5. CONCLUSIONS

On average in the nation's 100 largest Urbanized Areas, there are more and more of us, and each of us is using more and more urban land. Therein lie the two halves of the nation's urban sprawl problem. The toll of sprawl on natural habitats, agricultural land and scenic open spaces cannot be substantially halted unless anti-sprawl efforts include a two-pronged attack using both land-use/consumption tools and population tools.

5.1 Correcting misinterpretations of data

The above conclusion poses a challenge to anti-sprawl efforts because most use only a one-pronged tool. It is not that the data supporting the two-pronged conclusion have been unavailable. In fact, our literature search found, the very same data have often been used to oppose the necessity of a two-pronged approach. One contribution of this study may be to help journalists, government officials, advocacy groups and individual citizens to understand how they have been misinterpreting the data.

This study has identified the following misinterpretations as ones that appear to have had significant influence in causing the country's urban sprawl problems to be framed too narrowly by those desiring to resolve them.

5.1.1. Wrong generalizations from too little data

The authors regularly encounter population-stabilization enthusiasts who argue that the nation's population growth is the most significant threat to the quality of life of city inhabitants and of the natural world because of its role in urban sprawl. One of the authors believed at the outset of this study that the results would confirm that claim handily. After all, Census Bureau data showing that an incredible 78 million additional Americans have been added to the country since the first Earth Day in 1970 just seemed to guarantee such a conclusion.

But the population data and personal experiences in fast-growing cities were not sufficiently comprehensive to allow for an accurate conclusion about the nature of sprawl. Once we considered the full data on the 100 largest Urbanized Areas, we found no justification for an approach to the nation's urban sprawl that is decidedly weighted toward efforts at stabilizing the population while minimizing efforts to stop Per Capita Sprawl. As Figure 7 (on page 36) shows, the percentage growth in population and in per capita land consumption are practically the same.

Proper interpretation of that data would seem to require a roughly equal division of resources and attention to both parts of the sprawl problem.

5.1.2. Misunderstanding the data when sprawl is <u>double</u> population growth

A different kind of misunderstanding of the sources of sprawl is found in the comparing of Overall Sprawl rates to Population Growth rates. Sometimes there is an implied suggestion that population growth really isn't that important, as when a columnist recently wrote: "Sprawl is a Virginia specialty; a federal study says the state is developing its land twice as fast as its population is growing." [16] Other times, that type of fact is used to make a direct point, such as a recent letter from a president of a large conservation organization to a donor:

> "[In most states outside of California] the problem is not population increase but population distribution. For example, from 1940 to 1970, the population of the Portland, Oregon urban region doubled but the amount of land occupied by that population quadrupled."

In other words, he was saying, sprawl was double the rate of population growth and, therefore, population growth isn't really the problem.

[16] "County Opens Untouched Land to Usual Sprawl," Marc Fisher, *Washington Post*, January 18, 2001.

But that is an erroneous interpretation of accurate facts. This study has shown that when a city is "sprawling at double the rate of population growth," that means the city's population growth is not insignificant but is in fact the primary sprawl factor and more than half the problem – a finding that calls for quite a different response than the one by the writer of the letter. That writer made such a colossal error of interpretation that we don't want to embarrass the illustrious conservation leader by citing his name or that of his organization.

We feel certain that the mistake was entirely an honest one. And we feel such certainty because we have seen the same mistake stated repeatedly by some of the nation's top conservation and anti-sprawl leaders as they use the "sprawling at double the rate of population growth" to make the erroneous case that population growth is not a primary factor in an area's sprawl. The Rusk data cited on page 13 often is misused in this way, for example.

We find it difficult to understand why anybody seriously concerned about sprawl would deliberately choose to ignore or minimize something that is half the problem, or why journalists would so consistently mislead their readers in that way. So this constant misinterpretation of data would appear not to be intended; rather, it seems, most people just don't understand what it means to compare an *independent* variable (like Population Growth) with a *dependent* variable (like Overall Sprawl).

That is why this study's simple exercise of lining up the rates of Population Growth and Per Capita Sprawl side by side is so important. In the mathematical formula, as to a large extent in the real world, those two are both *independent* variables. The most common impression that one gets from looking at the two side by side is generally an accurate one: If the rate for one is a lot bigger than the other, then it can safely be assumed that the bigger factor is a lot bigger part of the Overall Sprawl; if the two are similar in size, it is correct to assume that the two have similar effects on Overall Sprawl.

In addition, this study has modeled ways to apportion the Overall Sprawl to the two *independent* variables so that each represents a certain percentage of the *dependent* variable (Overall Sprawl). Associating a percentage with an *independent* variable communicates far more to the average person than placing that *independent* variable side by side with a *dependent* variable.

In the end, it is how the data are described in everyday language that may be most important to improving understanding of the factors of sprawl. Saying that "population growth is the primary sprawl factor and accounts for more than half of urban sprawl" communicates far more clearly than saying that "urban areas are expanding at double the rate of the population

The reader may wonder why we say that population growth is more than half the problem rather than half the problem if its growth rate is half the rate of Overall Sprawl. Consider Charlotte, North Carolina. Its sprawl rate of 128.7% was just over double the population growth rate of 63%. The Holdren method finds population growth was related to 59.1% of Charlotte's 241.7 square miles of sprawl. That may seem questionable to people who don't routinely work with numbers. But it should make sense to most people once they see that Charlotte's population growth of 63% was significantly higher than its Per Capita Sprawl of 40.3%.

(What is said about population growth can also be said of Per Capita Sprawl. Little Rock's sprawl of 109% was just over double its Per Capita Sprawl rate of 52.4%. The Holdren method found that 57.1% of Little Rock's sprawl was related to Per Capita Sprawl.)

5.1.3. Misinterpreting the data when sprawl is slower than population growth

What does it mean when a city is sprawling at a slower rate than population growth? Is that cause for celebration? When the authors released an earlier report on a study of all Urbanized Areas in California, some journalists and city officials got quite excited and claimed victory because their cities were shown as having reduced per capita land consumption and as sprawling at a slower rate than their population was growing.

In the process, they missed the point that their cities still were sprawling at high rates. One of them, for example, indeed had reduced per capita land consumption by 45%, a major achievement at controlled growth. But at the same

time, the Urbanized Area still had expanded by a whopping 84%, hardly a cause for celebration. By concentrating on increasingly dense development, the city had kept the sprawl from being much worse, but it had continued to threaten large amounts of countryside because it expanded its population by 232%. In the immediate aftermath of our report, there was no sign of any interest by city officials in slowing their rate of population growth and, thus, there appeared to be no chance of taming rampant sprawl of the city.

5.1.4. False assumption that two-pronged approach not needed in many regions

A widely stated assumption holds that population growth exacerbates sprawl in some parts of the country but is only a minor, or even a negligible, factor in much of the country. This assumption has misled many to argue that population stabilization tools are inappropriate for some regions and need not be discussed there.

But this study found that in not a single one of 12 regions was population growth a minor or negligible factor in the average city's sprawl. Rather, population growth was a significant factor in the Overall Sprawl of all 12 regions. Indeed, it was a primary factor in five and the overwhelming factor in four (see page 14).

That finding makes it obvious that anti-sprawl campaigns would need to stress population stabilization in all regions of the country to have a chance for a real and sustainable halt to sprawl.

Nonetheless, it remains important to note that urban planning cannot rely solely on national or regional averages but must take into account the peculiar mix of local circumstances that vary widely in each region.

5.2. Limits to containing population growth within existing urban boundaries

The virtual void of population-stabilization plans within the anti-sprawl programs around the country is also related to a belief that population growth can be accommodated without causing sprawl. Theoretically, that is possible – for awhile.

The findings of the study raise the following issues, however.

5.2.1. Inability to force enough extra density

The Miami Urbanized Area had 94 square miles of sprawl. All of it was associated with population growth because per capita land consumption declined. Miami could have prevented all 94 square miles of sprawl if the 695,000 additional residents had settled within the existing urban boundary. That could have happened:

(1) If all pre-existing residents were forbidden from moving from inside the city to rural land just outside the city. They would have had to remain within the old boundaries of the Urbanized Area or moved inside the boundaries of another city.

(2) If arriving immigrants and residents of other parts of the country were required to settle inside existing city boundaries.

(3) If vacant land inside the urban boundary were used for providing places of work and commerce for the new residents.

(4) If the leftover business, commerce and entertainment needs plus the residential needs of the extra residents were met by a combination of the following: (a) large numbers of pre-existing residents in single-family dwellings would either divide their houses into duplexes or tear down their homes, allow apartment buildings to be built on their land and then move into one of the apartments; (b) the scarce remaining public parks would be converted into apartment complexes; (c) more low-level apartment buildings would be replaced with high-rises; (d) local teens and people in their early 20s on the verge of household formation would continue living with

their parents or double up with someone else already living within the old urban boundaries; (e) multiple families and unrelated adults began to share households.

(5) If the new residents placed no further demands for non-urban recreation, waste disposal, worksites, shopping or roads just beyond the urban boundary.

Those five requirements, however, would necessitate a level of government control, personal sacrifice, voluntary lifestyle change, loss of personal freedom, and expense that no city in America has come close to talking about – let alone fulfilling. But something that drastic would be needed to force one of the three most densely populated Urbanized Areas in America to increase its density enough to accommodate 695,000 more residents. And then the Area would have to do all those things again if population growth was allowed to continue any longer.

If one were to design a city from scratch, one would be far more likely to achieve such a density with public approval. But, as is obvious from the above five requirements, it is extremely expensive, disruptive and personally difficult to quickly achieve major density enhancements in already-built areas.
The United States provides no models of Urbanized Areas that succeeded in accommodating population growth without sprawl. Nothing in the political history of the nation's cities suggests the ability or willingness to do this even a few years, let alone in perpetuity.

5.2.2. Portland's lesson of limits

For a glimpse of what might be the best the nation as a whole is likely to be able to achieve in accommodating population growth without forcing urban sprawl, Portland may be the model. No Urbanized Area has received more attention than Portland in its efforts to preserve the natural beauty, quality of life and unbroken vistas of majestic Pacific Northwest landscapes from the concrete and subdivisions of sprawl.

Since most cities have not been able to develop the political support to do even a fraction of what Portland has done, it seems reasonable to consider Portland's experience to be something of the upper limit in how far incentives for increasing density can be pushed in most American cities – at least for the near-future.

In an effort to tame land-devouring sprawl, the state of Oregon, and the Portland metro area in particular, have taken bold steps that have garnered both national scrutiny and acclaim. In 1973 the Oregon legislature passed its landmark urban growth boundary law, requiring each municipality in the state to draw a line in the sand (or through forests and farms, in the case of western Oregon), beyond which urbanization could not march – at least, in theory. Today, each of Oregon's 241 cities is surrounded by an urban growth boundary. Portland's was first established in 1979.

The law does seem to have had a positive effect in reducing sprawl in the state, but certainly not in stopping it cold. Greater Portland not only stayed aesthetically pleasing but also met the Smart Growth goal of increasing density greatly. In the decade prior to the imposition of the Urban Growth Boundary, new population was added at the density of 2,448 per square mile. In the decade after the imposition of the Boundary, it was added at the density of 3,744 per square mile. That was a 53% increase in the density of new development, a major achievement.

But the discouraging news after all that effort is that the Portland Urbanized Area still sprawled out across 39 additional square miles (25,000 acres) from 1980 to 1990. Thus, in its first decade of vigorously applied Smart Growth techniques, Portland could not stop the urbanization of rural land. The reason? The population grew by 146,000 during the decade. (The official results of the second decade – the 1990s – will not be available until the Census Bureau has a couple of years to work with the 2000 Census data.)

The same disappointing results were to be found in the entire state of Oregon. The U.S. Department of Agriculture survey reveals that hundreds of square miles of open space have been converted to developed land between 1982 and 1997, long after the 1973 state legislative action to stop that from happening. Population growth – much of it from former Californians fleeing the rapidly congesting Golden State – was the explanation. Many are skipping the ever-denser Portland Urbanized Area and settling in the countryside just enough beyond the urban edge to not add to Portland's sprawl per se but to help account for the state's surging rural development.

The experience in Oregon suggests there likely are limits to how far government can curb per capita land use before diminishing returns set in. No matter how tough the regulations to try to force population growth into existing urban areas, they will have to be toughened still more the next year, and more the next, with no end to increasing densities and government restrictions – unless population growth is stopped.

As people continue to pour into Portland and Oregon, development pressures within the "containment vessel" of the Urban Growth Boundaries are intensifying. Indeed, news articles warning of "gaps" and "cracks" in "the Great Wall of Portland" have become legion. And resistance to the ever-higher densities and in-fill development promoted by regional planning authorities as the way to grow without sprawl appears to be spreading even in "Ecotopia." Increasing numbers of Portland residents are decrying the added congestion and surging housing prices that are accompanying efforts to prevent sprawl while having rapid population growth.

If metro Portland's population continues to grow and if the Portland public' s desire for breathing room and reasonably priced housing trumps its desire to contain or slow sprawl, the Portland Experiment of 1980 to 2000 may not be the exemplar of what Americans may be persuaded to adopt. Rather, it may be an example of Smart Growth controls that even one of the most ecologically minded and motivated American communities won't accept over the long run.

The lesson would not be that the Smart Growth efforts of Portland were wrong-headed but that the best-thought plans cannot create a protective wall for nature that will withstand the continuous onslaught of population growth.

5.2.3. The 'ecological footprint' effect of additional population beyond the urban boundaries

Even if it were politically and physically feasible to pack more and more population into existing urban boundaries without sprawl, the rising populations of the city would still create a larger and larger "ecological footprint" in the rural areas beyond the urban area.

It is important to recognize that the per capita land consumption figure upon which all conventional anti-sprawl efforts focus includes only the land consumed by an average resident inside his/her own Urbanized Area. It does not include all the rural land in other parts of the country that is required to obtain the food, fiber, minerals and energy for that resident, and to dispose of that resident's wastes. The urban land is only a tiny fraction of the impact on the Earth that each new American makes. In fact, each person in an urban area has tentacles that extend far outward, pulling in natural resources from a variety of productive lands and waters of the biosphere.

Another way of expressing this is that every person has an ecological footprint, the area of biologically productive land he or she co-opts or exploits to satisfy the above-mentioned demands. The average American has an ecological footprint of 12.6 acres.[17] This impacted area is roughly 25-75 times greater than the built-up space (i.e. developed or urbanized land) of one-sixth to one-half acre for each resident inside most Urbanized Areas.

Thus, even if we were able to control urban sprawl in the face of rapid population growth, the impact on the states' environment of rapidly growing numbers of Americans would still be enormous.

5.3. The necessity of addressing population growth

All of the above point to the necessity of addressing national policies now destined – according to the Census Bureau – to expand the current population of 281 million (up from 203 million in 1970) to more than a half billion (571 million) this century.

[17] Mathis Wackernagel and William Rees. 1996. *Our Ecological Footprint: Reducing Human Impact on the Earth*. Gabriola Island, B.C. and Philadelphia, PA: New Society Publishers. The New Catalyst Bioregional Series.

At the same time, cities which value their surrounding rural land and want to stop sprawl will need to address (a) local incentives that entice more people to move into particular cities and (b) state policies that attract residents from other states.

It is difficult, however, to conceive of many cities in America being able to stop their population growth for more than a short period if current demographic trends are allowed to continue and add nearly 300 million people to the nation this century.

Figure 3 (on page 12) shows how many square miles of the 100 largest Urbanized Area's sprawl over a 20-year period was related to the population growth of that time. Even if the cities had succeeded in eliminating all the sprawl related to the land-use and consumption factors behind per capita land growth, that still leaves 7,403 square miles of sprawl that was explained by population growth.

5.4. Future anti-sprawl efforts must tackle both growth factors

Population policies, phenomena and trends – along with the land-use/consumption ingredients in Per Capita Sprawl – are central to understanding the future of sprawl in American cities and how to prevent it. The findings of this study suggest that plans and programs from governmental agencies, think tanks, universities and advocacy groups must tackle – or at least support others who tackle – both population growth and land-use factors if they are to avoid being ineffective, naïve, foolish or deceptive in attempts to stop the urbanization of rural land.