A POPULATION DENSITY APPROACH TO INCORPORATING AN URBAN-RURAL DIMENSION INTO SMALL AREA LIFESTYLE CLUSTERS

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Background

The benefits of multivariate clustering techniques for market segmentation were made widely available during the 1980s by the lifestyle cluster products developed by several private data suppliers. Such systems typically assign small areas, such as block groups, to one of forty or more "lifestyle clusters" established through the application of multivariate techniques to detailed demographic composition. The resulting neighborhood typology (expressed as "cluster codes") can provide impressive consumer segmentation and predictive capability while sparing the time and expense of a complete multivariate analysis for each application.

Because lifestyle cluster systems depend on census data for small areas, the release of the 1990 census has provided a once-in-a-decade opportunity for their comprehensive update and revision. One of the aspects we wanted to review was the definition of an urban-rural dimension. A limitation noticed during the 1980s was the occasional occurrence of cluster codes in somewhat anomalous settings. In the parlance of the Claritas PRIZM Cluster system, one might find the "Blue Chip Blues" cluster designation assigned to block groups in areas as divergent as New York City, suburban Little Rock, and some smaller towns. Such occurrences are not only counter-intuitive, but may dilute the predictive power of the neighborhood typology. For this reason, a finer urban-rural dimension was developed for incorporation into our 1990-based lifestyle cluster system.

The Definitional Dilemma

For convenience, we refer to an urban-rural dimension, but recognize that the range of settlement types is not so simple, and not necessarily unidimensional. In fact our objective was to assign block groups to a range of urban-rural classifications. Because the application was the designation of lifestyle clusters, the classifications had to be *lifestyle-relevant.*

Terms such as urban, suburban and rural are commonly used to describe the extent and nature of settlement in an area, but there is no consensus as to their definition. There is an impressionistic element to such concepts, which definitions control for, but do not eliminate. Concepts such as *metropolitan* and *urban* are defined for federal statistical purposes. While they promote consistent usage, the classifications are not viewed as definitive, and are often contested (see, for example, Beale, 1984). *Suburbs* are not officially defined, but are usually designated with reference to *central cities* (another term subject to interpretation), and are often required to be "cities" or municipalities themselves, as in Baldassare (1992) and Hughes (1993). As residual designations, *rural* and *nonmetropolitan* areas tend to be defined more for what they are *not* than for what they are.

Further, the spatial precision of such definitions is impaired by their dependence on an arbitrary and regionally inconsistent framework of state, county and city boundaries. Metropolitan areas (MAs) are built from counties because county data are widely available, not because anyone believes that MAs conform exactly to county boundaries, or to minor civil division (MCD) boundaries in New England. Nor do "city" and "suburban" settlement types conform exactly to the boundaries of central cities and other municipalities. For lifestyle purposes, one might regard as "suburban" some areas that are unincorporated, officially nonmetropolitan, or even within the boundaries of central cities. Accordingly, one would not want to designate a block group as "urban" simply because it happened to fall within the official limits of a central city. Nor would one want to classify a block group as "rural" just because it happened to be just outside a nonmetropolitan city of 20,000 people.

Regional inconsistencies in the conventional geographic framework further confound the classification of small areas along the urban-rural dimension. For example, the inclusion of fringe block groups in metropolitan areas might be somewhat generous in geographically spacious western MAs, but relatively stingy in New England, where inclusion is by MCD. Inclusion in central cities and municipalities can be similarly inconsistent, given state-by-state differences in the propensity for incorporation and annexation.

Thus, while conventional urban-rural definitions are adequate for many administrative and research purposes, they are not well suited to the consistent classification of all land area. The dilemma lies in the fact that, while smaller areas offer greater spatial precision, they are difficult to classify out of context. For example, one might want to distinguish between otherwise similar block groups based on their inclusion in or proximity to major cities or metropolitan areas. However, such boundary dependent references are vulnerable to the imprecision and regional inconsistencies inherent in official definitions and designations.

Claritas Objectives

Our fundamental objective was to create and incorporate an objective urban-rural dimension into the development of a set of 1990 census based lifestyle clusters. We sought to define five major classifications: urban, suburban, second city, town and rural. In turn, each of the nation's 226,399 block groups would be assigned to one of these categories. Block group assignments were mandated because the lifestyle cluster classifications are developed at the block group level.

The intent was not to solve the definitional puzzle or to establish an all-purpose urban-rural typology, but rather to establish objective classifications that were less boundary-dependent. Lifestyle relevance for specific block groups, and the ability to make meaningful urban-rural differentiations were more important than the typology's conformity with conventional or official definitions.

Population Density

We used a population density approach in assigning block groups to urban-rural status. Density may not be "destiny," but its direct link to housing, and its impact on media access and consumer markets (Larson, 1993), suggest its importance to lifestyle. Relevance to the urban-rural dimension is evidenced by density's role in the designation of urbanized areas, which (like our measure) are designed to compensate for the imprecision of the standard metropolitan area designations by providing better separation of urban and rural territory (Bureau of the Census, 1993).

Even a measure as straightforward as population density is subject to debate. Stairs (1977) and Craig (1984) note that an area's population density is actually a mean density for its geographic subunits, and describe some advantages of population-weighted measures over conventional area-weighted density. Craig argues that conventional, or "crude" density assigns undue weight to large, sparsely occupied geographic subunits, and suggests population weighted density as a better characterization of the density and quality of life experienced by the majority of people in an area. Our measure ensures relevance to the density experienced by people in a large number of small areas through the contextual computation described below.

Contextual Density

Our approach was to define a contextual density measure. This measure was based on the density, not of the specific block group, but of a larger geographic area not constrained by boundary definitions. For lifestyle purposes, the density experienced by persons living in a block group is not restricted to the geographic boundaries of their block group.

The method for calculating the contextual density was begun by defining a grid structure for the United States. The grid was defined as 1/30 of a degree latitude and longitude. This divides the United States into roughly 900,000 cells. Each resulting grid cell square had an area of about 4 square miles (the actual area varies with the latitude). Examples of the area covered by the grids for several cities (latitudes) are given below:

City	Latitude	Area (square miles)
Miami	25.8	4.8
Atlanta	33.8	4.4
New York	40.7	4.0
Seattle	47.6	3.7

The population and land area of each grid cell was calculated by summing the population and land area for each block whose centroid fell within the cell's grid. Of the 900,000 possible cells, roughly 550,000 contain at least one block.

We looked at several alternative measures of density by varying the size of the cells and settled upon a larger area to define contextual density. A cell's contextual density was defined as the total population of the cell under examination and the eight surrounding cells (a 3 by 3 matrix of cells) divided by their total land area. Each cell's contextual density was then a combination of its own characteristics as well as the characteristics of the surrounding cells. This definition covered an area of about 38 square miles (again the actual coverage area varies by latitude).

At this point, rather than work on the basis of actual population densities, we chose to convert the information into centiles of density. Each grid cell was ranked from low to high on population density and divided into 100 equal groups based upon population. The scale ran from 0 (lowest) to 99 (highest) density. Thus those cells assigned a density centile of 16 represented 1/100 of the total population and a contextual density greater than 16 percent of the population. The actual density breaks for each centile are presented in Table 1. (Please note that the contextual density is defined for the cell and its surrounding cells. Thus dividing the total grid cell's population by the total grid cell's area will produce an average density for the cell but not what we are defining as contextual density).

This measure proved to be very stable and presented an accurate portrayal of the locale for a grid cell (or by association a tract or block group within the cell). The most dense cells (85 and higher) were clearly the hearts of big cities while the least dense cells (15 and lower) were indeed very rural. Figure 1 represents the grid densities in the Washington, D.C. - Baltimore, Maryland area. This map provides an idea of the grid spacing, and serves as an example of how the densities vary.

Although the contextual density measure clearly defines one type of density, there are many alternative ways that such a measure could be defined. Perhaps the most intuitive alternative would be to define a center based upon the centroid of a block group and summarize all block groups or blocks within a specified radius. We tried this approach for a number of different radii. Not surprisingly, radii of about 3 to 4 miles (producing a comparable size area) give nearly identical results as those produced by the grid approach. In the end, we chose a grid structure for its ease of computing and its regular geometry.

The relation of the size of the grid to the latitude was also of concern to us. Ideally, the measure should be identical for all areas. However, shifting to a fixed-mile radius did not seem to change the results significantly.

Although the grid density approach was very useful, it had its limits. The problems lay in interpreting intermediate densities. Whereas the most dense and least dense areas were incontrovertibly urban centers or rural locations, the intermediate values could be: the centers of small cities, close-in suburbs of small cities, suburbs of large cities, or the far-flung suburbs of a metropolis. An example of this can be seen in Figure 1. The center of Annapolis, Maryland has a grid density of 71. Here, the grid cell is the center of a small independent city. The same density can be seen just North of Falls Church, Virginia, in the Washington, D.C. suburbs. A third context can be seen in the center of Gaithersburg, Maryland. Here a grid density of 72 is associated with the center of a satellite city of Washington. We needed a measure which could differentiate among these possibilities. To address this issue we needed another dimension that measured the relationship of the grid cells to their "population center."

Population Centers

The concept of "population centers" was implemented in a straight-forward manner. Returning to the grid, we defined a cell as a local maxima or population center if its density centile was greater than or equal to those of all the cells surrounding it and the second ring around it (exclusive of the corners - approximately a 5-mile radius). This is illustrated below.

Grid Cell Density Centiles

	85	83	84	
82	85	87	83	73
87	88	**89**	81	77
83	89	88	83	82
	87	85	83	

As illustrated, the central cell has a density centile of 89, which is greater than or equal to all other cells (disregarding corners). As a result, this cell would be considered a local maxima or population center. Note that the cell below and to the left of the center cell could also be a local maxima for our purposes as well.

The relationship of other grid cells to these local density maxima or population centers was defined in the following manner: A local maxima cell became the"population center" for another cell if a route could be constructed (travelling cell by cell in any of the eight possible directions along the grid) in which the density centile of each successive cell was always decreasing or equal, and that route was shorter than that for all other competing local maxima. Ties were resolved by associating the cell with the larger of the two local maxima. In this manner, each grid cell was characterized by two measures, its own density centile (or grid cell density) and the density centile of its associated population center (population center density).

Table 2 presents a cross-tabulation of block group households by grid density and population center density. Because grid density was converted to centiles, the marginal of the household distribution by grid density is essentially even. The slightly uneven nature of the distribution reflects the differences between the distribution of population (upon which the grid density was defined) and households. Further, it is not possible to have a grid cell density higher than a population center density. Thus the table has a triangular form.

This table is presented in graphical form in Figure 2. Population centers are represented along the main diagonal. The grid cells associated with a specific population center would be plotted along a vertical line from the population center. Thus the center of New York city is represented with a population center density of 99. Moving along the vertical (and heading North from the city) one would encounter Yonkers (grid cell density 94), New Rochelle (grid cell density 89), Scarsdale (78), White Plains (70), Tarrytown (58), Briarcliff Manor (52) and Mount Kisco (36).

Likewise the trip outward from Washington, D.C. (population center density 94), presented in Figure 3, takes you though Silver Spring (grid cell density 88), Bethesda (77), Cabin John (69), Laurel (56), Potomac (51), Clinton (39) and Upper Marlboro (27).

Definition of Urban-Rural Categories

We took a heuristic approach to the definition of the five urbanization categories. Much time was spent looking at maps of the associated density measurements to determine meaningful breaks. The rural and small town definitions were simply based upon the grid cell density. Grid cell density centiles of 19 and lower were designated as rural while densities of 20 to 39 were defined as small town. Although we had not planned this result, these two areas are not far from one part of the non-urbanized area definition. The 39th density centile corresponds to grid cell contextual densities of from 899 to 959 persons per square mile. This is quite close to the density component of the Urbanized Area definition which is 1000 persons per square mile.

The differentiation between urban and second cities was a bit more difficult. We felt that this distinction was necessary to provide a better description of the lifestyles. Again, primarily through "professional judgement" based on the examination of the data, we settled on a population center density criteria. Those areas with a population center density of greater than 79 were designated as related to an "urban" center. The remainder were considered to be associated with "second cities."

Within the context of urban and second cities the consideration of the break between city and suburban was also handled on the basis of professional judgement. Returning to Figures 2 and 3, the problem was where to draw the line between areas which are urban and suburban for each population center size. In the case of New York, clearly most would consider Scarsdale to be suburban. The problem is less clear regarding the classification of Yonkers and New Rochelle. Similarly, in the Washington D.C. area, Potomac is suburban, however Silver Spring does have a urban flavor.

We examined many aspects of the neighborhoods across a number of cities. We started with the very high density cities such as New York, Los Angeles and Chicago and mapped their attributes. From this we came to a consensus regarding the cutoff between urban and suburban areas. We then examined several lower density urban areas such as Dallas, Minneapolis - St. Paul, Toledo and Memphis, again coming to a consensus regarding the cutoff between urban and suburban. The final line demarcating the transition from urban to suburban was determined by combining what worked "best" across these areas. In our terminology a grid cell (and its constituent block groups) was urban if :

population center density >= 79 {urban population center}
and
grid cell density >= 40 {not town or rural}
and
grid cell density >= 0.80 × "population center density" + 9.8

This equation describes a line from population center density 79, grid density 73 to population center density 99, grid density 89.

Through a similar process, second cities were defined as those areas meeting this criterion:

population center density < 79 {not an urban population center}
and
grid cell density >= 40 {not town or rural}
and
grid cell density >= 1.7368 × "population center density" - 64.208

This equation describes a line from population center density 79, grid density 73 to population center density 60, grid density 40.

Suburban areas were defined as those areas whose grid cell density was 40 or greater and which were neither urban nor second city. These classifications are represented in Figure 4. Note that although both urban and second cities areas can have suburbs, not all second cities have associated suburbs. The less dense second cities progress directly into town areas. Further, the figure presents the density relationships that define the urban-rural categories. The actual transition patterns depend on the actual densities present.

Results

Application of the equations to the block groups yields classifications of the following sizes:

Rural	18,016,688 households	20%
Town	17,875,435 households	19%
Second City	13,849,764 households	15%
Suburban	24,520,613 households	27%
Urban	17,684,910 households	19%.

A number of demographic characteristics for each of the five urban-rural categories are presented in Table 3. (Please note that all the items represent household-weighted averages of the block group characteristics. Thus, medians are more properly referred to as weight-averaged block group medians.) Although there are no real surprises in the data, some of the magnitudes of the differences were notable. In particular, although the average median household income was lowest for rural areas ($25,316) the income for suburban areas ($40,046) was quite large. The presence of single person households was likewise very evident in urban areas (31.5 percent of all households) compared with the other areas (rural, 20.7 percent; town , 21.6 percent; second city, 27.4 percent; and suburban , 23.0 percent).

The resulting assignments for several metropolitan areas (New York, Washington D.C. and Baltimore, Cleveland, Dallas - Fort Worth) are presented as maps in Figures 5 through 8. (The maps were drawn at the tract boundary level for aesthetic reasons.) These data provide a good view of the urban-rural classifications.

Discussion

Our goal was to create a set of objective criteria which could be used to classify low-level census geographies along the urban-rural dimension. To this end, the measurements and classifications described achieved considerable face validity, and have some unique advantages.

One advantage is that the measurement scheme does not depend on the characteristics of the tract or block group per se, but rather on its context. Again, lifestyle relates to the experience of living in an area, and that experience is influenced by more than the characteristics of the block group of residence. Accordingly, the measurements are relatively independent of census, administrative and political boundaries. The only direct geographic tie is to the centroid of the block. The very small population size of census blocks, and the relatively large physical area of the grid cells, minimizes the influence of standard geographic units.

However, the measurements have potential limitations. First is the possibility that the contextual grid density encompasses so large an area as to present too smooth a density gradient. In other words, our measure might not identify areas of rapid transition from, for example, urban to suburban settlement. Although we did not observe this in any of the areas we examined, some rapid transitions could have been masked.

Second, as presently defined, the contextual density measure can jump over physical features, such as rivers and mountains, to summarize density based on surrounding areas that may be more removed (in lifestyle relevance) than their straight-line distance from the center cell suggests. Where densities are substantial, one might expect connections such as bridges or roads to preserve the relevance between center and surrounding cells. In less densely settled areas, physical barriers may exist which would make inclusion less appropriate.

Finally, the definition is density-dependent to the exclusion of other characteristics, such as housing stock, tenure, sewer access, and commuting patterns, all of which are related to urban-rural character. Density is closely related to such factors, as seen in our results. However, we ask a lot of density as the sole measurement and that reliance can create some awkward situations.

An interesting result can be seen in heavily industrialized and thereby low-population sections of central cities. A good example of the effect of a large industrial area is seen in Cleveland, Ohio, which shows two population centers--one on the East side and one on the West. Cleveland's two population maxima are created by the very low-population downtown business district as well as an industrialized corridor along the Cuyahoga River, which divides the city. The effect of industrial areas is also seen in Detroit, where our procedures create two urban areas. The main area is centered on downtown Detroit, and is separated from a smaller area by the River Rouge industrial area. Again, the relatively low residential density of the industrialized zone creates a lower density area which our procedure interprets as suburban. The problem is not so much that these areas occasionally occur but what type of area they should actually be considered. Neither the urban nor suburban designations seem to fit comfortably.

The density approach to the classification of areas along the urban-rural dimension presents some interesting problems. Density is related to, but does not account directly for specific characteristics related to urbanization. Even contextual density has limitations in some industrialized areas, and its smooth gradients might be an occasional disadvantage. However, these issues are not critical from the perspective of lifestyle segmentation. The urban-rural classification scheme defined here is only one part of a more comprehensive process, which does focus on the detailed characteristics of individual block groups in assigning them to a lifestyle cluster classification. The inclusion of this contextual urban-rural classification therefore provides a useful and consistent framework for interpreting the rest of the block group information.

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Table 1

Grid Cell Centile Definitions

Density Centile	Density Low	Density High	Grid Cells	1990 Population	Grid Cell Land Area
0	0	10	238,651	2,487,076	2,313,103
1	10	17	53,644	2,487,073	221,344
2	17	24	34,970	2,487,150	142,057
3	24	30	26,631	2,487,154	107,080
4	30	37	21,132	2,486,975	83,725
5	37	44	17,793	2,487,155	70,192
6	44	52	15,204	2,487,125	59,864
7	52	60	13,247	2,486,471	51,150
8	60	68	11,506	2,487,721	45,060
9	68	77	10,216	2,486,785	39,400
10	77	87	8,998	2,487,229	34,562
11	87	98	8,023	2,486,967	30,895
12	98	110	7,105	2,487,084	26,850
13	110	123	6,355	2,487,572	24,808
14	123	136	5,726	2,487,312	21,183
15	136	151	5,007	2,486,179	19,516
16	151	167	4,764	2,487,483	18,446
17	167	185	4,481	2,487,682	16,807
18	185	203	3,893	2,486,383	14,392
19	203	223	3,440	2,487,660	13,629
20	223	244	3,281	2,486,810	12,459
21	244	267	3,084	2,487,255	11,050
22	267	292	2,695	2,487,126	10,356
23	292	317	2,474	2,486,853	9,373
24	317	344	2,267	2,487,307	8,724
25	344	370	2,046	2,486,974	7,497
26	370	400	1,860	2,486,696	7,314
27	400	432	1,836	2,486,714	6,774
28	432	468	1,714	2,488,345	6,207
29	468	503	1,508	2,487,729	5,907
30	503	540	1,395	2,483,978	5,281
31	540	576	1,265	2,486,351	4,819
32	576	615	1,211	2,490,065	4,483
33	615	656	1,134	2,486,220	4,173
34	656	702	1,015	2,491,220	3,945
35	702	748	1,016	2,484,944	3,807
36	748	797	963	2,484,347	3,540
37	797	847	870	2,484,312	3,299
38	847	899	846	2,489,644	3,086
39	899	959	746	2,490,123	3,003
40	959	1,013	716	2,483,204	2,631
41	1,013	1,064	666	2,491,244	2,493
42	1,064	1,117	630	2,488,179	2,430
43	1,117	1,175	591	2,482,569	2,253
44	1,175	1,237	574	2,490,316	2,105
45	1,237	1,293	508	2,475,100	2,041
46	1,293	1,351	517	2,497,015	1,952
47	1,351	1,411	476	2,490,805	1,764
48	1,411	1,473	444	2,487,934	1,651
49	1,473	1,533	418	2,484,148	1,639
50	1,533	1,598	415	2,481,971	1,559

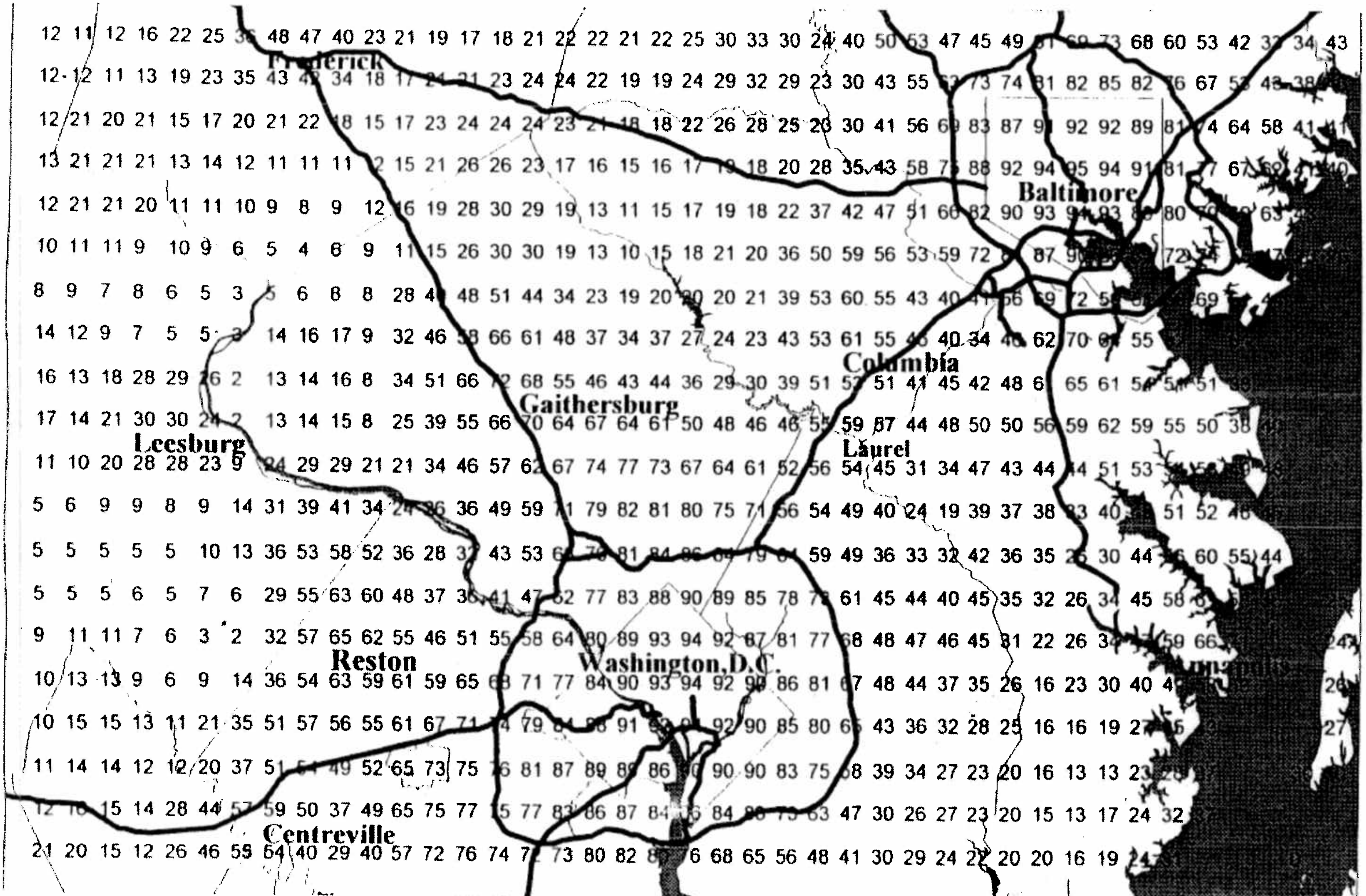
Table 1

Grid Cell Centile Definitions

Density Centile	Density Low	Density High	Grid Cells	1990 Population	Grid Cell Land Area
51	1,598	1,666	384	2,496,336	1,477
52	1,667	1,727	351	2,482,945	1,356
53	1,727	1,798	355	2,485,305	1,364
54	1,798	1,870	334	2,488,070	1,302
55	1,870	1,940	327	2,492,663	1,236
56	1,940	2,007	326	2,479,836	1,160
57	2,007	2,079	294	2,484,182	1,187
58	2,079	2,148	296	2,489,585	1,140
59	2,148	2,222	273	2,488,265	1,091
60	2,222	2,308	283	2,490,579	1,041
61	2,308	2,381	272	2,485,159	1,026
62	2,383	2,468	255	2,487,473	941
63	2,469	2,549	239	2,486,037	981
64	2,549	2,631	249	2,490,768	972
65	2,632	2,718	232	2,474,726	840
66	2,719	2,806	225	2,495,132	868
67	2,806	2,897	225	2,491,580	814
68	2,897	2,987	209	2,487,172	839
69	2,987	3,081	196	2,479,281	772
70	3,081	3,180	196	2,490,329	740
71	3,180	3,282	195	2,481,416	767
72	3,282	3,408	191	2,487,336	722
73	3,409	3,526	188	2,503,796	711
74	3,527	3,635	164	2,469,648	671
75	3,635	3,760	168	2,495,860	636
76	3,760	3,886	157	2,481,521	617
77	3,886	4,005	152	2,496,321	576
78	4,005	4,161	149	2,466,080	616
79	4,163	4,324	153	2,505,013	548
80	4,325	4,505	143	2,492,310	543
81	4,505	4,687	133	2,479,521	518
82	4,694	4,902	127	2,488,015	502
83	4,905	5,149	127	2,489,849	467
84	5,149	5,387	117	2,475,181	431
85	5,388	5,683	123	2,494,608	451
86	5,690	5,990	112	2,486,778	432
87	5,997	6,406	110	2,500,319	398
88	6,406	6,807	104	2,470,026	393
89	6,811	7,284	95	2,488,462	370
90	7,291	7,857	83	2,492,740	318
91	7,862	8,576	78	2,502,161	297
92	8,604	9,315	73	2,449,943	273
93	9,317	10,461	67	2,511,654	250
94	10,469	12,046	54	2,477,165	212
95	12,073	14,633	50	2,477,990	186
96	14,763	17,860	43	2,539,159	158
97	18,067	26,650	34	2,481,143	114
98	27,126	37,454	26	2,562,151	80
99	39,402	50,983	13	2,380,550	50
Total			548,717	248,709,873	3,535,132

Washington, D.C. & Baltimore Area

Figure 1



Grid Cell density is annotated at the approximate center of the grid cell.

Table 2

Distribution of Households by Grid Characteristics

Rows: Grid Density. Columns: Population Center Density.

Grid Density	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99	Total
90-99										9,172,849	9,172,849
80-89									3,440,238	5,802,249	9,242,487
70-79								2,343,262	4,553,708	2,577,667	9,474,637
60-69							1,827,229	3,039,167	2,779,108	1,801,187	9,446,691
50-59						1,686,247	2,411,811	2,002,263	2,083,858	1,347,539	9,531,718
40-49					2,691,354	1,784,321	1,294,155	1,266,134	1,320,893	830,048	9,186,905
30-39				3,657,810	1,823,998	640,764	705,694	711,506	716,877	495,064	8,751,811
20-29			5,979,925	1,310,377	591,064	273,575	290,536	283,033	265,167	129,947	9,123,624
10-19		8,709,075	719,870	221,499	101,834	59,892	35,060	31,829	26,864	9,459	9,915,382
0-9	7,885,126	152,108	42,328	16,342	3,978	1,094	330				8,101,306
Total	7,885,126	8,861,183	6,742,123	5,206,028	5,212,226	4,445,893	6,564,816	9,677,194	15,186,813	22,166,009	91,947,410

Column Percent Distribution of Households by Grid Characteristics

Rows: Grid Density. Columns: Population Center Density.

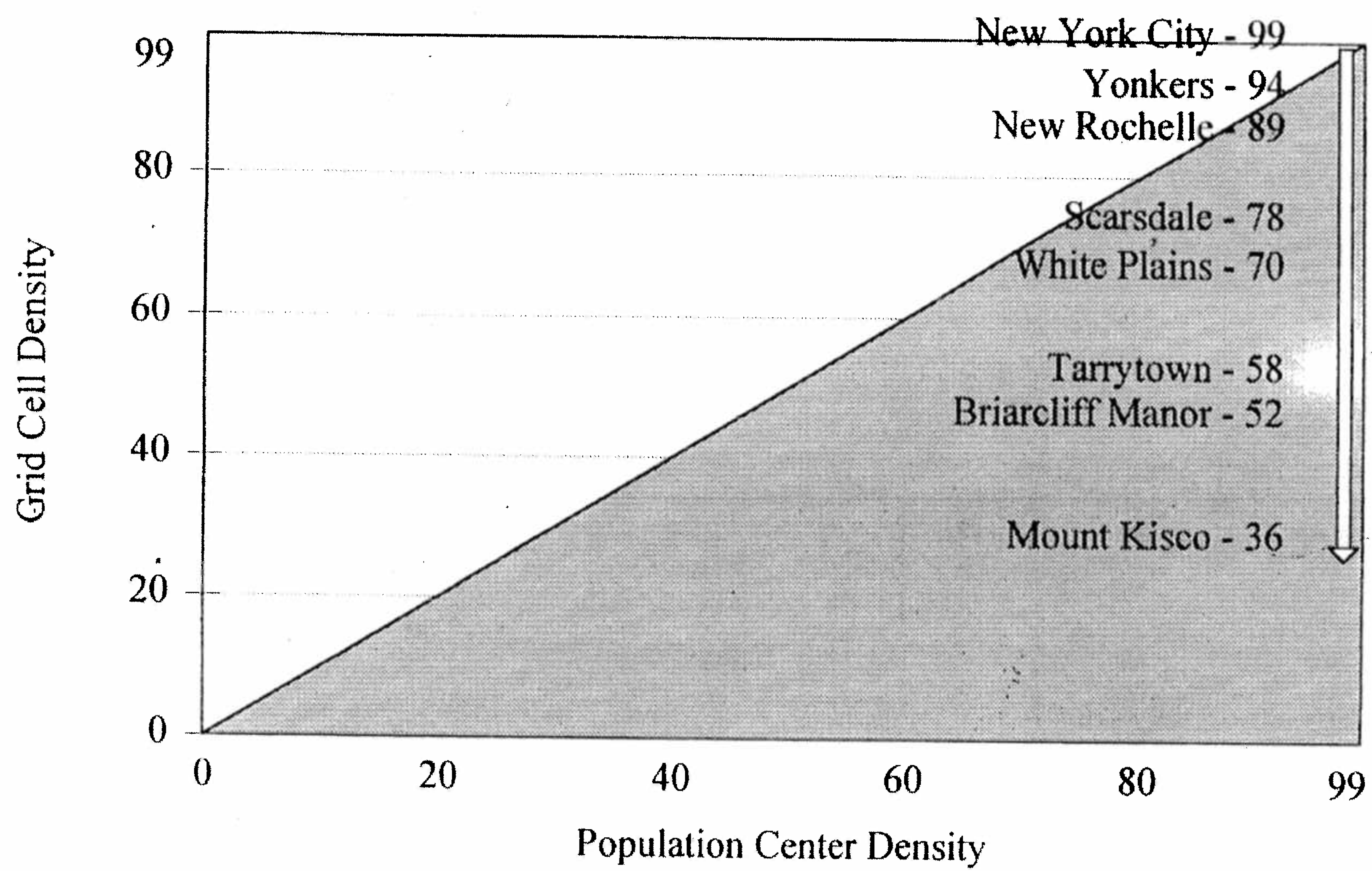
Grid Density	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99	Total
90-99										41	10
80-89									23	26	10
70-79								24	30	12	10
60-69							28	31	18	8	10
50-59						38	37	21	14	6	10
40-49					52	40	20	13	9	4	10
30-39				70	35	14	11	7	5	2	10
20-29			89	25	11	6	4	3	2	1	10
10-19		98	11	4	2	1	1	0	0	0	11
0-9	100	2	1	0	0	0	0				9
Total	100	100	100	100	100	100	100	100	100	100	100

Row Percent Distribution of Households by Grid Characteristics

Rows: Grid Density. Columns: Population Center Density.

Grid Density	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99	Total
90-99										100	100
80-89									37	63	100
70-79								25	48	27	100
60-69							19	32	29	19	100
50-59						18	25	21	22	14	100
40-49					29	19	14	14	14	9	100
30-39				42	21	7	8	8	8	6	100
20-29			66	14	6	3	3	3	3	1	100
10-19		88	7	2	1	1	0	0	0	0	100
0-9	97	2	1	0	0	0	0				100
Total	9	10	7	6	6	5	7	11	17	24	100

New York City Communities



CLARITAS

Figure 3

Washington, D.C. Communities

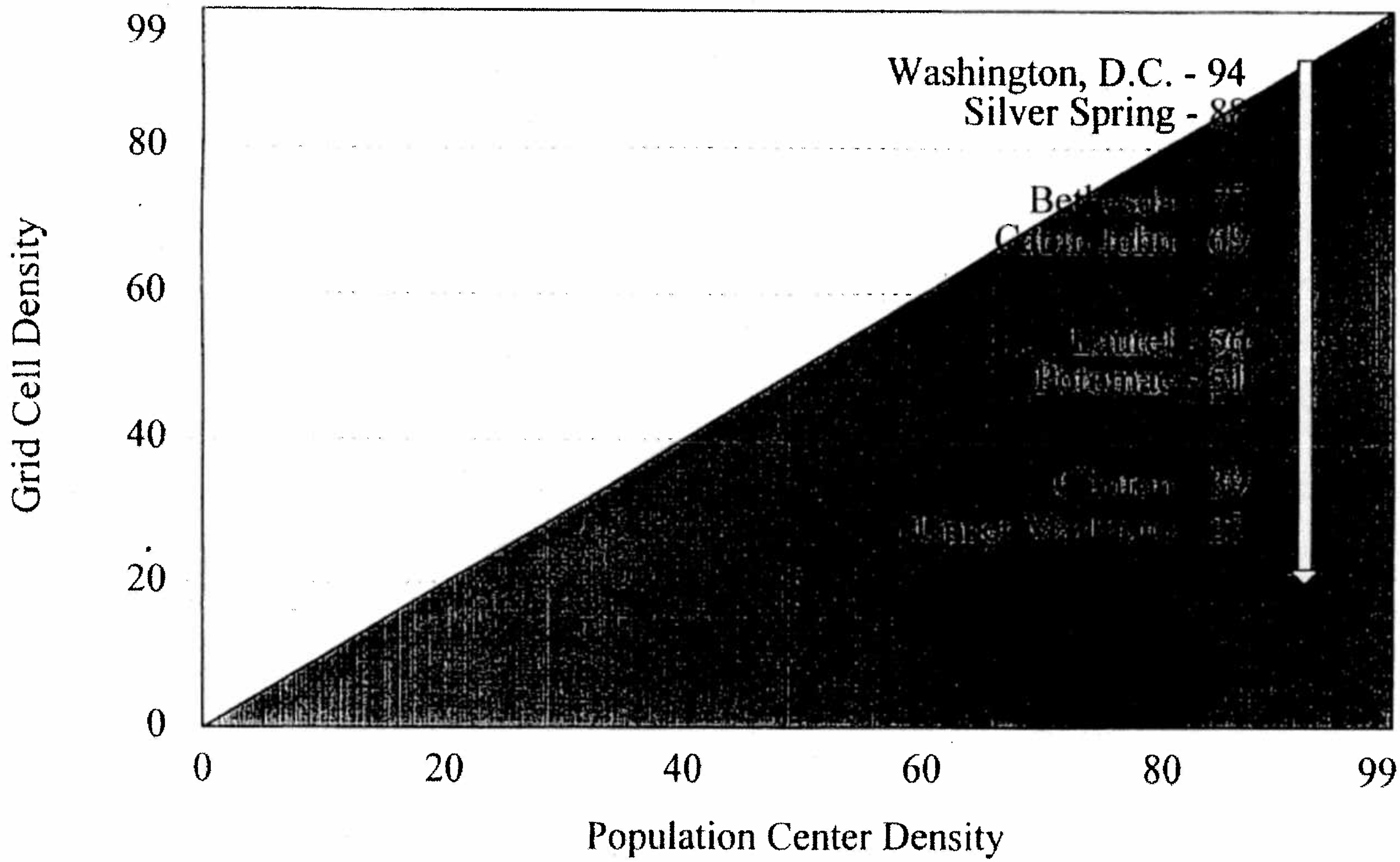


Figure 4

Urbanization Classifications

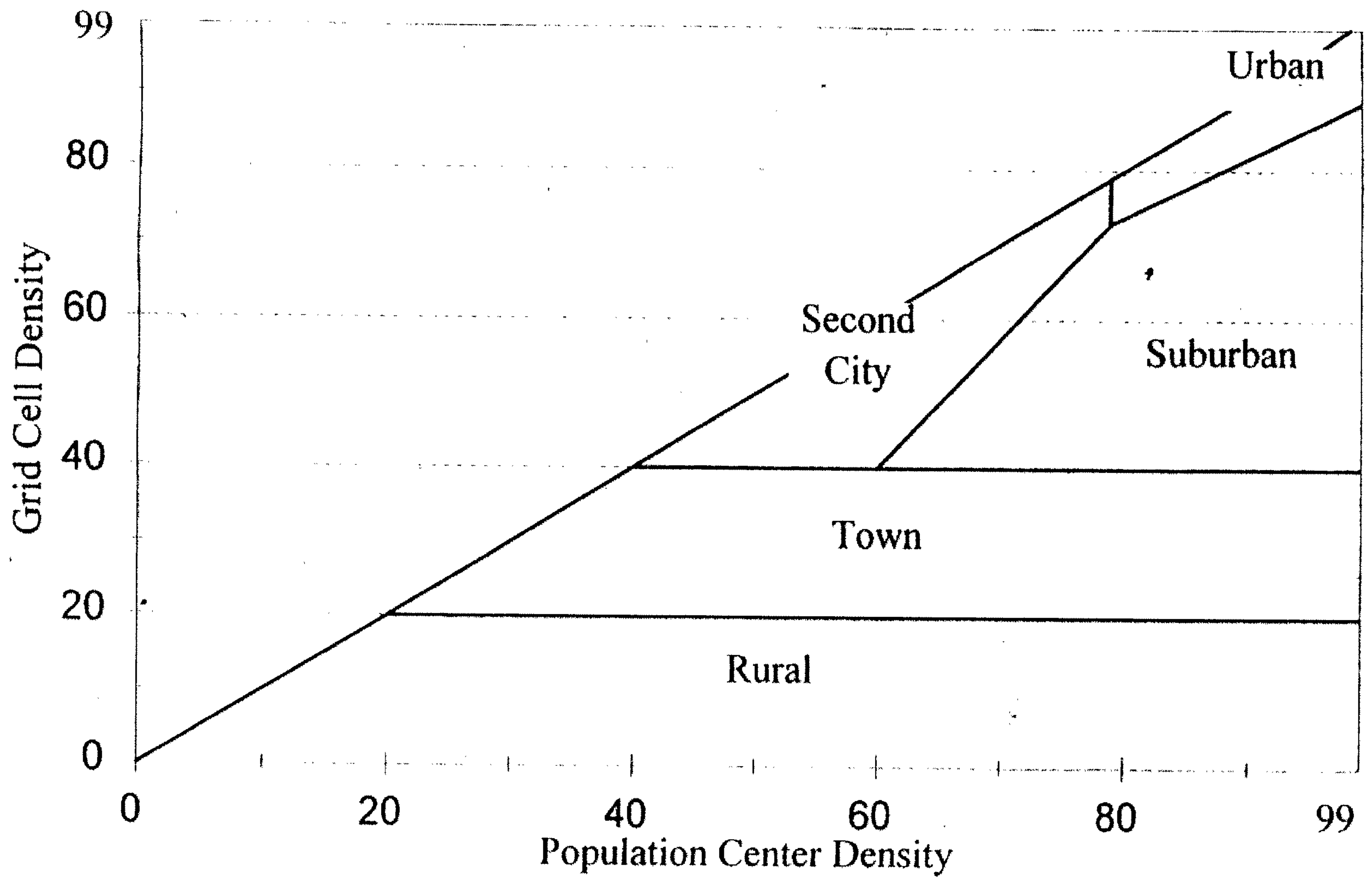


Table 3

Selected Demographics by Urban-Rural Classification

Demographic	Rural	Town	Second City	Suburb	Urban
Total Households	18,016,688	17,875,435	13,849,764	24,520,613	17,684,910
Pct of Total Households	20	19	15	27	19
Population Center Density	11.7	42.0	60.3	85.5	92.1
Grid Cell Density	10.3	29.3	55.3	63.3	89.1
Median HH Income	25,316	32,207	30,384	40,046	30,434
Median Householder Age	49.0	47.0	45.7	45.9	46.1
Pct HHdr Age 15-34	22.8	25.9	30.5	27.6	29.3
Pct HHdr 65+	24.6	21.8	22.0	19.2	22.1
Pct HHdr White	90.0	88.9	81.0	81.5	58.4
Pct HHdr Black	6.1	6.0	11.6	8.8	21.6
Pct HHdr American Indian	1.2	0.5	0.4	0.3	0.3
Pct HHdr Asian	0.2	0.8	1.7	2.8	4.9
Pct HHdr Hispanic	2.3	3.7	5.2	6.5	14.7
Pct Pop Foreign Born	1.6	3.2	5.7	8.4	18.8
Pct 1 Person HH	20.7	21.6	27.4	23.0	31.5
Pct 4+ person HH	28.1	27.2	23.4	26.6	24.1
Pct Married Couple HH	64.6	61.3	50.4	57.0	40.4
Pct HHs with children	39.2	38.6	33.9	36.1	31.6
Pct Married Couple HHs w/Children	31.6	30.3	23.8	27.6	19.1
Pct HHs Single Parent	7.6	8.3	10.0	8.5	12.6
Pct HHs with Female HHdr	8.8	10.0	12.4	11.0	16.2
Pct Own	78.3	71.6	58.1	66.4	44.1
Pct Rent	21.7	28.4	41.9	33.6	55.9
Average units in structure (weighted by HH)	1.4	2.8	5.7	6.2	13.3
Pct Structures SFDU	74.6	72.6	63.7	68.4	42.8
Pct Structures 1 Detached	73.4	68.9	58.0	61.6	34.0
Pct Structures 1 Attached	1.2	3.7	5.7	6.8	8.8
Pct Structures 20+ Units	0.5	2.3	7.2	8.2	21.5
Pct HHs in Condo	0.3	2.2	4.5	6.9	7.0
Median years of stay in Unit	9.5	7.8	7.1	8.1	8.1
Pct HHs Moved in <= 5 years	40.8	49.3	54.3	51.5	49.7
Pct HHs Move in 20+ years	21.6	17.5	17.0	17.2	18.5
Pct with College Degree	11.3	18.8	22.3	25.9	22.8
Pct White Collar Occ.	42.8	55.4	59.1	65.4	60.4
Pct Managerial/Professional Occ.	18.0	25.0	26.6	30.3	27.3
Pct Blue Collar Occ.	38.1	30.6	26.0	23.4	25.1
Pct Farm Occ.	7.2	2.2	1.4	1.0	0.9
Pct in Agricultural Ind.	9.5	3.4	2.1	1.4	1.1
Pct in Manufacturing Ind.	21.6	19.6	15.9	15.9	15.0

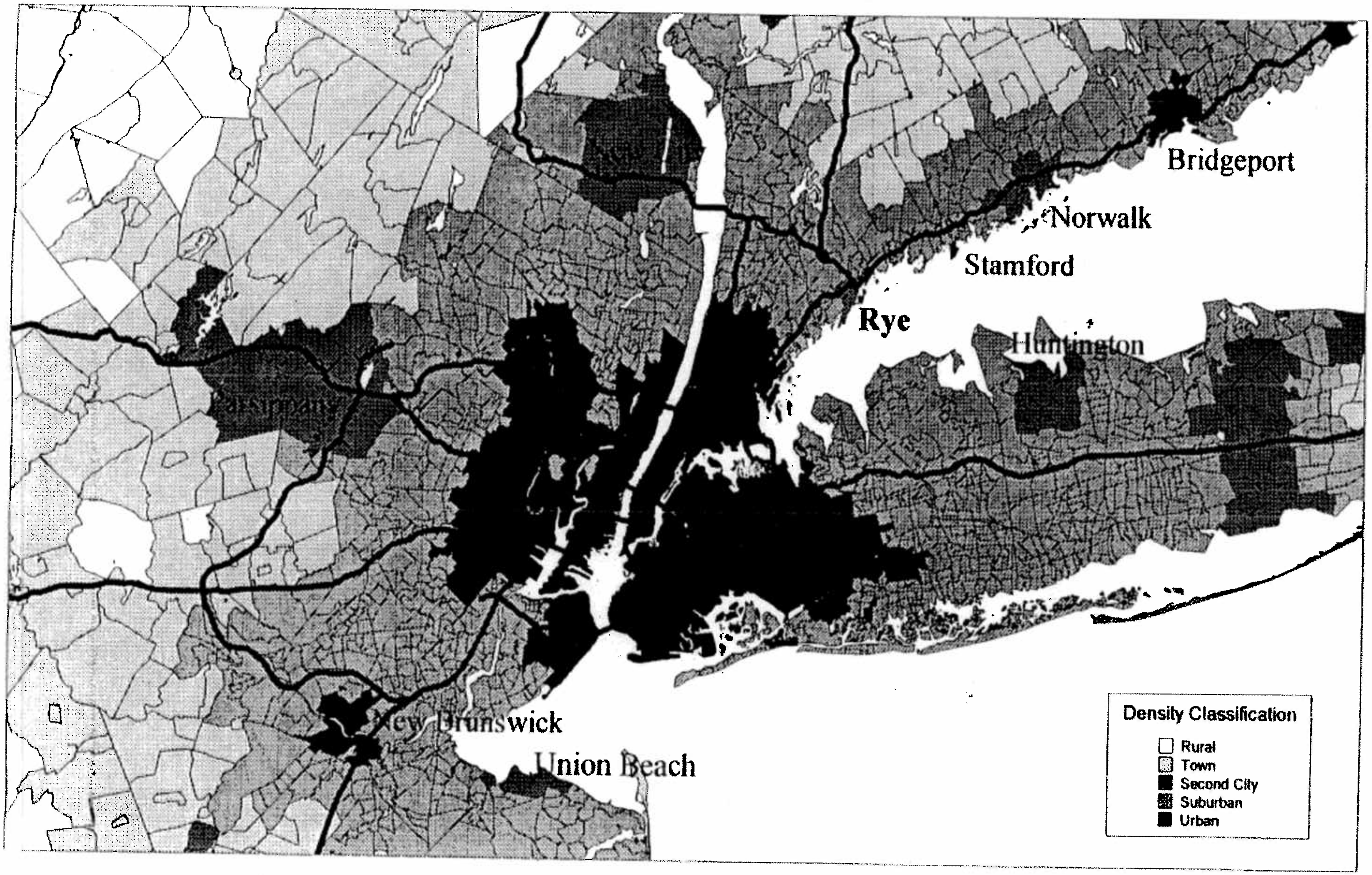
Abbreviations and Notes:

HH = Household
HHdr = Householder
Occ = Occupations, based on employed persons age 16 and over
Ind = Industry, based on employed persons age 16 and over
SFDU = Single family dwelling unit
Average Units in Structure = Weight-averaged number of units in structure weighted by households
College Degree = Pct population age 25 and over with BA or advanced degree

Data represent weight-averaged values for block groups weighted by households.

Figure 5

Tract Urbanization Classifications for the New York City Area



Tract Urbanization Classifications for the Washington, D.C. & Baltimore Area

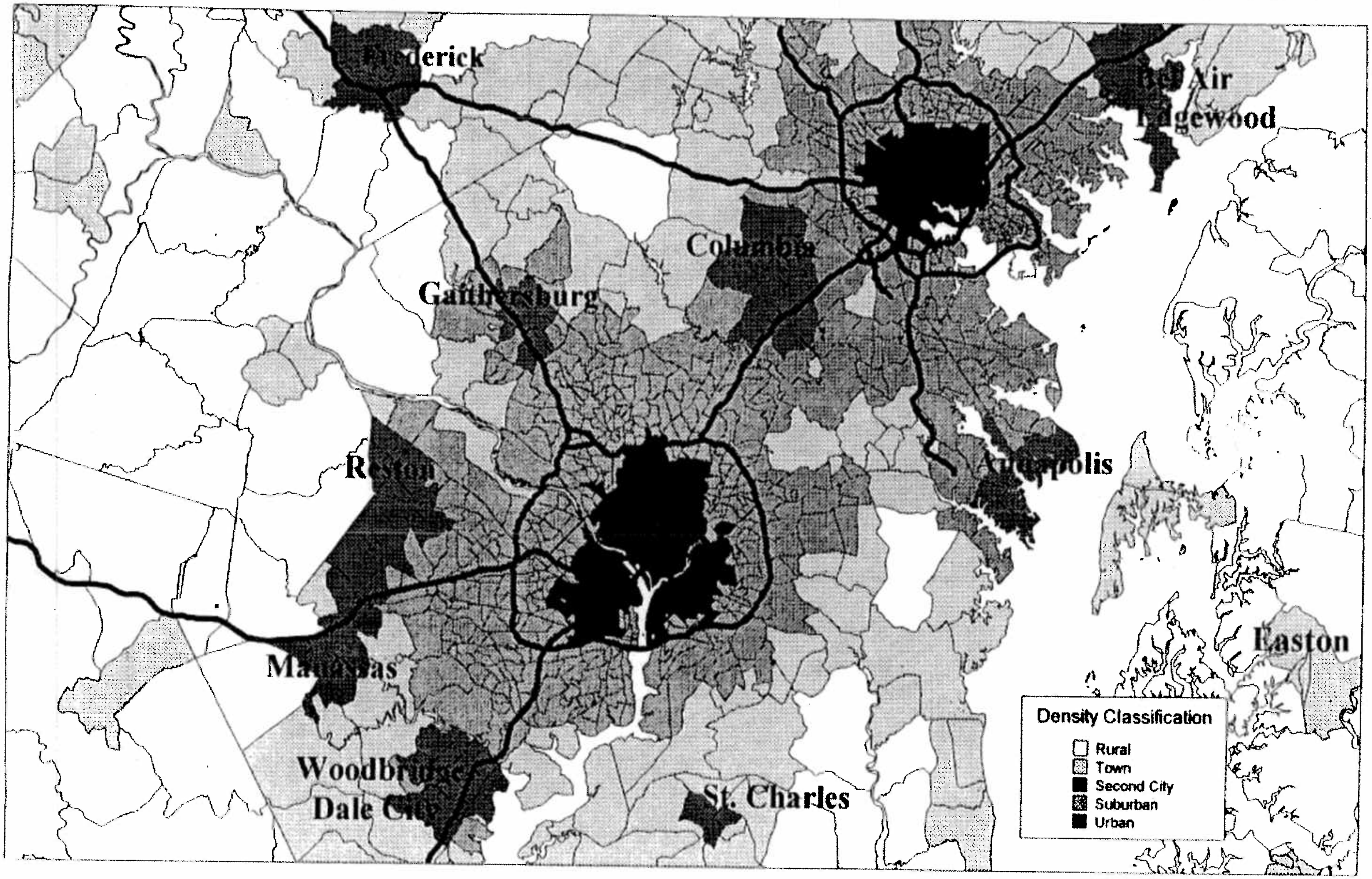


Figure 7

Tract Urbanization Classifications for the Cleveland Area

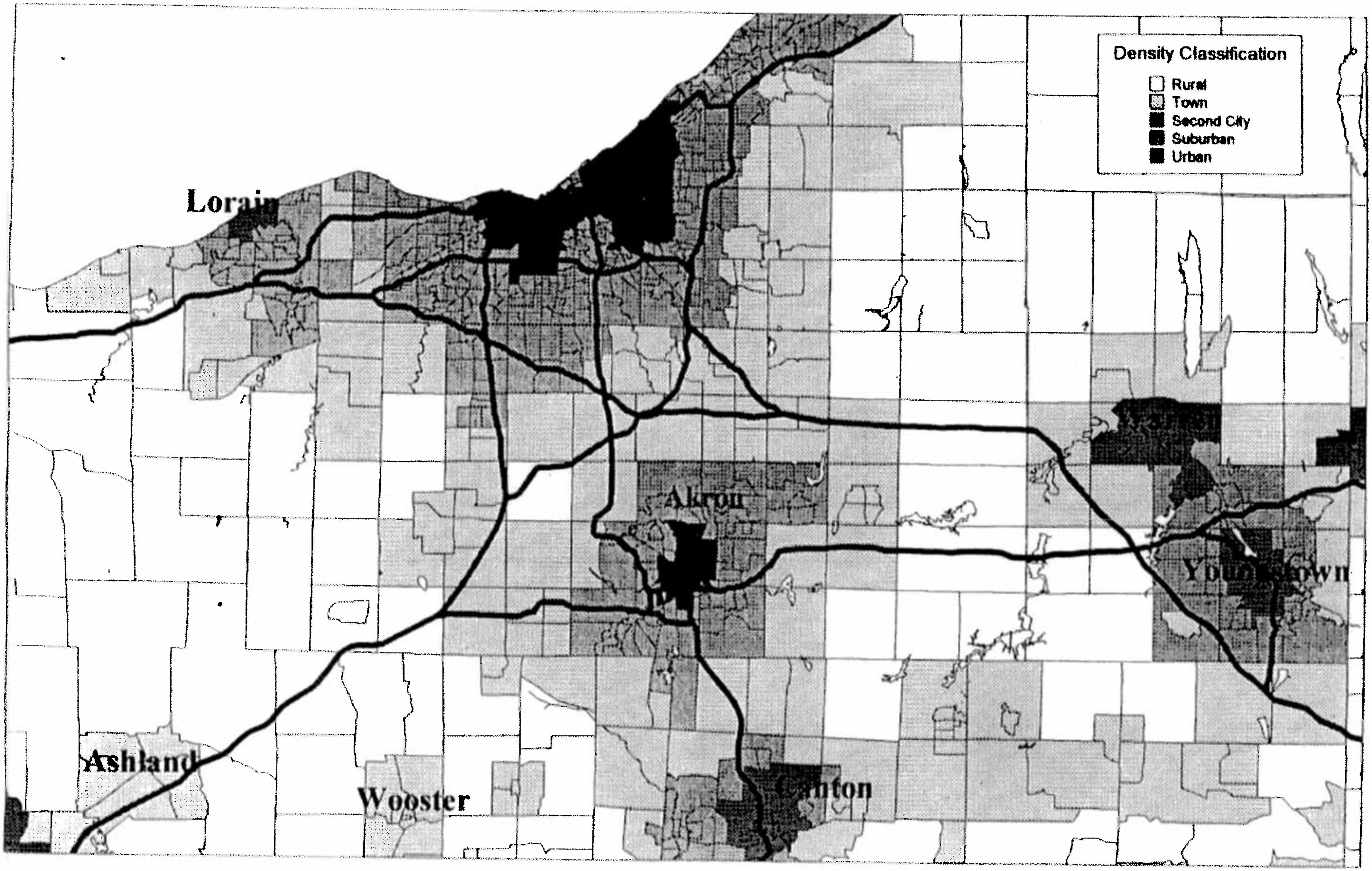
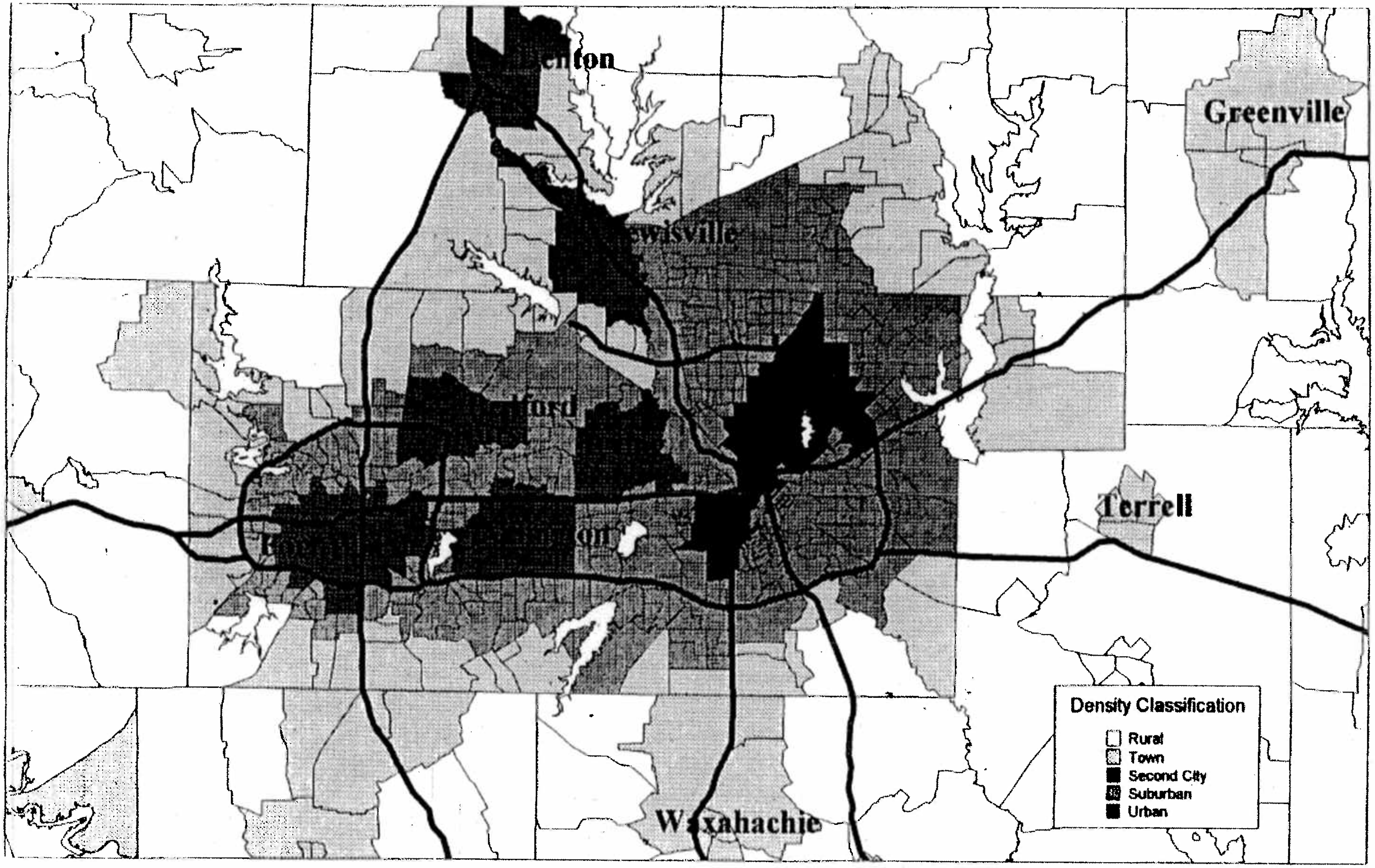


Figure 8

Tract Urbanization Classifications for the Dallas - Fort Worth Area



THE LEADER IN PRECISION MARKETING

CLARITAS

June 14, 1995

Elaine Murakami
Federal Highway Administration, HPM40
400 7th Street, SW
Washington, DC 20590

Dear Elaine:

A copy of the paper on our urban-rural classifications is enclosed. As I indicated at the meeting, it describes work completed by Dave Miller as part of the development of the new PRIZM cluster system. I just wrote the front end, so we could make it a PAA paper, but I would be glad to follow up on any questions you might have.

I very much enjoyed participating in yesterday's meeting. Call anytime if I can be of assistance.

Sincerely,

Ken Hodges
Director, Demography