	292	418
60.0-61.9	16	1101	2501	2411	862	66.25	342	73	274	452
62.0-63.9	10	734	1857	1852	541	61.28	265	39	217	287
64.0-65.9	22	1929	5284	5228	1432	58.13	988	73	316	585
66.0-67.9	13	1007	2269	2050	845	59.82	411	25	205	474
68.0-69.9	9	358	928	915	256	60.87	151	31	139	134
70.0-71.9	5	544	893	889	459	51.55	459	20	89	270
72.0-73.9	16	805	1571	1512	623	53.72	544	32	307	407
74.0-75.9	11	607	1522	1344	447	53.36	398	10	107	304
76.0-77.9	8	507	1232	1175	357	64.68	147	18	172	194
78.0-79.9	9	510	1093	1036	390	57.25	227	13	105	271
80.0-81.9	10	600	1082	1045	436	59.58	238	52	149	304
82.0-83.9	11	678	1423	1304	570	55.49	366	15	101	436
84.0-85.9	6	164	466	373	110	42.34	110	7	59	89
86.0-87.9	6	348	645	602	273	51.33	223	5	133	247
88.0-89.9	7	304	777	777	216	51.78	170	35	140	156
90.0-91.9	5	406	780	630	342	51.15	332	2	26	288
92.0-93.9	3	94	233	233	53	41.34	53	20	71	33
94.0-95.9	4	244	458	446	190	53.38	116		106	168
96.0-97.9	5	281	631	494	212	52.62	212	8	106	184
98.0-99.9	46	3091	4346	4004	2383	45.45	2289	123	834	2424

TABLE 17-F
CITY SUMMARY ACCORDING TO INDEX C
CITY OF MILWAUKEE 1960 U. S. CENSUS OF HOUSING

VALUE OF INDEX C	TOTAL BLOCKS	HOUSING UNITS	POPULATION TOTAL	HOUSING	RENTED UNITS	AVERAGE RENT	LOW RENT UNITS	DILAP- IDATED	DETER- IORATED	DEFICIENT
000-004	892	38086	97474	89339	29684	69.50	10701	1229	5748	8272
005-009	480	15673	48057	47838	5030	91.51	836		35	120
010-014	1815	66257	215421	214430	20224	84.09	1919	16	375	371
015-019	631	28546	88803	88354	11368	78.47	814	71	788	672
020-024	340	16902	52973	52531	8221	70.71	676	42	790	655
025-029	215	11851	36385	35813	6211	68.44	789	56	762	847
030-034	168	9310	28869	28667	5025	68.16	854	57	904	802
035-039	131	7256	23006	22743	3975	66.33	1159	72	979	684
040-044	141	8072	24592	23806	4786	65.75	1403	119	1252	1213
045-049	91	5714	16910	16530	3462	65.80	1044	128	909	1034
050-054	64	4208	12725	12661	2617	62.36	998	73	909	700
055-059	67	4794	14195	13917	2974	65.33	893	105	1098	939
060-064	46	2851	8437	8221	1820	64.95	492	98	639	624
065-069	37	2051	6651	6614	1226	67.81	212	80	759	195
070-074	44	2443	7767	7574	1463	66.34	526	77	943	360
075-079	31	1840	5608	5544	1174	63.60	343	116	717	315
080-084	26	1395	4129	4129	816	63.36	357	66	584	287
085-089	37	1983	6282	6223	1169	58.81	630	134	855	358
090-094	27	1910	5643	5599	1196	61.54	604	123	922	427
095-099	34	1997	6303	6274	1283	61.69	693	129	982	369
100-104	18	870	2781	2749	480	60.25	302	66	504	117
105-109	11	648	2112	2076	429	61.13	162	38	438	101
110-114	17	1070	3540	3477	720	60.29	424	68	528	220
115-119	6	375	1319	1268	234	60.00	96	42	199	58
120-124	8	405	1417	1386	253	63.46	67	19	304	56
125-129	6	448	1332	1325	309	55.22	244	96	172	71
130-134	7	402	1171	1160	231	54.07	128	46	234	103
135-139	4	256	973	973	177	59.02	115	38	155	39
140-144	8	306	977	964	190	55.78	138	55	204	55
145-149	4	189	576	561	131	61.94	39	19	130	50
150-154	3	237	831	831	158	54.10	158	77	86	32
155-159	6	387	1223	1219	276	59.92	156	57	245	76
160-164	4	220	739	739	147	61.69	52	57	126	18
165-169	2	139	493	493	92	56.10	92	26	95	13
170-174	5	198	642	642	138	56.88	111	71	82	25
175-179	2	157	472	472	99	51.52	99	23	115	16
180-184	4	269	851	851	189	56.37	146	71	156	42
185-189	5	360	989	989	203	56.26	142	123	176	41
190-194	1	64	276	276	46	60.80		25	16	4
195-199	3	162	525	525	103	57.93	71	61	86	9
200-204	3	227	755	755	160	65.61	43	104	113	13
205-209	2	106	409	409	72	55.25	72	37	46	9
210-214						NO DATA				
215-219	1	67	247	241	45	61.10		32	31	2
220-224	1	63	210	202	41	58.63	41	27	26	7
225-229						NO DATA				
230-234	4	170	615	615	116	61.95	92	74	68	19
235-239						NO DATA				
240-244						NO DATA				
245 & UP						NO DATA				

TABLE 17-G
CITY SUMMARY ACCORDING TO PER CENT OF VACANCY
CITY OF MILWAUKEE 1960 U.S. CENSUS OF HOUSING

RANGE	TOTAL BLOCKS	HOUSING UNITS	POPULATION TOTAL	HOUSING	RENTED UNITS	AVERAGE RENT	LOW RENT UNITS	DILAP- IDATED	DETER- IORATED	DEFICIENT
00.0-01.9	2548	87730	289391	284925	34154	74.73	6431	620	4347	2555
02.0-03.9	1001	53811	163617	161132	26817	76.56	3905	556	4388	3347
04.0-05.9	672	35427	103354	102013	19770	72.45	4403	650	4371	3452
06.0-07.9	407	22116	64935	63985	12792	68.20	3666	495	3794	2859
08.0-09.9	276	16119	44776	43712	10228	68.37	3002	576	2653	2614
10.0-11.9	161	8942	24247	23427	5767	63.48	2616	332	1967	2071
12.0-13.9	95	5212	14264	14062	3001	66.56	1470	189	1183	1065
14.0-15.9	63	2504	6867	6836	1313	62.07	615	108	519	484
16.0-17.9	53	2067	6148	5508	1171	63.04	519	88	384	381
18.0-19.9	31	2062	4948	4795	1261	61.94	427	104	313	343
20.0-21.9	41	1580	4243	4044	900	57.96	625	157	456	498
22.0-23.9	22	937	3154	2633	574	50.32	496	32	204	124
24.0-25.9	11	406	983	965	235	61.82	166	16	150	92
26.0-27.9	8	251	700	700	122	56.15	105	30	108	42
28.0-29.9	12	233	593	593	83	49.26	64	2	70	34
30.0-31.9	10	278	767	746	109	52.73	71	70	62	35
32.0-33.9	9	215	526	482	87	53.59	53	12	51	24
34.0-35.9	1	34	56	56	18	39.81	18		1	21
36.0-37.9	3	224	282	282	123	48.43	108		148	156
38.0-39.9	1	79	53	53	48	61.80				75
40.0-41.9	7	191	315	315	93	43.75	93	20	33	105
42.0-43.9	3	44	64	64	13	27.23	13		4	19
44.0-45.9	5	111	217	217	32	80.97	11	12	8	2
46.0-47.9	1	28	52	52	11	98.70		2	8	
48.0-49.9						NO DATA				
50.0-51.9	2	34	60	60	8	58.00	3	6	1	
52.0-53.9						NO DATA				
54.0-55.9	2	29	711	32	13	47.78	13	5	12	10
56.0-57.9						NO DATA				
58.0-59.9	1	79	82	82	24	52.88	24	33	23	10
60.0-61.9						NO DATA				
62.0-63.9	1	8	8	8	2	.00	2		7	7
64.0-65.9						NO DATA				
66.0-67.9	1	12	16	16	3	.00	3	2	7	
68.0-69.9						NO DATA				
70.0-79.9	2	161	188	188	11	31.36	11	26	13	15
80.0-89.9						NO DATA				
90.0-100.0	2	10	90	22		NO DATA				

TABLE 17-H
CITY SUMMARY ACCORDING TO PER CENT OF OVERCROWDING
CITY OF MILWAUKEE 1960 U. S. CENSUS OF HOUSING

RANGE	TOTAL BLOCKS	HOUSING UNITS	POPULATION TOTAL	HOUSING HOUSING	RENTED UNITS	AVERAGE RENT	LOW RENT UNITS	DILAP- IDATED	DETER- IORATED	DEFICIENT
00.0	1009	28550	78969	77109	11967	81.11	1643	97	947	919
00.1-01.9	133	10435	25028	24332	6770	82.49	765	33	500	1051
02.0-03.9	645	33348	92639	89328	16913	80.30	1428	171	1483	2070
04.0-05.9	642	30176	85465	83117	15359	72.48	2615	258	2435	2606
06.0-07.9	591	30083	88276	87302	15155	71.46	2966	354	3057	3023
08.0-09.9	518	24896	75474	74588	12234	67.23	4165	322	2876	3012
10.0-11.9	442	19657	63676	63011	8954	68.03	2614	374	2922	1796
12.0-13.9	328	14707	48995	48413	6614	67.03	1879	261	1865	1347
14.0-15.9	262	11634	40499	39718	5305	66.12	2081	337	1758	1043
16.0-17.9	221	10775	36836	36211	5591	64.90	2862	451	1845	1391
18.0-19.9	151	7188	26193	25949	3375	67.57	1015	241	1420	538
20.0-21.9	170	6574	23672	23467	3417	65.95	1369	341	1278	653
22.0-23.9	84	3860	14015	13917	1927	62.08	932	233	972	395
24.0-25.9	72	2318	9016	8971	1063	65.23	440	180	510	189
26.0-27.9	36	1329	4892	4884	692	65.98	270	168	353	105
28.0-29.9	35	1466	5493	5451	843	60.79	497	70	482	125
30.0-31.9	23	905	3506	3506	503	70.27	157	30	149	50
32.0-33.9	29	674	2655	2637	337	56.59	194	74	166	55
34.0-35.9	8	341	1475	1469	222	70.09	130	7	24	3
36.0-37.9	12	222	959	936	115	54.69	83	51	57	14
38.0-39.9	3	369	1785	1629	348	57.78	311		8	5
40.0-41.9	16	399	1791	1767	273	56.68	122	57	94	26
42.0-43.9	5	433	1483	1483	311	45.59	311	5	42	7
44.0-45.9	4	78	415	378	43	88.36	6	2	4	1
46.0-47.9	1	79	360	360	74	68.57				3
48.0-49.9						NO DATA				
50.0-51.9	5	62	298	230	46	46.36	38	3	9	2
52.0-53.9	1	107	495	495	99	69.70				3
54.0-55.9						NO DATA				
56.0-57.9	3	246	1236	1236	220	75.50	35	22	26	7
58.0-59.9						NO DATA				
60.0-61.9						NO DATA				
62.0-63.9	2	17	91	91	12	43.75	4	1	3	1
64.0-65.9						NO DATA				
66.0-67.9						NO DATA				
68.0-69.9						NO DATA				
70.0-71.9						NO DATA				
72.0-73.9						NO DATA				
74.0-75.9	1	6	20	20	1	.00	1			
76.0-77.9						NO DATA				
78.0-79.9						NO DATA				
80.0-81.9						NO DATA				
82.0-83.9						NO DATA				
84.0-85.9						NO DATA				
86.0-87.9						NO DATA				
88.0-89.9						NO DATA				
90.0-91.9						NO DATA				
92.0-93.9						NO DATA				
94.0-95.9						NO DATA				
96.0-100.0						NO DATA				

TABLE 17-1
CITY SUMMARY ACCORDING TO PER CENT OF SOUND UNITS WITH ALL FACILITIES
CITY OF MILWAUKEE 1960 U. S. CENSUS OF HOUSING

RANGE	TOTAL BLOCKS	HOUSING UNITS	POPULATION TOTAL	HOUSING	RENTED UNITS	AVERAGE RENT	LOW RENT UNITS	DILAP- IDATED	DETER- IONATED	DEFICIENT
00.0-03.9	62	2613	6933	6818	1926	35.95	1293	518	1695	803
04.0-05.9	22	1230	2784	2705	911	52.37	669	195	704	550
06.0-07.9	16	649	1743	1727	461	53.57	302	116	374	237
08.0-09.9	12	669	1651	1645	463	55.72	349	76	496	217
10.0-11.9	14	672	1949	1866	497	60.60	353	98	453	188
12.0-13.9	15	903	1958	1828	706	49.68	647	60	384	511
14.0-15.9	13	841	1822	1768	624	52.47	498	49	457	458
16.0-17.9	15	833	2273	2264	573	53.37	408	135	363	274
18.0-19.9	17	956	2695	2575	675	53.09	614	109	480	346
20.0-21.9	24	1044	2670	2595	769	53.95	563	96	484	410
22.0-23.9	14	820	2605	2584	578	60.39	310	102	398	168
24.0-25.9	22	1285	3467	3408	907	58.17	546	110	609	416
26.0-27.9	18	1214	3213	3009	813	57.03	638	121	468	409
28.0-29.9	16	1142	2744	2674	861	58.90	480	71	314	474
30.0-31.9	20	1079	3082	2959	744	58.47	540	83	506	291
32.0-33.9	28	1332	3792	3520	952	60.71	493	90	433	475
34.0-35.9	19	1052	2794	2761	729	59.33	343	71	487	245
36.0-37.9	25	1545	4077	3875	1140	61.45	651	116	623	459
38.0-39.9	23	1669	4053	4018	1180	59.20	625	72	481	586
40.0-41.9	35	2201	8103	5811	1571	67.19	537	147	809	552
42.0-43.9	33	1734	5455	5426	1106	58.71	655	138	715	286
44.0-45.9	30	1614	4643	4611	1042	58.61	633	83	577	390
46.0-47.9	27	1730	4664	4314	1179	61.07	461	59	359	608
48.0-49.9	30	1703	4706	4686	1071	61.61	611	92	509	404
50.0-51.9	39	2142	6668	6469	1416	64.97	274	147	646	399
52.0-53.9	29	1426	4199	4057	961	61.74	523	60	394	287
54.0-55.9	41	2427	7059	6824	1645	62.15	838	48	615	551
56.0-57.9	33	2347	6629	6008	1669	64.47	643	82	561	306
58.0-59.9	36	2294	6232	5974	1527	67.89	251	42	529	476
60.0-61.9	39	2659	6885	6852	1829	65.96	371	83	574	519
62.0-63.9	42	2772	7688	7461	1838	65.49	701	38	588	538
64.0-65.9	48	3205	8940	8803	2099	66.69	299	86	578	579
66.0-67.9	53	2903	8990	8721	1716	64.63	710	46	490	521
68.0-69.9	61	3905	10378	10138	2580	65.54	477	80	593	696
70.0-71.9	71	3571	10621	10571	2124	64.23	580	62	589	481
72.0-73.9	62	3390	10589	10441	2041	64.44	742	44	554	392
74.0-75.9	76	3975	12475	12028	2344	66.74	477	83	667	346
76.0-77.9	67	3584	10323	10069	2136	66.52	440	45	428	439
78.0-79.9	76	4212	12817	12740	2513	66.18	567	58	445	449
80.0-81.9	93	4942	15038	14749	2687	69.43	436	53	531	431
82.0-83.9	98	4554	14376	14141	2470	79.62	555	42	420	372
84.0-85.9	126	6304	19357	19011	3365	69.76	575	36	560	448
86.0-87.9	108	5804	17700	17532	3001	70.46	405	30	400	400
88.0-89.9	147	7907	23451	23187	4374	73.18	555	25	431	456
90.0-91.9	188	8554	26321	25950	4036	74.20	206	40	393	377
92.0-93.9	226	10755	31726	31595	5047	79.89	425	33	408	356
94.0-95.9	279	13579	42364	41996	5898	75.29	390	40	335	332
96.0-97.9	402	19317	59653	59342	8222	83.72	525	24	312	256
98.0-99.9	135	10972	33852	33426	5730	79.44	1120	9	66	76
100.0	2327	72904	237500	234473	24035	84.22	2429			

TABLE 17-J
CITY SUMMARY ACCORDING TO VALUE PER SINGLE FAMILY, OWNER-OCCUPIED UNIT
CITY OF MILWAUKEE 1960 U. S. CENSUS OF HOUSING

RANGE	TOTAL BLOCKS	HOUSING UNITS	POPULATION TOTAL	HOUSING	RENTED UNITS	AVERAGE RENT	LOW RENT UNITS	DILAP- IDATED	DETER- IORATED	DEFICIENT
80000-4999	894	38139	97632	89497	29717	69.49	10701	1231	5769	8279
5000-5499	1	50	148	148	32	63.65		4	45	6
5500-5999	4	244	880	874	173	57.34	136	14	125	14
6000-6499	5	302	1128	1128	223	68.64		6	105	29
6500-6999	11	672	2068	2068	421	55.17	364	81	297	112
7000-7499	24	1312	4510	4504	844	59.54	457	126	505	131
7500-7999	51	3122	10473	10416	1955	62.00	1019	164	826	413
8000-8499	63	3762	12292	12143	2327	62.92	1014	228	1057	544
8500-8999	98	5112	16434	16360	2919	60.67	1462	275	1273	530
9000-9499	119	7080	22476	22344	4066	64.67	1392	193	1445	775
9500-9999	132	7332	23259	23177	4125	62.70	1387	243	1398	760
10000-0499	173	9870	31506	31302	5359	65.03	1260	176	1919	982
10500-0999	165	9993	31063	30794	5577	67.41	1403	292	1503	1118
11000-1499	176	10604	33158	32962	6139	66.13	1796	196	1334	857
11500-1999	187	10302	31100	30425	5821	66.63	1002	191	1313	983
12000-2499	196	9987	30321	30189	4888	69.56	621	57	950	682
12500-2999	177	8188	24649	24381	4024	71.59	553	82	881	444
13000-3499	202	8954	26704	26597	4215	72.54	375	61	823	571
13500-3999	223	10108	31686	31262	4323	74.64	600	141	812	613
14000-4499	214	8278	26469	26245	2873	76.50	264	39	439	236
14500-4999	224	9221	29443	29270	3068	78.16	249	42	424	215
15000-5499	230	9015	29053	28898	3348	80.96	340	67	306	168
15500-5999	215	8701	28292	28184	2651	81.07	261	30	254	214
16000-6499	245	9777	31030	30963	3325	82.63	651	20	213	148
16500-6999	151	5610	18627	18560	1592	86.23	92	23	125	102
17000-7499	142	5353	17773	17654	1461	83.08	115	12	89	106
17500-7999	160	5346	17652	17557	1413	83.86	130	14	67	84
18000-8499	165	6070	20525	20104	1735	86.45	123	24	120	92
18500-8999	121	4427	13530	13458	1447	81.32	274	15	104	208
19000-9499	107	3845	12683	12640	1081	92.51	63	10	51	9
19500-9999	99	3186	10272	10175	902	82.88	97	17	53	119
20000-0499	83	2760	8666	8430	773	84.76	180	9	69	117
20500-0999	62	2320	6940	6686	914	81.84	31	17	100	143
21000-1499	60	1657	5326	5250	533	92.75	45	3	29	5
21500-1999	36	1272	3730	3676	451	93.71	14		20	46
22000-2499	34	1018	3090	3090	264	94.08	15	2	5	2
22500-2999	31	947	2859	2855	304	103.04	27	2	1	1
23000-3499	26	862	2602	2560	277	97.37	18		6	
23500-3999	23	773	2334	2317	285	97.73	6		6	1
24000-4499	11	334	1088	1088	77	98.57	12	2	3	1
24500-4999	12	264	801	801	48	83.26	10		12	2
25000-5499	11	258	843	838	40	97.47			1	
25500-5999	8	653	1275	1257	453	79.36	5	34	42	207
26000-6499	8	249	864	864	59	90.09	7		7	1
26500-6999	8	239	684	684	97	111.02	3		1	1
27000-7499	9	240	813	813	32	89.15	12			2
27500-7999	2	32	107	107	7	.00	7			
28000 & UP	54	3094	6853	6410	2125	89.91	340		158	367

Table 18-A
 Rank Order Correlations: Composite Indices*
 (Selected Pairs)

First Index	Second Index	Rho	Rho ²
I	A	.95	.90
	B	.72	.52
	II	.77	.59
	III	-.79	.62
II	A	.78	.58
	C	.81	.66
	I	.77	.59
	III	-.69	.62
III	A	-.70	.49
	B	-.59	.34
	I	-.79	.62
	II	-.69	.47
A	C	.95	.90
	I	.95	.90
	II	.78	.58
	III	-.70	.49
B	I	.72	.52
	II		
	III	-.59	.35
C	A	.95	.90
	II	.81	.66

*Uncorrected for tie scores

Table 18-B
Rank Order Correlations: Composite Indices and Selected Variables*

Variable	Index	Rho	Rho ²
% Dilapidation	A	.64	.41
	B	.51	.26
	C	.62	.38
	I	.62	.38
	III	.10	.01
% Deteriorating	A	.82	.67
	B	.49	.24
	C	.82	.67
	I	.76	.58
	II	.56	.31
III	-.40	-.16	
% Deficient	A	.74	.55
	B	.68	.46
	C	.75	.56
	I	.72	.52
	II	.64	.41
III	-.34	-.12	
% Overcrowded	A	.38	.12
	B	.72	.52
% Vacancy	I	.40	.16
	III	-.30	-.09
% Renter Occupancy	I	.51	.26
	III	-.56	-.31
% Non-Housing Unit Population	I	.48	.23
% Non-White Occupancy	A	.51	.26
	I	.55	.30
	III	-.01	-.00
Rent per Unit	I	-.76	-.58
Value per Unit	I	-.80	-.64
Rent per Room	I	-.60	-.36
Value per Room	B	-.39	-.15
	I	-.82	-.67
Rooms per Unit	A	-.03	-.00
	I	-.07	-.00
	II	-.16	-.03
	III	-.08	-.01

*uncorrected for tie scores

Table 18-C
Rank Order Correlations: Selected Census Variables*

First Variable	Second Variable	Rho	Rho ²	First Variable	Second Variable	Rho	Rho ²		
% sound, all Facilities	% Overcrowded	-.19	-.04	% Non-Housing Unit Population	% Sound, All Facilities	.35	.12		
	% Vacancy	-.30	-.09		% Deteriorating	.54	.29		
	% Renter Occupancy	-.50	-.25		% Deficient	.59	.35		
	% Non-Housing Population	.35	.12		% Overcrowded	.42	.18		
	% Non-White Population	.03	.00		% Non-White Occupancy	.70	.49		
	Rent per Unit	.64	.41		% Non-White Occupancy	% Sound, All Facilities	.03	.00	
	Value per Unit	.66	.44			% Dilapidated	.70	.49	
	Rent per Room	.41	.17			% Deteriorating	.58	.34	
Value per Room	.69	.48	% Deficient	.56		.31			
% Dilapidated	% Deteriorating	.65	.42	% Overcrowded		.46	.21		
	% Deficient	.58	.34	% Vacancy		.48	.23		
	% Overcrowded	.45	.20	% Renter Occupancy		.54	.29		
	% Vacancy	.50	.25	% Non-Housing Population		.70	.49		
	% Non-White Occupancy	.70	.49	Rent per Unit	-.04	-.00			
	Rent per Unit	.05	.00	Value per Unit	.02	.00			
	Value per Unit	.13	.01	Rent per Room	.01	-.00			
	Rent per Room	.10	.01	Rooms per Unit	.19	.04			
% Deteriorating	Value per Room	.13	.01	Rent Per Unit	% Sound, All Facilities	.64	.41		
	% Dilapidated	.65	.42		% Dilapidated	.05	.00		
	% Deficient	.61	.37		Rent per Unit	.70	.49		
	% Overcrowded	.32	.10		% Deteriorating	-.42	-.18		
	% Vacancy	.41	.17		% Deficient	-.53	-.28		
	% Renter Occupancy	.48	.23		% Overcrowded	-.30	-.09		
	% Non-Housing Population	.54	.29		% Vacant	-.27	-.07		
	% Non-White Occupancy	.58	.34		% Non-White Occupancy	-.04	-.00		
Rent per Unit	-.42	-.18	Value Per Unit	% Sound, All Facilities	.66	.44			
Value per Unit	-.43	-.18		% Dilapidated	.13	.02			
% Deficient	% Dilapidated	.58		.34	% Deteriorating	-.43	-.18		
	% Deteriorating	.61		.37	% Vacancy	-.26	-.07		
	% Non-Housing Population	.59		.35	% Non-White Occupancy	.02	.00		
	% Non-White Occupancy	.56		.31	Rent per Unit	.70	.49		
	Rent per Unit	-.53		-.28	Rent Per Room	% Sound, All Facilities	.41	.17	
	Rent per Room	-.24		-.06		% Dilapidated	.10	.01	
	Rooms per Unit	-.12	-.01	% Deficient		-.24	-.06		
	% Overcrowded	% Sound, All Facilities	-.19	-.04		% Overcrowded	-.25	-.06	
% Dilapidated		.45	.20	% Non-White Occupancy		.01	.00		
% Deteriorating		.32	.10	Rent per Unit		.76	.58		
% Renter Occupancy		.06	.00	Value Per Room		% Sound, All Facilities	.69	.48	
% Non-Housing Population		.42	.18			% Dilapidated	.13	.02	
% Non-White Occupancy		.46	.21		Rooms Per Unit	% Deficient	-.12	-.01	
Rent per Unit		-.30	-.09			% Overcrowded	-.16	-.02	
Rent per Room		-.25	-.06			% Non-White Occupancy	.19	-.04	
Rooms per Unit	-.16	-.02	% Vacancy			% Sound, All Facilities	-.30	-.09	
% Dilapidated	% Sound, All Facilities	-.30				-.09	% Dilapidated	.50	.25
	% Dilapidated	.50				.25	% Deteriorating	.41	.17
	% Deteriorating	.41		.17		% Non-White Occupancy	.48	.23	
	% Non-White Occupancy	.48		.23		Rent per Unit	-.27	-.07	
	Rent per Unit	-.27		-.07	Value per Unit	-.26	-.07		
	Rent per Room	-.25		-.06	% Renter Occupancy	% Sound, All Facilities	-.50	-.25	
	Rooms per Unit	-.16		-.02		% Deteriorating	.48	.23	
	% Sound, All Facilities	-.50	-.25	% Overcrowded		.06	.00		
% Dilapidated	.45	.20	% Non-White Occupancy	.54		.29			
% Deteriorating	.32	.10	% Non-Housing Unit Population	% Sound, All Facilities		.35	.12		
% Renter Occupancy	.06	.00		% Deteriorating		.54	.29		
% Non-White Occupancy	.54	.29		% Deficient		.59	.35		
% Non-Housing Population	.35	.12		% Overcrowded		.42	.18		
% Non-White Population	.03	.00		% Non-White Occupancy	.70	.49			
Rent per Unit	.64	.41		% Sound, All Facilities	.03	.00			
Value per Unit	.66	.44		% Dilapidated	.70	.49			
Rent per Room	.41	.17		% Deteriorating	.58	.34			
Value per Room	.69	.48	% Deficient	.56	.31				

rho = rank order correlation coefficient

rho² = the predictive efficiency - portion of variation in the first variable which is explained by variations in the second variable.

*uncorrected for tie scores

Table 19
Rank Order Multiple Correlations: Indices and Selected Census Variables

<u>Index I</u>	<u>Percent sound, all facilities</u>	<u>Percent deficient</u>	<u>Correlation Code</u>
Rd.0q=.97			a. Index A
Rd.af=.97	Rg.1p=.65	Rj.op=.76	b. Index B
Rd.op=.92	Rg.1o=.36	Rj.no=.63	c. Index C
Rd.gs=.87	<u>Rg.mo=.59</u>	<u>Rj.or=.61</u>	d. Index I
Rd.gq=.86			e. Index II
Rd.bf=.85	<u>Percent dilapidated</u>	<u>Percent non white occupancy</u>	f. Index III
Rd.gp=.85			g. % sound, all facilities
Rd.pq=.85	Rh.oq=.72	Ro.hp=.70	h. % dilapidated
Rd.1j=.83	<u>Rh.op=.70</u>	Ro.hq=.70	i. % deteriorating
Rd.or=.82		Ro.1q=.65	j. % deficient
Rd.gm=.78	<u>Percent deteriorating</u>	Ro.jp=.64	k. % overcrowded
Rd.h1=.78		<u>Ro.1p=.62</u>	l. % vacancy
Rd.ae=.77			m. % renter occupancy
Rd.1o=.77	R1.1o=.60	<u>Average rent per unit</u>	n. % non housing unit occupancy
Rd.pr=.76	R1.1p=.52		o. % non white occupancy
Rd.hj=.76	R1.km=.56		p. average rent per unit
Rd.ho=.64	R1.fo=.70	Rp.g1=.64	q. average value of owner occupied
Rd.h1=.63	<u>R1.mo=.61</u>	<u>Rp.11=.43</u>	r. average rent per room
<u>Rd.no=.57</u>			s. average value per room
		<u>Average value of owner occupied home</u>	t. average rooms per dwelling
		Rq.go=.66	

*uncorrected for tie scores

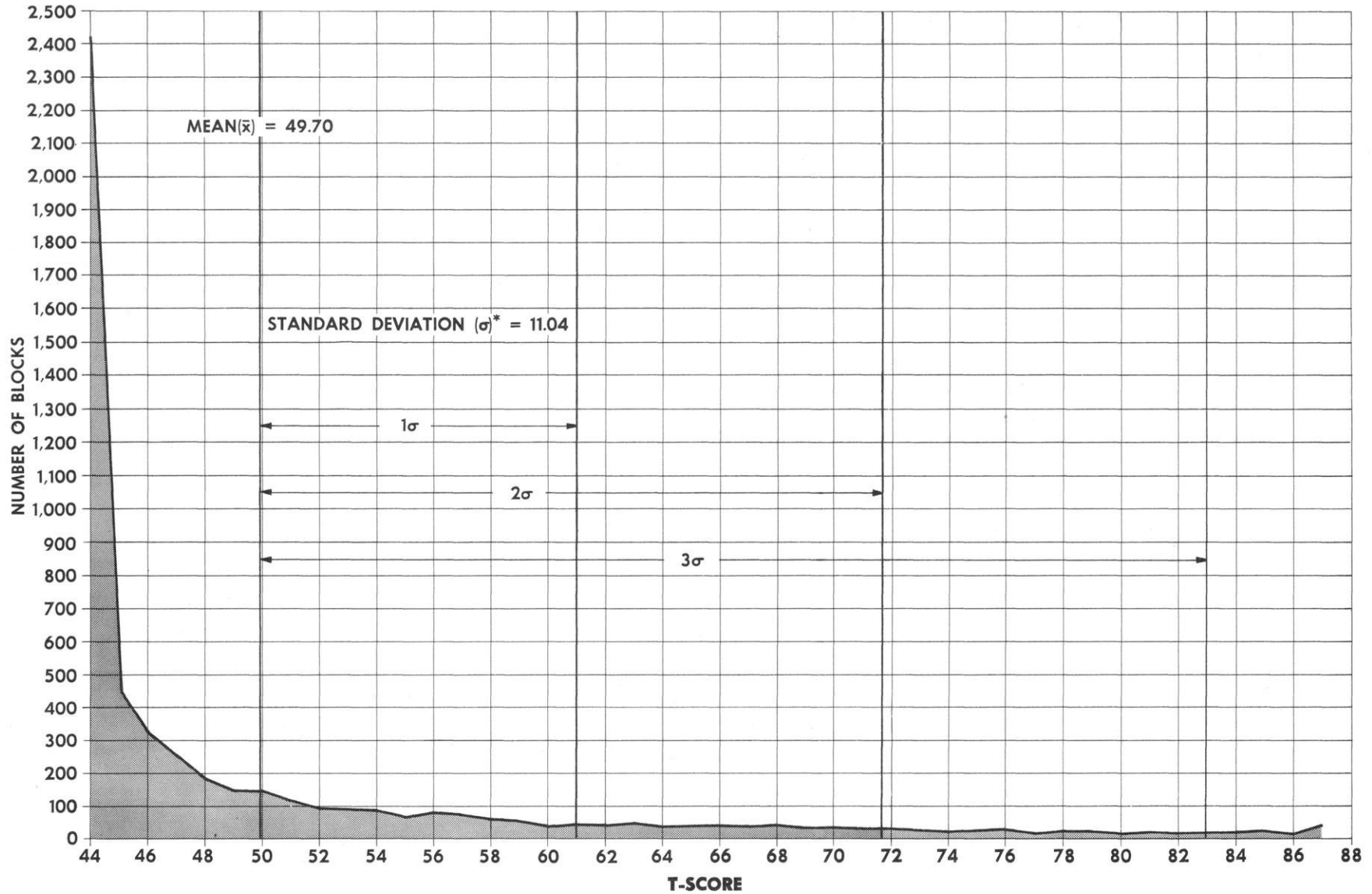
<p>Table 21</p> <p>Regression Equations Utilizing Census Variables and Exterior Inspection to Predict Index Values and Selected Variables</p> <p>(Based upon a stepwise regression analysis of a ten per cent random sample of Milwaukee blocks containing both renters (five or more) and owners (five or more) N=310</p>		<p>Coefficient of Determination (R²)</p> <p>Y Intercept</p>		INDEPENDENT VARIABLES																		
DEPENDENT VARIABLE				DCD condition-residential	DCD condition-mixed use	% sound, all facilities	% sound, lacking facil.	% deteriorating, all facil.	% deteriorating, lacking facil	% deteriorating, total	% lacking facilities, total	% dilapidated	Average rent per unit	Average rent per room	Average value per unit	Average value per room	% renter occupancy	% vacancy	% overcrowding	% non-white occupancy	Average rooms per unit	Average persons per room
DCD condition-residential	.632	-19.3																				
DCD condition-mixed use	.397	-31.2	.72	.15																		
Index A	.976	-95.2			-.90	.28	.12															
Index B	.998	-120.3						.34														
Index C	.951	-177.9	.51		-2.1				1.3													
Index I	.989	8.3			-.32				1.4													
Index II	.963	4.2							.20													
Index III	.940	1454.0							.05		.43											
% sound, all facilities	.987	21.4																				
% sound, lacking facil.	.971	51.6			-2.0																	
% deteriorating, all facil.	.993	30.1			-1.2																	
% deteriorating, lack facil.	.937	-47.8			2.9																	
% deteriorating, total	.980	30.1			-1.4																	
% lacking facilities, total	.823	48.6			-1.9																	
% dilapidated	.794	59.7	.16		-2.2																	
Average rent per unit	.488	11.8																				
Average rent per room	.922	39.8		.13																		
Average value per unit	.521	4.3																				
Average value per room	.916	13.1																				
% renter occupancy	.352	23.5			.45																	
% vacancy	.213	28.9			.22																	
% overcrowding	.725	-4.1																				
% non-white occupancy	.487	36.1																				
Average rooms per unit	.265	18.9																				
Average persons per room	.640	7.7																				

Table 22
Product-Moment Multiple Correlations Using Only Those Census Variables Which Could Be
Duplicated in Intercensal Years Without Interior Inspection of Structures

Dependent Variable	Independent Variables Added Successively	Coefficient of Multiple Correlation	Irrelevant Variables
Index I	Exterior Inspection of Residential Structures-DCD	.68	Nonwhite Occupancy Renter Occupancy
	Value per Unit	.78	
	Rent per Unit	.80	
	Vacancy	.80	
Index II	Value per Unit	.90	Residential Structures-DCD Nonwhite Occupancy Vacancy
	Rent per Unit	.98	
	Renter Occupancy	.98	
Index III	Value per Unit	.86	Residential Structures-DCD Vacancy
	Rent per Unit	.88	
	Renter Occupancy	.89	
	Nonwhite Occupancy	.89	
Index A	Residential Structures-DCD	.64	Nonwhite Occupancy Renter Occupancy
	Rent per Unit	.70	
	Value per Unit	.71	
	Vacancy	.71	
Index B	Vacancy	.62	Nonwhite Occupancy Renter Occupancy
	Value per Unit	.75	
	Residential Structures-DCD	.78	
	Rent per Unit	.79	
Index C	Residential Structures-DCD	.67	Nonwhite Occupancy Renter Occupancy
	Value per Unit	.73	
	Vacancy	.73	
	Rent per Unit	.74	

FIGURE 21

SOUND, PERCENT OF TOTAL HOUSING UNITS WITH ALL PLUMBING FACILITIES ACTUAL T-SCORE VALUES FOR 5,452 BLOCKS



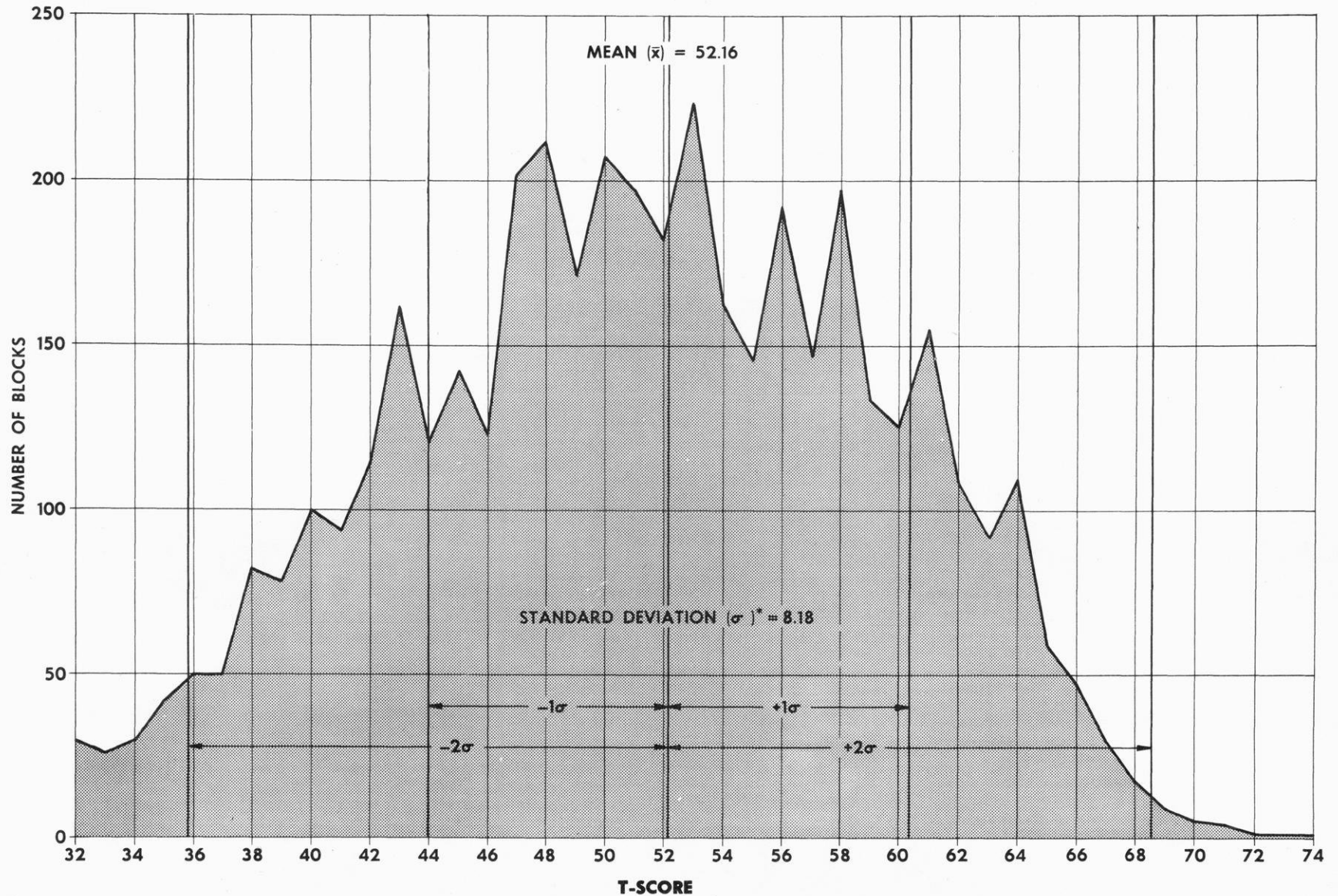
SOURCE: TABLE 3

**For most distribution it is expected that 99.7% of all values will be included between $\pm 3\sigma$ of \bar{x} .*

FIGURE 22

VALUE PER UNIT, ACTUAL T-SCORE VALUES FOR 4,391 BLOCKS**

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**For most distribution it is expected that 99.7% of all values will be included between $\pm 3\sigma$ of \bar{x} .*

***3.5% of the blocks are not included.*

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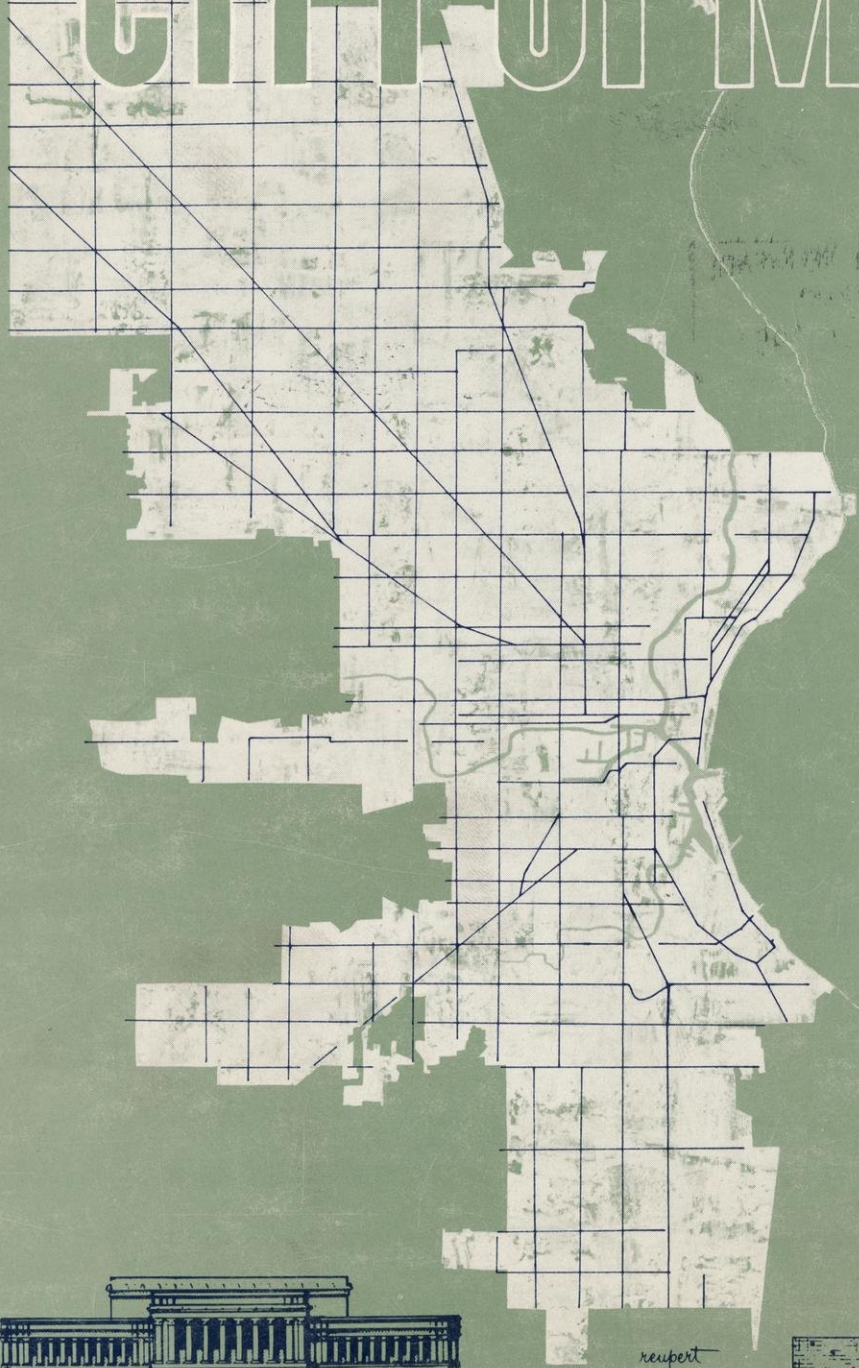
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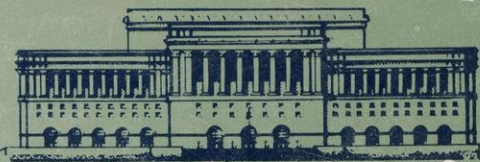
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