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AN ASSESSMENT OF URBAN SPRAWL IN THE MIDDLE STATES REGION, 1990-2000

Ola Johansson
Department of Geography
University of Pittsburgh at Johnstown
Johnstown, PA 15904

ABSTRACT: *One of the unfortunate but seemingly unstoppable consequences of urban growth is sprawl. Despite the widespread use of the sprawl concept, there is no commonly accepted agreement on what it entails, much less an exact quantifiable definition. This paper will discuss the growth of 25 cities in New York, Pennsylvania, New Jersey and Delaware that are the centers of the regions' Metropolitan Statistical Areas. The main data source is the U.S. Bureau of the Census' urbanized area designation. By investigating changes in the urbanized areas from 1990-2000, several measurements of sprawl can be obtained, including absolute and relative spatial growth, overall population densities, and population density changes. These measurements are used to identify spatial patterns of sprawl in the Middle States region. Finally, a conceptual addition to the sprawl debate – passive sprawl – is made in the paper.*

INTRODUCTION

Sprawl is one of the most discussed and debated spatial processes in our society. Its impacts are widely felt by most citizens in their daily lives, and perhaps because of that, the term also lacks a precise definition. Similarly, the causes, consequences, and solutions of sprawl are also frequently and passionately argued. The different perspectives on sprawl are colored by individual viewpoints and interests: a planner, a biologist, a developer, or a neighborhood activist invariably carry different notions on what the term embodies. This diversity of opinion may be appropriate; only the most rigid thinker demands that there can only be one undisputed definition to such a multifaceted process. This paper will assess the level of sprawl in selected urban areas in the Middle States region (New York, Pennsylvania, New Jersey and Delaware) using several measurements based on data from the U.S. Bureau of the Census. Moreover, a conceptual addition to the sprawl debate – passive sprawl – will be made at the end of the paper. But before proceeding to the data analysis, here is a summary of some common perspectives on sprawl**.**

• *Sprawl as historical process*. From this perspective, popular among the general population, sprawl is more or less synonymous with urbanization. Air photos of endless, monotonous subdivisions offer "proof" that such developments are the ultimate in mindless sprawl. People adhering to this belief point to Los Angeles as the quintessentially sprawling city, or alternately and more recently, deride Las Vegas, the fastest growing city in the country, as the ultimate example of sprawl.

• *Sprawl as sub-optimal outcome*. This may also be dubbed the planners' perspective because sprawl is a haphazard process that needs to be reshaped by experts. "Smart growth" and its more ambitious cousin "sustainable development" are two current concepts offering a middle way between freewheeling development and restrictive land use planning (Benfield et al., 2001). The tools and goals of combating sprawl include open land preservation, urban redevelopment, compact neighborhood development, pedestrianism, public transit, and so on. To achieve coordinated land-use planning, action on the state (Weitz, 1999) or regional (Orfield, 2002; Pierce, 1993) level is often deemed necessary.

• *Sprawl as the enemy of non-urban land*. This common cause brings farmers and environmentalists together. Problems with water quality, air pollution, and habitat fragmentation irk the environmentalist. Farmers likewise want to stop sprawl because the value of farm property is no match for urban land uses. Even if they do not want to capitalize immediately on increasing property prices, rising property taxes and new suburban regulations may force the farmer out of production. In many sprawl-infected areas, incentives for farmland preservation have been implemented with various degrees of success. Such measures can garner public support, probably not because farmland is really needed, but because the myth of the family farm enterprise and the aesthetics of farming landscapes remains strong.

• *Sprawl as decline of civilization*. This view may also be labeled the New Urbanist perspective. Argued by Kunstler (1996), Duany et al. (2000) and others, the most damaging aspect of sprawl is its corrosive effects on the historic fabric or

the built American environment. Public space, neighborliness, and front porch sitting lose out to standardized, automobile-dependent suburban design and its segregationist tendencies unless efforts to create civilized places and spaces can be revived.

- *Sprawl as rise of a new civilization*. Observers like Peirce Lewis (1995) and Robert Fishman (1995) may not endorse the process of sprawl, but they have detected a significant breach with urban history. The basic notion of center and periphery that has been with us since the earliest days of urbanization in Mesopotamia is disintegrating today. All the leading elements of cities – residences, production, trade – have decentralized and can be found randomly dispersed in a quasi-urban "Galactic City."

- *Sprawl as desirable urban form*. Here, sprawl represents a quintessential American trait: the supremacy of private property. Libertarian and market-oriented think tanks such as the Reason Public Policy Institute (Staley, 1999) and the Heritage Foundation (Shaw and Utt, 2000), opine that sprawl is good because it is a spatial outcome of our collective will expressed through the market. Land should be freely bought, sold, and utilized as land owners please without restrictions because the benefits – inexpensive housing and plenty of residential choice – outweigh the negative.

There appears to be only one thing all agree on: sprawl has progressed unabated for decades and there is no trend reversal in sight. Certainly there are counter-movements: gentrification, downtown revival, and historical preservation have renewed interest in the central city and thereby have created centripetal forces of investment. Traffic congestion and onerous commutes act as disincentives to sprawl, and recent waves of immigrants have taken advantage of inexpensive, older housing in central cities, once again creating thriving urban neighborhoods. Even local governments are slowly waking up to the costs they have to bear in providing sprawl-sustaining infrastructure and are therefore more prone to enact tighter land use regulation than in the past. Despite these trends, all evidence suggests that sprawl continued unabated during the 1990s and beyond. Although cities posted a nation-wide comeback in the 1990s, they were still outpaced by their growing suburbs (Katz and Lang, 2003). If cities with the largest discrepancy between (low) city growth and (high) suburban growth have a high level of sprawl, then cities in the Southeast are the most sprawling, according to one recent study (Berube, 2003), while the opposite is detectable on the West Coast where some cities even grow faster than their suburbs.

SPRAWL IN THE MIDDLE STATES REGION

The Middle States region has not seen rapid population growth recently, sometimes even experienced population losses, but most people would nevertheless agree that sprawl is indeed occurring. The first objective of this paper is to assess and describe sprawl in the Middle States region from 1990 to 2000. Trends for 25 cities – the central cities of the Metropolitan Statistical Areas in the region – will be compared. The second objective is to introduce and discuss one particular element of sprawl identified as passive sprawl.

The data source to identify sprawl in this paper is the U.S Bureau of the Census' urbanized areas (U.S Bureau of the Census, 1990, 2000, 2002)[1]. If a central place (i.e. a city) and adjoining built-up area has more than 50,000 people, it is called an urbanized area (UA). Adjoining built-up areas are included based on a density criteria, generally 1,000 people per square mile. By comparing the changes in size and population of urbanized areas between 1990-2000, several measures of sprawl can be obtained. One problem is that the U.S. Bureau of the Census has modified the urban definition from 1990-2000. Modifications include: (1) Previously designated urban areas are not grandfathered as they have been in the past (generally leading to more stringent density requirements); (2) Changes in the so-called "extended place" rules mean that low density areas are no longer classified as urban just because they are found within a municipal boundary; and (3) Longer "jumps" are allowed, i.e. the Census is more liberal with the inclusion of linear developments leading out from the urbanized area that would not have been included based on the general density criteria. Two cities in the Middle States region (Vineland, New Jersey and Rome, New York) have been drastically affected so they were excluded from further analysis. In both cases, large areas classified as urban in 1990 because they were within the city boundaries are considered rural in 2000. The other 25 cities, however, are conducive to sprawl analysis using Census data.

The first sprawl measure in Table 1 uses the total land area that has been added to each UA between 1990-2000. This measure of absolute sprawl best fits the notions of "sprawl as historical process" and "sprawl as the enemy of non-urban land." In most cases, larger cities are more sprawling than smaller cities[2]; however, Philadelphia outranks New York because its sprawl has created a

contiguous area that includes Wilmington, Delaware, which was not the case in 1990. It is also noteworthy that relatively large Pittsburgh and Rochester are surpassed in sprawl by several smaller cites, such as Poughkeepsie, New York. Moreover, three cities (Glen Falls, New York; Trenton, New Jersey; Scranton–Wilkes-Barre, Pennsylvania) have smaller urbanized areas in 2000 than in 1990. This outcome results from a combination of population losses and aforementioned Census redefinitions.

The total amount of new urban land only captures one part of the sprawl concept. The second measure in Table 1 converts total area growth to a percentage change in the size of the UA. Such a measure places all cities – large and small – on equal footing and captures the relative level of sprawl from 1990-2000. A regional tendency is detectable: cities in eastern Pennsylvania are found on top of the sprawl list with Lancaster as the most sprawling city. In addition to Lancaster, two other cities in eastern Pennsylvania – York and Allentown-Bethlehem – more than doubled their UA in the 1990s. The least sprawling cities are relatively diverse both in terms of size and geographic location. New York and Pittsburgh, for example, are two large cities that occupy a position of low sprawl using this measurement. In 2000, the Scranton–Wilkes-Barre, Pennsylvania urbanized area was 21% smaller than in 1990.

Table 1. Four Measures of Sprawl for 25 Urbanized Areas in the Middle States Region

Total Sprawl Rank		Total new urban area (sq. mi.) 1990 - 2000	Rank	Urban area change (%) 1990 - 2000	Rank	Population density (persons/sq.mi.) in 2000	Rank	Population density change (%) 1990 - 2000	Rank
1	Lancaster, PA	112.1	5	128.4	1	1,622	3	-26.8	3
2	York, PA	61.4	10	107.3	2	1,627	4	-34.8	1
3	Poughkeepsie, NY	131.8	4	98.9	4	1,328	1	-19.6	9
4	Allentown - Bethlehem, PA	147.4	3	103.7	3	1,991	11	-31.1	2
5	Philadelphia, PA	635.3	1	54.6	6	2,861	22	-21.1	6
6	Albany, NY	75.6	7	36.2	10	1,966	10	-19.4	10
7	Reading, PA	40.8	13	68.3	5	2,387	18	-23.4	4
8	Harrisburg, PA	58.6	11	39.1	7	1,741	6	-11.0	17
9	Syracuse, NY	46.1	12	34.5	11	2,239	16	-23.1	5
10	Buffalo, NY	81.2	6	28.4	13	2,664	21	-20.3	7
11	Rochester, NY	75.2	8	34.2	12	2,353	17	-16.5	12
12	Atlantic City, NJ	32.2	14	36.3	9	1,880	8	-1.9	20
13	Erie, PA	21.1	15	36.6	8	2,472	20	-19.7	8
14	Johnstown, PA	6.7	18	18.5	16	1,779	7	-17.5	11
15	Elmira, NY	5.9	19	20.6	15	1,941	9	-16.4	13
16	Altoona, PA	8.0	17	26.9	14	2,196	15	-15.1	14
17	Binghamton, NY	11.0	16	16.8	17	2,079	13	-14.1	15
18	Pittsburgh, PA	74.3	9	9.5	21	2,057	12	-4.7	19
19	Dover, DE	5.7	20	15.2	19	1,498	2	11.2	24
20	New York, NY	386.2	2	13.0	20	5,309	25	-1.8	21
21	Williamsport, PA	3.9	21	16.8	18	2,176	14	-12.5	16
22	Glen Falls, NY	-2.3	23	-6.0	24	1,630	5	8.5	22
23	Trenton, NJ	-3.7	24	-3.8	23	2,914	23	-6.5	18
24	State College, PA	1.1	22	5.4	22	3,332	24	10.5	23
25	Scranton - Wilkes-Barre, PA	-42.6	25	-21.2	25	2,427	19	25.9	25

Note: Population density is ranked in ascending order because the lowest numerical value indicates the highest level of sprawl.

A third way of approaching sprawl is to say that cities with the lowest population densities are the most sprawling. As planners and New Urbanists alike have espoused the virtues of urban density, this perspective corresponds best to the notions of "sprawl as sub-optimal outcome" and "sprawl as decline of civilization." In general, there is a tendency for smaller cities to have lower densities, although the correlation appears to be modest in the Middle States region as can be seen in Table 1, which ranks population density using data from 2000. Poughkeepsie, New York has the lowest density with 1,328 persons per square mile, and is therefore the most sprawling, followed by other moderately sized cities in the eastern part of the Middle States region. Predictably, New York City has the highest density level of all urbanized areas with 5,309 persons per square mile. Small but student-dominated State College, Pennsylvania is the second densest UA after New York City, making them the least sprawling. Moreover, cities similar in size and location can have very different levels of density. Lancaster, Pennsylvania, for example, is much less dense (ranked number three in Table 1 for this sprawl measure) than its neighbor city of Reading (ranked number 18).

To focus more explicitly on changes from 1990-2000, the fourth measure in Table 1 shows the percentage change of population densities. If cities have become denser, then we may conclude that these cities have been successful in limiting sprawl during the 1990s. Of the cities considered in this study, all but four became more sprawling according to this measure. A near-35% decrease in population density indicates that the disparity between old, dense development patterns and contemporary sprawl is most severe in York, Pennsylvania. A similar trend is evident in all eastern Pennsylvania cities (but less so in Harrisburg). It is worth noting that Dover, Delaware and State College, Pennsylvania are unique in one regard: they have become denser during the 1990s at the same time the urbanized area has increased in size. This may indicate local efforts to promote density, reurbanization, and/or growth limitations on new developments.

Finally, to offer an overall assessment of urban sprawl in the Middle States region, a sprawl index based on the four previous perspectives on sprawl has been calculated (Table 1). The index uses the rank order only and the four rankings are weighted equally. Based on the composite index, Lancaster, Pennsylvania can be crowned as the "sprawl capital" of the Middle States region followed by York, Pennsylvania, and Poughkeepsie, New York. In Figure 1, the 25 cities in the study are mapped, based on the composite index, in three equal size categories: high (eight cities), medium (nine cities), and low (eight cities) levels of sprawl. Most high sprawl cities are found on the growth frontier of Megalopolis, especially in eastern Pennsylvania. (Philadelphia's rank may be artificially high as it now includes Wilmington in its urbanized area.) The East Coast proper (Delaware, New Jersey, and New York City) have medium to low levels of sprawl, as do central and western Pennsylvania. Cities in western New York State have medium levels of sprawl. Compared to comprehensive national studies, these results are similar, but not identical, to conclusions by Miron (2003) who identify Harrisburg, Reading, and Lancaster in Pennsylvania, and Rochester, New York as some of the most sprawling cities in the country. On the other hand, using a sprawl index by Metropolitan Statistical Area based on the percentage of people living in low density census tracts, Lopez and Hynes (2003) conclude that the Middle States region occupies a middle position in terms of sprawl, with only one area – Dover, Delaware – as high sprawl. In this study, Dover is recognized as having very low overall population density, though from other perspectives, it does not classify as a high sprawl city.

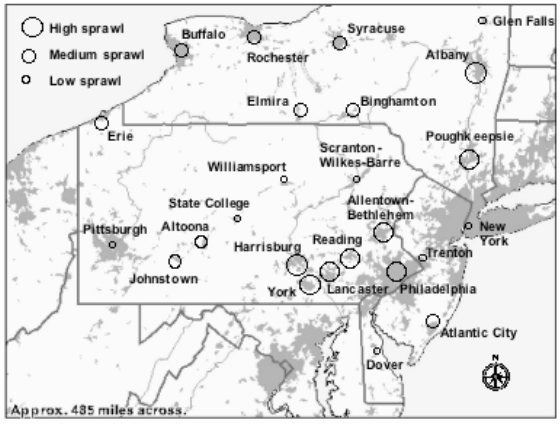

Figure 1. High, medium, and low levels of sprawl in Middle States UAs. (Basemap: U.S. Bureau of the Census.)

PASSIVE SPRAWL – THE JOHNSTOWN EXAMPLE

Conventional thought assumes that sprawl is an active process – homes, businesses, offices, and other forms of infrastructure are continuously built on the metropolitan fringe (Daniels, 1999) creating new exurbs (Spectorsky, 1955; Davis et al., 1994).

However, peripheral sprawl is comprised of both new and previously existing settlements. It may take an act of physical development for sprawl to occur, but when it does, it will inevitably incorporate existing residential areas as well. Therefore, I define the concept of passive sprawl as *existing rural settlements that become urbanized as the boundary of urban areas expands outward*.

As a case study of passive sprawl, population changes from 1990-2000 for the urbanized area of Johnstown, Pennsylvania were studied. The central parts of the Johnstown UA are made up of older, denser neighborhoods in the narrow valleys at the confluence of Little Conemaugh and Stony Creek Rivers (Figure 2). Several communities in proximity to each other developed as mill towns near the rivers, and starting in the late

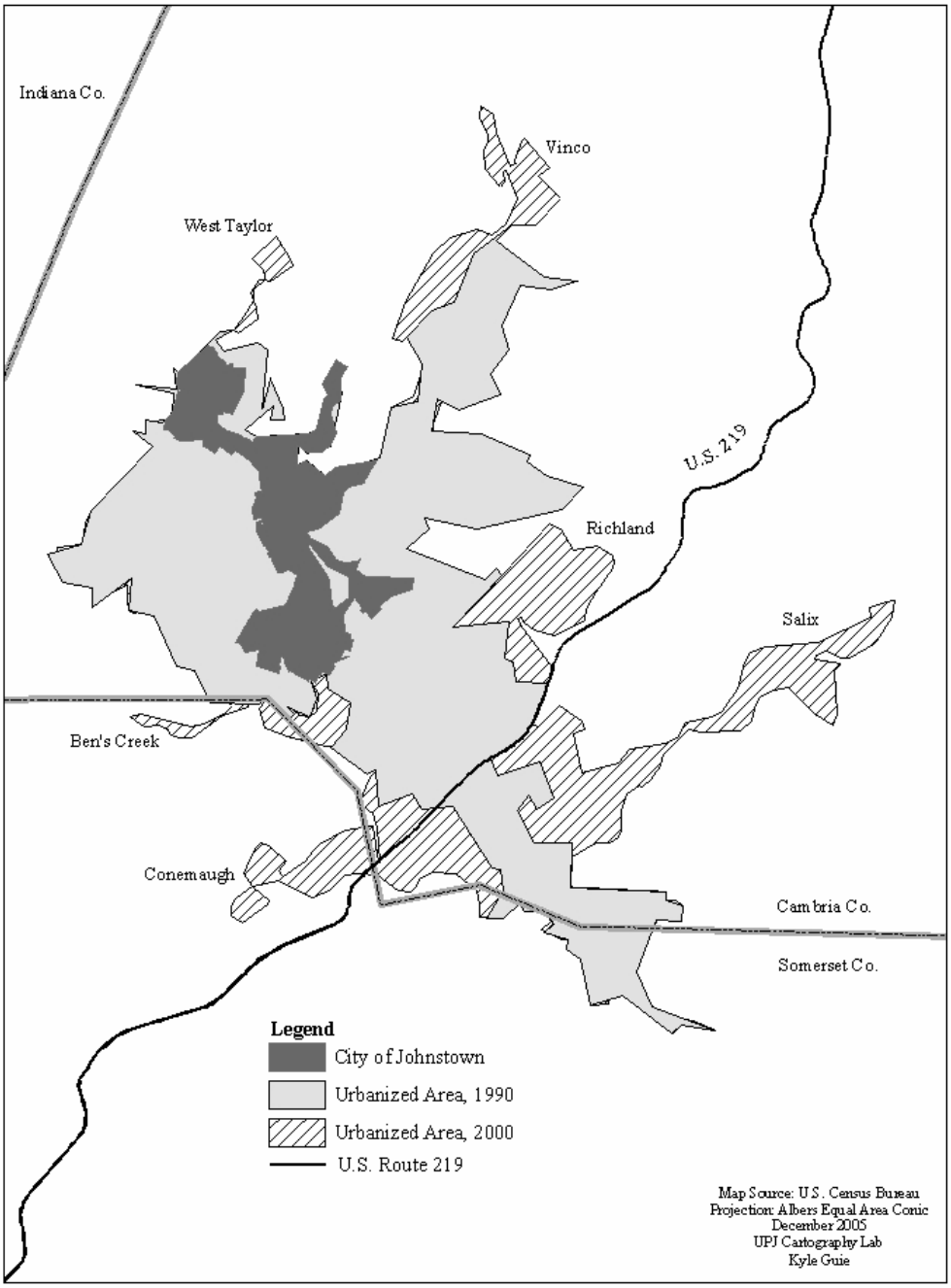

Figure 2. The Johnstown, Pennsylvania urbanized area.

1800s, the surrounding plateau began to be settled. Today, these communities make up the contiguously urbanized area of greater Johnstown. Highway 219 is now the city's main transportation corridor and has attracted contemporary suburban sprawl. The 2000 population of the UA was 76,133 (a small decrease from 1990). Spatially, the UA grew 18%, even as some areas were declassified as urban by the Census in 2000. The areas newly classified as urban in 2000 are identified and labeled in Figure 2. To achieve a fine-grained analysis when distinguishing between active and passive sprawl in these areas, the research was conducted on the Census block level. Blocks have been renumbered from 1990 to 2000, but the overwhelming majority of blocks have the same geographic boundaries both times. A few 1990 blocks have been subdivided into two or more new blocks. In only seven instances did the boundaries change so a population adjustment had to be performed. (The impact stemming from this change on the final conclusions is negligible[3].) A bigger methodological concern was the possibility of "offsetting," i.e. population increases in new developments can be offset by decreases in older residential units within the same Census block. Census data do not tell us anything about migration on the individual level, so a statistical adjustment is necessary. Taking these concerns into consideration, passive sprawl is calculated through a two-step procedure. First, the population in a 1990 Census block is considered passive sprawl, while population in 2000 subtracted by population in 1990 is active sprawl. Second, to adjust for the offsetting problem, a typical level of population growth in existing housing units was calculated. Through field observation, a large number of Census blocks were selected that have a housing stock that is representative of the area, and did not contain any new construction during the 1990s. The calculated mean population growth (denoted C in the equation below) of these blocks is used to adjust the initial assumption of passive sprawl and is estimated to be 0.963. The calculation of passive sprawl is as follows:

$$PS(\%) = (1- ((POP1990*C) / POP2000))*100$$

PS(%) =	Passive sprawl
POP1990 =	Population in 1990
C =	Population growth constant for existing housing
POP2000 =	Population in 2000

In Johnstown, 115 blocks were added to the UA from 1990-2000 (the same area had 97 rural blocks in 1990). Six new contiguous areas with a total population of 9,497 people were incorporated into the UA (Figure 2). The same area, when it was not part of the Johnstown UA in 1990, had a population of 8,702. If that population is adjusted for population losses in pre-existing residential units, an estimated 8,371 persons resided in such pre-existing units in 2000. Conversely, an estimated 1,126 individuals moved into new developments. Using the equation above, only 12% of the population in the six new contiguous areas were active sprawlers and an overwhelming 88% of new urban dwellers were passive sprawlers – they urbanized without changing location (or possibly replaced other residents in pre-1990 homes).

Based on Census data and field observation, the research suggests that passive sprawl in Johnstown takes four distinct forms. Passive sprawl is found in: (1) Old nucleated settlements such as the villages of Salix on the eastern periphery of the UA and Vinco to the north. New subdivisions have also been added in proximity to such settlements; (2) Linear roadside settlements, which were included in the UA in 2000 as either additional housing was built along such roads or because of Census changes in the "jump rule." In most cases, such roadside settlement now connects older outlying villages to the UA; (3) Pre-1990 rural subdivisions that have been reclassified as urban because new developments occurred in nearby census blocks; and (4) Non-nucleated, previously rural housing that has experienced a process similar to that affecting the rural subdivision category. The first category, pre-existing nucleated villages, is the most significant category as a source of passive sprawl in the case of Johnstown.

CONCLUSION

Sprawl occurs in almost all parts of the Middle States region, but to varying degrees and in various forms. By investigating changes in the urbanized areas from 1990-2000, several measurements of sprawl have been obtained, including absolute and relative spatial growth, overall population densities, and population density changes. These measurements have been used to identify spatial patterns of sprawl in the Middle States region. Several urbanized areas with little or no population growth experienced significant sprawl, but it is particularly eastern Pennsylvania that exhibits traits commonly associated with sprawl, and Lancaster ranks as the most sprawling city in this study. Scranton–Wilkes-Barre, Pennsylvania ranks as the city with lowest sprawl in this study, but it may be a

statistical anomaly related to definitional changes by the U.S. Bureau of the Census, so perhaps State College, Pennsylvania should be considered the least sprawling city (see Table 1). Sprawl is a multifaceted process so conclusions based on the composite index calculated in this paper are by no means definitive. To further illuminate the complex nature of sprawl, the concept of passive sprawl was developed because sprawl does not only mean new development on a "blank slate" but is, in fact, a blend of new and existing settlements. The Johnstown, Pennsylvania case study indicates that an overwhelming amount of sprawl can be passive sprawl – in this case 88%. Moreover, this implies that long-established rural communities and their social networks are threatened by the changing settlement patterns associated with sprawl (Savage and Lapping, 2003) – passive sprawlers become part of a Galactic City. Using the U.S. Bureau of the Census' urbanized areas designation to investigate this process on the block level has not been without problems – sprawl is sometimes an artifact of Census redefinitions. However, it is worth noting that such rethinking by the Census of what constitutes urban also reflects other societal trends, such as higher tolerance of long commutes, which also necessitates a rethinking of what constitutes sprawl. Additional refinement of the methods and concepts applied in this paper is desirable. To further such research, three avenues may be suggested: cities and regions with higher levels of sprawl than Johnstown, Pennsylvania should be investigated, as the ratio between active and passive sprawl could be very different in such locations (e.g. sunbelt cities); further elaboration is needed to quantify how much of the measured sprawl is due to Census redefinitions; and finally, data sources other than the Census should be considered to study the passive sprawl concept.

ENDNOTES

[1] Only one dimension of sprawl, the residential dimension, is captured using this data set. Commercial and industrial forms of sprawl are not included.

[2] For a size comparison, the populations of the urbanized areas (2000) are, in descending order: New York, NY (17,799,861), Philadelphia, PA (5,149,079), Pittsburgh, PA (1,753,136), Buffalo, NY (976,703), Rochester, NY (694,396), Allentown-Bethlehem, PA (576,408), Albany, NY (558,947), Syracuse, NY (402,267), Wilkes Barre-Scranton, PA (385,237), Harrisburg, PA (362,782), Poughkeepsie, NY (351,982), Lancaster, PA (323,554), Reading, PA (240,264), Trenton, NJ (268,472), Atlantic City, NJ (227,180), Erie, PA (194,804), York, PA (192,903), Binghamton, NY (158,884), Altoona, PA (82,520), Johnstown, PA (76,113), State College, PA (71,301), Elmira, NY (67,159), Dover, DE (65,044), Williamsport, PA (58,693), Glen Falls, NY (57,627)

[3] In these blocks, the total number of residents was only 448 people in 2000, which is less than 5 % of the total population in the newly designated urban areas (and the error due to adjustment is significantly smaller than that). The population adjustment was based on the size of realigned areas and to what extent they were built up.

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