

Weighing Sprawl Factors In Large U.S. Cities

A report on the nearly equal roles played by
population growth and land use choices in the
loss of farmland and natural habitat to urbanization

1. INTRODUCTION

Considerable controversy has arisen over whether land-use and consumption decisions are the primary engines of urban sprawl, or whether the nation's continuing population boom might provide most of the power driving the expansion of cities into the countryside. Understanding the relative contributions of those factors appears to be essential if cities, states, and the nation as a whole are to devise plans that will provide for sustainable restraints on sprawl.

This study has sought to move beyond the abstract assertions and non-contextual anecdotes that have dominated the debate thus far. It attempts to quantify the roles of the major sprawl factors and to analyze some of the comparative statistical evidence.

1.1. Sprawl claims thousands of square miles each decade

Efficient use of anti-sprawl resources is especially important because sprawl foes are challenging formidable forces. Economic, cultural, demographic and political forces between 1982 and 1997, for example, converted approximately 39,000 square miles (or 25 million acres) of rural land into subdivisions, malls, workplaces, roads, parking lots, resorts, and the like.⁵

- The rural area lost to development between 1982 and 1997 is about equal to the entire land mass of Maine and New Hampshire combined.
- The rate of rural land lost to development in the 1990s was about 2.2 million acres per year. If this rate continues to the year 2050 – when today's toddlers are middle-aged – the United States will have lost an additional 110 million acres of rural countryside. That's about equal to the combined areas of Connecticut, Massachusetts, Rhode Island, Vermont, Delaware, Pennsylvania, New York, New Jersey, and Virginia.
- Added to the loss of an area equivalent to Maine and New Hampshire, the losses by 2050 will amount to much of the Eastern Seaboard. Anyone who has flown at night from New York to Florida and seen the vast clusters of lights below sweeping away as far as the eye can see knows just how far advanced this process of mass urbanization already is – and how strained is the myth of limitless American open spaces.

This study focuses on one part of the rural land loss – the development surrounding what are called Urbanized Areas (entities defined by the Census Bureau as central cities and the contiguous development of their suburbs). Examined are the factors in the sprawl of the 100 largest Urbanized Areas. In those 100 alone, more than 14,000 square miles of the surrounding rural land were lost to urbanization during the most recent 20 years of Census research (1970-90).⁶

⁵ See note 3.

⁶ The U.S. Census Bureau data sources used in this study are: *1990 Census of Population and Housing, Summary Population and Housing Characteristics – United States*, Table 8 - Land Area and Population Density; *1980 Census of Population, Number of Inhabitants, United States Summary*, Table 34 - Population, Land Area, and Population Density of Urbanized Areas: 1980; *1970 Census of Population, Volume I Characteristics of the Population, Part 1, United States Summary* (issued June 1973), Table 20 - Population and Land Area of Urbanized Areas: 1970 and 1960). All of these are available from the Statistical Information Office (Population Division) of the U.S. Department of Commerce's Bureau of the Census in Maryland (301-457-2422).

Although rates (percentage increases) of sprawl are significant to know, the most important environmental fact about a city's sprawl is the actual number of square miles of rural land that have been urbanized.

Table 2 lists the 10 Urbanized Areas which eliminated the most rural land over the two decades. Paving and building over hundreds of square miles of woods, wetlands, prairies, desertscape and fields, they truly earned the dubious distinction as the nation's "Top Sprawlers," representing many regions, from the Southwest and Texas to the Northern Plains, the Southeast and the Mid-Atlantic.

1.2. Sprawl as sign of economic vitality or ecological threat?

Many organizations and media commentators defend the ever-shrinking rural inventory as a sign of the vitality of the economy and say that it should be embraced and even encouraged.⁷ The country's reservoir of farmland and other open space is too vast to worry about how much is being paved each year, they say.

That is not the view of most Americans, however, according to polls which find that "sprawl is among their greatest concerns."⁸

This study does not attempt to resolve that difference of opinion, but the authors' sentiments clearly lie with those who are troubled by the signs of ecological damage from sprawl and other human intervention. Sprawl has contributed directly to the degradation and decline and fragmentation of natural habitats such as wetlands and woodlands, and this "habitat encroachment" is also implicated in the demise of hundreds of species of wildlife now listed as threatened or endangered by the federal and state governments.

Ecological health is especially precarious in the coastal regions:

- Water quality in the East Coast's most important estuary, the Chesapeake Bay, is threatened by the sheer spread of pavement and other impervious surfaces within its 64,000-square-mile watershed. By 1990, some 11,480 square miles had already been developed, and analysis of satellite imagery and other ground-based data indicates that in the 1990s an additional acre was being developed every 6-10 minutes. Residential and related land development degrades local streams and sends "water-fouling" nutrients into the bay, which threaten to overwhelm hard-won, costly reductions in these "loadings."⁹
- In Florida, 68 species of flora and fauna are federally listed¹⁰ and 99 are state listed¹¹ as threatened or endangered by the explosive expansion of cities that 30 years ago were little more than sleepy southern

Urbanized Area	Sprawl (sq. miles)
1. Atlanta, GA	701.7
2. Houston, TX	638.7
3. New York City, NY-NJ	541.3
4. Washington, DC-MD-VA	450.1
5. Philadelphia, PA-NJ	412.4
6. Los Angeles, CA	393.8
7. Dallas-Fort Worth, TX	372.4
8. Tampa-St. Petersburg-Clearwater, FL	358.7
9. Phoenix, AZ	353.6
10. Minneapolis-Saint Paul, MN	341.6

Source: U.S. Census Bureau data

⁷ See, for example: Daniel T. Griswold. 2000. "FAIR Ads Unfairly Blame Immigrants for Urban Sprawl, Traffic Jams." CATO Today's Commentary, October 5. Distributed nationally on the Knight-Ridder news wire.

⁸ See, for example: "Straight Talk From Americans – 2000." National Survey for the Pew Center for Civic Journalism, conducted by Princeton Survey Research Associates. Released February 15, 2000. Available on the Internet at http://www.pewcenter.org/doingcj/research/r_ST2000nat1.html. Also see polls of Maryland and Virginia voters released in September, 2000 by Negative Population Growth, Inc. that showed significant majorities concerned about the effects of sprawl on the environment and quality of life. Available at www.npg.org.

⁹ Karl Blankenship. 2000. "Bay partners split on policy for land conversion." Bay Journal. Vol. 10, No. 1.

¹⁰ The White House, Office of the Vice President. 1999. "Vice President Gore Announces Comprehensive Strategy to Restore Species in Florida Everglades." News Release.

¹¹ Florida Conservation Foundation. No date. Accessed on the World Wide Web at <http://sundial.sundial.net/~florida/page47.html>.

towns. More than 40% of the state's natural habitats already have been converted to urban or agricultural uses.

- California's fabled suburban expansion has converted the state from one of the ecological wonders of the world into what the scientific journal *Nature* magazine has labeled one of the world's 25 "biodiversity hotspots." That is, comparatively speaking, a very high fraction of the state's unique and endemic plant and animal species – and the living communities and ecosystems they comprise – are imperiled by human activity and development.¹²

Versions of those dramatic impending environmental tragedies can be found in local ecosystems scattered around the country. Urban sprawl is not the only cause, but the expansion of cities is especially powerful because it tends to blot out nearly all ecological and agricultural qualities of the land it converts.

1.3. Paving the world's breadbasket

Like 19th century American cornucopians who could not imagine how human activity could seriously threaten the existence of the seemingly limitless passenger pigeons and buffalo, many commentators and leaders today say they can't imagine any limits to America's supply of farmland. Technological progress that increases the yield per acre can easily stay ahead of the loss of acreage due to urban expansion, they claim.

That technological progress will have to move quickly. The U.S. Department of Agriculture estimates that in just the five years between 1992 and 1997 the nation lost 12.8 million acres of agricultural land: cropland (5.3 million acres), pastureland (6.1 million acres), rangeland (1.4 million acres).

Agricultural land also succumbs to forces other than urban development. Arable land is subject to manmade and natural phenomena such as soil erosion, salinization, and waterlogging that can rob its productivity and eventually force its abandonment. Much of these losses are due to over-exploitation by intensive agricultural practices needed to constantly raise agricultural productivity (yield per acre) in order to provide ever more food for America's and the world's growing populations.

Thus, the potent combination of relentless development and land degradation from overexploitation is reducing America's productive agricultural land base even as the food demands on that same land base from a growing population are increasing. If the rates of agricultural land loss that have prevailed in recent years continue to 2050, the nation will have lost over 55 million of its remaining 375 million acres of cropland, or 15% of it, even as the U.S. population is projected to grow by more than 40% from 283 million to 404 million.¹³

Continuing onto 2100, the discrepancy widens even further. The Census Bureau's medium projection is 571 million, more than a doubling of today's U.S. population. If the same rate of cropland loss were to continue that occurred from 1992-97, then the United States would lose approximately 110 million acres (about 30%) of its remaining 375 million acres of cropland.

Cropland per capita, that is, the acreage of land to grow grains and other crops for each U.S. resident, would decline by two-thirds, from 1.4 acres in 1997 to 0.46 acre in 2100. If this actually occurs, biotechnology will have to truly work magic in raising yields per acre in order to maintain the sort of diet Americans have come to expect – let alone to continue to export any food to the large number of countries that currently depend on American surpluses. Such intensification of agricultural use must also assume no significant increase in the impacts of agriculture to ground and surface water, soil loss, biodiversity, etc.

¹² Norman Myers, et al. 2000. "Biodiversity hotspots for conservation priorities." *Nature*, vol. 403, p. 853. 24 February; R.P.Cincotta, et al. 2000. "Human population in the biodiversity hotspots." *Nature*, vol. 404 p. 990, 27 April. California is one of the world's 25 biodiversity hotspots and one of the most heavily populated ones at that.

¹³ U.S. Census Bureau. 2000. "Annual Projections of the Total Resident Population as of July 1: Middle, Lowest, Highest and Zero International Migration Series, 1999 to 2000." Middle Range Projection.